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INFORMATION FOR CONTRIBUTORS

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GUEST EDITOR'S NOTE

There is a continuous and constantly modernised tradition in Hungarian linguistics to deal with psychological issues. This was true already at the turn of century in the work of classical authors such as Zoltán Gombocz who has presented the classical *Völkerpsychologie* of W. Wundt to the Hungarian linguistic community. In the 1930s scholars like Antal Klemm introduced psychological issues into their syntactic proposals, and the impact of Karl Bühler's *Sprachtheorie* on the work of Gyula Laziczius is well known. This period also extended applied and practically oriented child language research. The continuous efforts of relating the psychology of emotions to language in the work of Iván Fónagy already belong to the present.

The papers collected here written by people both of a linguistic and of a psychological background show the more data oriented features characteristic of present day psycholinguistics and a special emphasis on the importance of knowledge gained from the mental representation and processing of a language so different from the dominant English language materials. Most of the authors are established scholars with a long publication history. Their contribution to this Special Issue is usually part of larger projects. The editor hopes that this small volume will contribute to the Hungarian presence in psycholinguistics on the international scene.

Many people helped in the preparation of this volume. The Guest Editor would like to thank first of all for the opportunity given to him by Ferenc Kiefer, and for the assistance of Juliet Langman, Brian MacWhinney, András Komlósy, Péter Siptár and Judit Szépe.

Budapest, August 16, 1996.

Csaba Pléh

SENTENCE PARSING IN APHASIA: GRAMMATICALITY JUDGEMENTS BY HUNGARIAN BROCA'S APHASICS*

ZOLTÁN BÁNRÉTI

Abstract

This paper deals with the issue that agrammatic Broca's aphasics can correctly judge the grammaticality of certain sentences while they are unable to produce them (not even in a repetition task). This problem has been interpreted in various ways. In this paper I deal with the issue from an unorthodox modularistic viewpoint. The plausibility of an account based on asynchrony between syntactic and lexical processes will be motivated.

I intend to present some samples of data and a hypothesis about syntactic parsing. We tested a total of six Hungarian Broca's aphasics. Subjects were asked to judge whether tape-recorded Hungarian sentences were acceptable or unacceptable. Sentences in the test contained grammatical and ungrammatical versions of word order, case endings, NP-movement, anaphoric binding, agreement of syntactic features, pro-Subject, gapping, VP-anaphora, sentential intertwining, and other phenomena. Subjects were capable of making correct grammaticality judgements with some kinds of Hungarian sentences and not with others. The question is the following: what are the factors facilitating or impeding judgement on certain sentences? The explanation is related to asynchrony between syntactic and lexical processes. The first syntactic processing decisions are based on a limited amount of syntactic information (on bottom-up linguistic evidence, such as triggers: suffixes, case endings). When a verb is encountered, the argument filter is given the verb argument frame from the lexicon. In on-line mode subjects are unable to integrate the output of the syntactic parser with lexical-phonological segments from on-line lexical storage (working memory). My arguments are based on the assumption that the first-pass syntactic parser (because of its impairments) is too slow in processing case ending frames (closed class items) and therefore lexical information in working memory is already gone when needed.

1. Introduction

1.1. The linguistic symptoms of Broca's aphasia can be explained as disturbances and asynchronies in the interactions of processing modules. Some methodological principles need to be assumed, however. According to Linebarger (1990), the basis

* In preparing this paper I benefited from helpful discussions with László Kálmán, Herman Kolk, Csaba Pléh and Zita Réger.

of the method relying on the selective preservation/loss of linguistic capabilities is the observation that the simultaneous loss of skill X and the selective retainment of skill Y indicate that independent underlying mechanisms can be hypothesized for skills X and Y, especially if we have the reverse situation with other patients, who have retained skill X and lost skill Y. This double dissociation is the standard argument for the independence of X and Y (Marin–Saffran–Schwartz 1976; Linebarger–Schwartz–Saffran 1983a; Grodzinsky–Swinney–Zurif 1985; Grodzinsky 1990; Linebarger 1990; Frazier–Flores d’Arcais–Coolen 1993).

1.2. It is an additional assumption of such an analysis relying on selective retainment/loss of linguistic skills that skills X and Y are intuitively of the same complexity and require their inputs to be maintained in memory to a similar degree (Saffran 1985; 1990).

2. The relevant features of Hungarian

2.1. Hungarian is a more or less “free word-order”, agglutinating language (Kiefer–É. Kiss 1994). Unlike in true free word-order languages, in Hungarian the order of words **within** phrases is quite fixed, so it would be more proper to call it **free phrase-order** language. The order of major constituents is independent of their syntactic functions and is subject to great variation in Hungarian sentences.

2.2. Syntactic functions and/or thematic roles, rather than being encoded in terms of linear order, are expressed by morphological devices, primarily by attaching **case suffixes to NPs**. According to Kálmán (1985), the possible subcategorization by verbs involves at least 17 cases expressed by 38 morpho-phonological variants of surface case ending forms in the nominal paradigm.

The plural *-k* and the singular zero indicate the number of nouns.

There are twelve possessive suffixes indicating the person and number of the possessor as well as the number of the possessed element (Kornai 1992).

Suffixes of a **finite verb** express the number and person of the subject and, with some dependence on context, make it possible to determine the person of direct object as well. Another set of suffixes of finite verbs indicates tense and mood.

The suffixes of finite verbs must be in agreement with suffixes of subject NPs and object NPs in person, number and definiteness, according to agreement rules between the verbal and nominal paradigms.

2.3. Kornai (1992), in connection with statistical machine translation, states that—because of the free phrase-order of Hungarian—“a simple transitive sentence has at least 6, and a simple ditransitive at least 24 grammatically valid permutations which will all be translated with the same English sentence, a conservative estimate would be that we need at least 10 times as many English/Hungarian pairs for a representative sample as we would for English/French” (255).

2.4. Hungarian has two major types of stress patterns associated to sentence patterns. There are distinct stress patterns for neutral and focused sentences. In neutral sentences each major syntactic constituent bears an identical stress. Sentences of this kind exhibit slight SVO features within the free phrase-order frame (Bánréti 1994).

As for focused sentences, the syntactic position of an XP constituent is determined by an interplay of its discourse function (given, new, contrasted, etc.) describable with terms like Topic and Focus, and its logical scope (quantifier, operator, predicate) (É. Kiss 1994). The rightmost heavy stress-bearing constituent in focused sentences is either the Verb or the XP immediately preceding it (in which case the XP is interpreted as being focused). The focused sentence type is used only in special, non-zero contexts to convey information whose acceptance is supposed to contradict some expectation of the listener. Neutral sentences do not imply such corrections (Kálmán 1985).

3. Syntactic processing in a repetition test

3.1. In what follows I will assume that the **parser** is a device which transfers information between grammar and message level representation. (The “what-is-to-be-said” is represented at the message level.) In the sense of Kolk (1995), although recursive syntax is capable of producing a structure of any given complexity, there is no continuous overload, leading to a flow of speech errors, because the sentence production system is adapted to its limited capacity. Complex utterance structures at message level representation are “**fine-tuned**” to the recursive syntax (Kolk 1995, 293). This is one of the main tasks of the parser. The fine-tuning is related to **the size of the temporal window** available for syntactic computation and syntactico-lexical integration (during a given time period). According to Kolk (1995), aphasics suffer from a **reduction** in the size of the temporal window (delivered by the parser), the fine-tuning between syntax and message level representation is disturbed. This leads to capacity overload and **desynchronization** in the integration of grammatical formatives (case endings) with lexical material (content words).

Fragmented, “telegraphic” speech is adaptive reaction from the aphasic speakers to the capacity overload.

3.2. Broca’s aphasia shows several, selectively retained syntactic skills. The impairment of access to grammatical morphology (if injuries are less severe) is mainly manifested in fragmented speech; however, the function of syntactic self-correction is present. The patient therefore has maintained his/her intuitions concerning grammaticality in some way.

The spontaneous speech of one of our patients showed fragmentation, agrammaticality and syntactic self-monitoring. The patient was 37 years of age, right handed, a car mechanic, suffering from a stroke which resulted in extended fronto-parietal hypodensity of the left hemisphere.

3.3. In the course of a **sentence repetition test** the patient gave answers that were suggestive of initial structure building operations of the syntactic parser. The main argument for this is the fact that, for our patient, the **performance** of the parser can be **assessed** and **predicted**. We will demonstrate this below.

3.4. With respect to stress patterns, each target sentence was neutral in the test. Hungarian is an inflectional language where the verb assigns case to noun phrases by means of case endings that mark theta roles in surface structure.

We can outline the **performance of our patient’s parser** as follows. In comparison with the target sentence, it is possible for the parser:

- (a) to approximate the class of the target predicate; its case frame is retrievable;
- (b) if a different predicate is retrieved, then the suffixes are those appropriate to the case frame of the “original” predicate;
- (c) if the predicate is missing, the parser stops; for instance, it cannot list only the NP’s from the target sentence;
- (d) filling one slot from the argument frame of the predicate with selectional restrictions that are the same as (or very much like) the original;
- (e) knowledge about missing, lexically or phonologically null arguments is manifest in further search attempts that either mention case endings without a content word, or link them to pronouns or neologisms, in repetition of case endings, or in compensatory speech.

Some samples from a sentence repetition test follow (**E** stands for the examiner who utters the sentence to be repeated. **P** stands for the patient’s replies. The test was in Hungarian, the glosses below contain the relevant details only):

- (1) **E:** Péter beszélgetett Marival.
Peter-nom talk-3sg/past Mary-with
'Peter talked to Mary'
- P:** Péterrel beszél ..inná..... -val.
Peter-with talk-3sg/present nonsense-word -with
- (2) **E:** Marival találkozott János.
Mary-with meet-3sg/past John-nom
'John met Mary'
- P:** Marival..... beszélgetett volna vele.
Mary-with talk-3sg/past would have her-with
- Ő beszélgetett vele..Marival.
He talk-3sg/past her-with Mary-with
- (3) **E:** Mari megcsinálta az ágyat és lefeküdt.
Mary-nom make-3sg/past/def the bed-acc and (she) go-3sg/past to bed.
- P:** Mara..... Mara..... Mara..... mmmmmm
Mara-nom Mara-nom Mara-nom
- (4) **E:** Sándor küldött egy képeslapot Marinak.
Alex send-3.sg/past a postcard-acc Mary-dat
'Alex sent Mary a postcard'
- P:** Sándor jött és akkor írta ... és azt
Alex come-3sg/past and then write-3sg/past/def and that-acc
- akkor ment hozta.... a.. mi az a..... mit?
then go-3sg/past bring-3sg/past/def the what is that what-acc
- E:** Képeslap!
Postcard-nom!
- P:** Épetlapot, képeslapot édeslapot.
Nonsense word-acc nonsense word-acc sweetcard-acc

E: Mit csinált vele?
What did he do with it?

P: Képeslapot adott a kis gyereknek adott oda és
Postcard-acc give-3sg/past the little child-dat give-3sg/past to and
'He gave a postcard to the little child...gave to and'

...és akkor ment haza.
...and then go-3sg/past home
'and then he went home'

3.5. Analysis of the repetition test

A detailed analysis of the test results suggests that matters are more complex than what we outlined above in 3.4.

Our patient was pursuing the following strategy. In the utterances in (4), the patient was attempting to repeat the Hungarian equivalent of *Alex sent Mary a postcard*. He made several false starts: notably, they were semantically related to the intended message. First, he tried the Hungarian equivalent of the verb *came* (semantically a motion verb, like *sent*, but intransitive). Next he tried the Hungarian equivalent of the verb *write-3sg/past/def* (with 3rd person suffix referring to direct object as well), correctly transitive but more closely related semantically to *postcard* than to *sent*). However he was not able to retrieve *postcard* itself. He mentioned the accusative case-ending (-t) of *postcard* **without** the content word (*postcard*), and linked the accusative case ending to pronouns (*az-t*: 'that-acc', *mi-t*: 'what-acc'). Next he tried the Hungarian equivalent of *went* (which is again, incorrectly, intransitive). Next he came up with the Hungarian equivalent of *bring-3sg/past/def* (with 3rd person suffix referring to direct object) which is both syntactically and semantically close to *sent*. But by that time he was completely unable to retrieve what the object was supposed to be. Next he heard the original noun marked for nominative with a zero suffix (the Hungarian equivalent of *postcard-nom*) and he returned a nonsense word marked with an **accusative case ending**! Next he heard a Hungarian pronoun marked with **instrumental case ending** (*What did he do with-it?*) and again he returned an **accusative case ending** but by that time he was able to repeat the original content word (*postcard-acc*) linking accusative case ending to this content word.

3.6. Hungarian has a very rich inflectional system for nouns. It is remarkable that the patient did not make **purely** inflectional errors in the repetition task. If he

approximated the class of the target verb, then its surface case frame was retrievable. The patient's responses exhibit the features of **temporal asynchrony** between accessing case endings and content NPs. Utterances in (4) show that the **surface case ending of a noun** was mentioned earlier than the noun itself (with that case ending). See in (4) for instance **the temporal relation** between the Hungarian **accusative case ending** and the Hungarian equivalent of *postcard*, and the temporal relation between the Hungarian **dative case ending** and the Hungarian equivalent of *Mary/little child*, nouns in the dative in the patient's responses.

Temporal asynchrony between accessing case endings and content NPs is shown in example (1) as well (*Péter beszélgetett Marival*. Peter-nom talk-3sg/past Mary-with 'Peter talked to Mary'). The examiner produced an utterance in which the **first NP** was marked for **nominative** with a zero suffix (*Péter*) and the **second NP** was marked with **instrumental case ending** (*Mari+val*, Mary-with) in sentence-final position. The patient produced an utterance in which the **first NP** was marked with **instrumental case ending** (*Péter-rel*, Peter-with) and the final NP was not mentioned at all. That is to say, the patient attached the case ending of the **final NP** to the **first NP**. He retrieved a case ending which was heard **later** and attached it to an NP which was heard **earlier**.

In example (2) (*Marival találkozott János*. Mary-with meet-3sg/past John-nom 'John met Mary'), the target sentence contained a sentence-initial NP marked with instrumental case ending (*Mari-val*, Mary-with) and a final NP marked for nominative with a zero suffix (*János*, John-nom). In his first attempt, the patient repeated the sentence-initial NP marked with instrumental case (*Mari-val*). He was unable to retrieve the sentence-final NP marked for nominative case with a zero suffix (*János*, John-nom) rather he produced a **grammatical pronoun** marked with instrumental case, i.e., he attached the instrumental case ending that has been retrieved to the pronoun (*vel-e*, with-her). In his second attempt, the patient was able to retrieve the **first case ending** without the content NP: he produced a grammatical pronoun marked for **nominative** case with a zero suffix (*Ő*, He-nom), then produced a grammatical pronoun marked with **instrumental** case ending (*vel-e*, with-her) and finally, after a pause, he repeated the content NP marked with instrumental case ending (*Mari-val*, Mary-with). To sum up: by the end of the second attempt, the patient produced the **complete** surface case ending frame of the target verb (NP-nominative, NP-instrumental), he tried to attach case endings to NPs, during this process he used grammatical pronouns (marked for nominative and instrumental case as well). He was able to attach a case ending which was heard **earlier** to an NP which was heard **earlier**. He was able to retrieve a case ending which was heard **later** and was unable to attach it to an NP which was heard **later**.

In our on-line repetition test the parsing mechanism could not proceed unless a verb was produced. This is shown in example (3). The target utterance contained two conjoined verbs with their different case frames. The patient was not able to retrieve either of the verbs and was even unable to “list” only the nouns with correct case-endings. He also failed to use any inflections (see example (3)). But he never made both inflectional errors and errors in the choice of the main verb in the **same** sentence. This is compatible with the assumption that the patient has to trade processing of surface form against lexical access. (Inflection is part of the surface parser module but I do not claim that this (sub)module would not be impaired.)

3.7. We have seen that our patient’s repetitive performance is agrammatical. Thus it may seem strange that such a patient can correctly assess the grammaticality of some sentences. Furthermore, he can assess sentences he cannot produce correctly either in spontaneous speech or in repetitive tests. For instance, he can correctly assess grammatical and ungrammatical instances of accusative or dative use, while the use of these cases is impaired in his speech.

4. Grammaticality judgements

Grammaticality judgement tests provide an important heuristic device for the interpretation of the grammar–parser relation in aphasia. In what follows, I summarise a few of the most interesting approaches.

4.1. The mapping hypothesis

Linebarger’s investigations involve aphasics’ impairments in using syntactic processes to constrain thematic role assignments. Agrammatic aphasics are capable of retrieving the syntactic structure of heard sentences and are able to judge some of them correctly. The distribution of grammaticality judgements into easy-to-judge and hard-to-judge tasks shows preserved sensitivity to structural features of sentences that are necessary to the recovery of phrase structure and insensitivity to semantic properties, including lexical information about predicate/argument structure, and impairments in the mechanism of thematic role assignment. The pattern of grammaticality judgements suggests that later interpretative processes are affected more seriously than earlier mechanisms. She stated that “The poor performance of these subjects on the difficult conditions, as well as their asyntactic comprehension, reflects, on this view, a failure to exploit an initial structural analysis for further processing” (Linebarger 1990, 105). “The assessment of grammaticality in the difficult conditions requires maintenance of a record of the lexical input to a degree that

taxes the impaired capacities of both agrammatic and conduction aphasic subjects. In contrast, assessment of grammaticality in the easy conditions turns on dependencies that are computed during first-pass parse and that are protected from this STM (short-term memory) limitation: Either the first-pass parse occurs early enough that antecedent elements of the dependencies are still available, or the antecedent elements are somehow carried along as alterations of the internal state of the parser" (113).

"The mapping hypothesis takes the agrammatic data as evidence for the modularity of syntactic processing, because of the disparity between subjects' ability to parse certain structures and their impaired interpretation of these same structures" (Linebarger 1995, 53).

Under the mapping hypothesis, "theta assignment even for unmoved arguments is claimed to be a locus of vulnerability in agrammatics, since it involves linking elements in the two structures, the S-structure and theta grid" (82).

4.2. The competition model

"According to the Competition Model, listeners should attend more closely and react more quickly to sentence elements that are high in cue validity, i.e., cues that carry the most reliable information about aspects of sentence meaning" (Wulfeck–Bates–Capasso 1991, 333). This study extended the Competition Model to grammaticality judgement tasks by performing grammaticality judgement tests in an on-line fashion with English speaking and Italian Broca's aphasics. For Italian aphasics easy-to-judge tasks contained agreement errors while for English speaking aphasics easy-to-judge tasks contained ordering errors. They stated that "Subjects retain language-specific profiles of cue utilization... Broca's aphasics also display language-specific profiles in their on-line judgements of grammaticality" (333). "...language-specific knowledge is largely preserved in Broca's aphasia requiring an account of language breakdown based on deficits in the processes by which this preserved knowledge (i.e., competence) is accessed and deployed (i.e., performance)" (335). Wulfeck–Bates–Capasso (1991) mention Hungarian data as well.

MacWhinney–Osman–Sági–Slobin (1991) examined the use of accusative case marking in sentence interpretation by aphasic speakers of Hungarian and Turkish. "For normal subjects the findings replicated the results of MacWhinney, Pléh & Bates (1985)" (248). "In accord with the claims of the Competition Model (MacWhinney–Bates eds. 1989) cues that are the strongest in the language tend to be the best preserved" (248). The case marking cue was more damaged with the Hungarian Broca's and Wernicke's group than the word order cue in English subjects. However, "Despite its high reliability and availability, the use of the case cue in Hungarian and Turkish aphasics declined to a level that was close to the level of

use for the much less reliable word order cues” (248). When case marking was not retrievable, Hungarian subjects had a clear SVO interpretation for NVN sentences and VOS interpretation (where the first noun was inanimate) for VNN sentences.

4.3. Disruptions of referential dependencies

Maurer–Fromkin–Cornell (1993) assumed that the parser, “within limits of memory and processing resources, is **correct with respect to the grammar**” (358). They suggest that the syntax of referential dependency is disrupted in Broca’s aphasia. Agrammatic aphasics are capable of building syntactic chains, but are incapable of coindexing the members of the chain (anaphors and traces that are referentially dependent on their antecedents). The patients lack the Coindexation Condition (if an element is R-dependent on another, then the two must share the same R-index). According to their Double Dependency Hypothesis, “1) the deficit underlying asyntactic comprehension affects the processing of syntactic R-dependencies, and 2) when there is only one such dependency the resulting syntactic representation, although abnormal, is not ambiguous, but when there are two such dependencies the resulting representation is semantically ambiguous” (Maurer–Fromkin–Cornell 1993, 357). In this approach the impaired parser cannot follow the principles of grammar correctly. However, Maurer *et al.* emphasized that it was unclear “whether this was due to a fundamental loss of grammatical competence in the asyntactic comprehender or to a deficit to processing according to which knowledge is still present, but cannot be used in these tasks” (366).

4.4. The referential representation hypothesis

Frazier–McNamara (1995) criticizes the R-Dependence Hypothesis. Performing grammaticality judgement tests they found that aphasic deficit affects referential and non-referential (“government”) chains as well, and that a consistent subject-object asymmetry predicted by R-Dependence Hypothesis failed to emerge in the judgements. They claim that the R-Dependence Hypothesis does not explain subjects’ difficulties with computational vocabulary. (The computational vocabulary consists of predicates, case endings, prepositions, operators like *wh*-expressions, variables like traces, conjunctions, etc.) Frazier and McNamara propose what they call the Referential Representation Hypothesis: “agrammatics sacrifice the computational representation when the processing demands of the sentence exceed available processing capacity” (Frazier–McNamara 1995, 237). They claim that “the representation of the referential/descriptive content of a phrase **supplants** its computational description at points where processing demands threaten to exceed processing capacity” (237). As an explanation, they assume that listeners are orientated to the content of sentences, not to their form.

Linebarger (1995) contrasts different accounts of agrammatism. She claims that chain disruption hypotheses (Grodzinsky's Trace Deletion Hypothesis, the Double Dependence Hypothesis, and others) and trade-off hypotheses have some empirical and conceptual shortcomings. For instance, chain disruption accounts "attribute to agrammatics an unimpaired ability to infer correct interpretation from impoverished syntactic representations in certain cases (subject gaps, simple actives)... but cannot explain why the same kinds of interpretative inferencing cannot be employed in other cases (passives, S-S relatives)" (75).

Linebarger claims that trade-off hypotheses cannot offer an explanation regarding the dissociation between grammaticality judgements and comprehension or the **pattern** of performance within a grammaticality judgement test itself (e.g., differences between easy-to-judge and hard-to-judge tasks).

She argues for the mapping hypothesis, that is, the view that aphasic subjects are able to compute syntactic structure but unable to exploit it in further interpretive processes.

4.5. Impairments on the operational memory

Kolk (1995) claims that grammaticality judgement tasks are easier than comprehension tasks. The latter requires longer availability of the syntactic information in memory than grammaticality judgements. Because of requirements of longer availability in memory, comprehension is more easily disrupted by fast syntactic decay or slow syntactic activation. Kolk states that syntactic nodes, needed to construct a syntactic tree, take some time to reach their "memory time phase", that is, to become available to interact with other nodes. Furthermore, this memory time is limited; if it is exceeded, elements disappear from memory. A particular syntactic category, say a VP, can be retrieved only if all immediate daughter categories (e.g., V, NP, PP) are available. The activity of one element is required for the activation of another element. For instance, information about the subject of the sentence must be active in order for the right form of the verb to become activated. Between these two types of information, there must therefore be computational simultaneity or synchrony" (Kolk 1995, 284).

Haarmann-Kolk (1994) stated that "Broca's aphasics may show either slow syntactic activation or fast syntactic decay but not both at the same time... normal activation goes at the expense of fast decay and, vice versa, normal decay goes at the expense of slow activation" (513).

The slowing down of syntactic processes affects not only the computation of structure but also the selection of the proper function words or inflectional endings. A syntactic slow down leads to desynchronization in syntactic processes and in integrating categorized syntactic slots with lexical material.

4.6. The role of the on-line modality

Modality of sentence presentation affects subjects' performance in grammaticality judgements. For instance, according to Romani (1994), with grammaticality judgements her patient's performance was poor in **on-line** auditory tests but good in written (off-line) tests. However, if sentences were presented on a computer screen one word at a time, performance deteriorated to the same level as performance in auditory tests.

5. Grammaticality judgements by Hungarian aphasics

5.1. As far as I can tell, wide-ranging grammaticality judgement tests have not been made for Hungarian speaking Broca's aphasics. In our test we intend to cover some relevant features of Hungarian. Judgement tasks involved a lot of syntactic rules, relations between syntax and lexicon and accessibility of lexical information as well. The tests involved the following specific fields:

- attachment of surface case endings to NPs (according to Verb),
- agreement of inflectional suffixes of Verb with subject and object NPs in person, number and definiteness,
- variants of phrase-order compared to the surface position of the Verb,
- contextual relations of focused sentences,
- referential dependencies between moved NP and its trace, referentially free NP and anaphora,
- effects of referential dependencies on agreement of surface case endings and person/number suffixes,
- V-anaphora, VP anaphora, and gapping,
- agreement in lexical features,
- selectional restrictions.

We tested a total of six Hungarian Broca's aphasics (including the patient characterized above in the repetition test). Subjects were asked to judge whether tape-recorded Hungarian sentences were acceptable or unacceptable. Sentences in the test contained grammatical and ungrammatical versions of word order, case endings, NP-movement, anaphoric binding, agreement of syntactic features, pro-Subject, gapping, VP-anaphora, sentential intertwining, and other phenomena. Subjects were capable of making correct grammaticality judgements with some kinds of Hungarian sentences and not with others. The question is the following: What are the factors facilitating or impeding judgement on certain sentences?

5.2. The patients were recruited from the National Institute for Rehabilitation in Budapest and the Neurology and Psychiatry Clinic of the Szent-Györgyi University in Szeged. All subjects had had a cerebral vascular accident (CVA) in the left hemisphere. Patients with different lesions were grouped together as Broca's aphasics because their profile on the clinical battery placed them in the 'agrammatic syndrome' category. They were diagnosed as Broca's aphasics on the basis of performance profiles on the Western Aphasia Battery (WAB) (Kertesz 1982) and in further clinical evaluations by speech-language pathologists and neurologists.

Subjects:

Age: 47, sex: female, lesion site: left fronto-temporal.

Age: 37, sex: male, lesion site: left fronto-parietal.

Age: 59, sex: male, lesion site: left insula and middle temporal gyrus.

Age: 54, sex: male, lesion site: left middle cerebral artery distribution.

Age: 47, sex: male, lesion site: left fronto-temporal.

Age: 52, sex: male, lesion site: left insula with extension into the left parietal region.

All subjects were right-handed.

5.3. We asked the patients to judge whether some sentences were acceptable or unacceptable. For instance, *A gyerek látja őt* (The child sees him-acc) is a good sentence, whereas **A gyerek látja én* (*The child sees I-nom) is not. Acceptable: *A mama berakta a ruhát a szekrénybe* (Mother put the clothes into the wardrobe). Unacceptable: **A szín berakta a fázást a lisztbe* (*The colour put cold into the flour). The first pair of sentences above involves formal rules of syntactic case and number agreement, and the second pair involves selectional restrictions imposed by the verb on its arguments.

The test was presented in the auditory modality, using tape-recorded sentences. The patients were required to give a quick response "as s/he feels", and no explanation was required. The instruction was: "please tell me whether this sentence is correct or incorrect".

As for stress patterns, each sentence in the test was neutral (in the sense of 2.4.), except for the tasks of **Sentential Intertwining** and **Unfocussable Sentence Adverbial in Focus**. These two types of tasks involved stress patterns of focused sentences.

Each test contained 14 acceptable and 14 unacceptable sentences (28 sentences in all). Acceptable and unacceptable items all figured **in minimal pairs** in the test. Each minimal pair stood for a particular syntactic constructional category. The judgements showed whether the patients were able to sense the opposition between members of minimal pairs. Since a grammaticality judgement on one member of a

minimal pair entails judgement of the other member, therefore members of minimal pairs were placed at a distance from each other, separated by members of other minimal pairs. (E.g. the unacceptable counterpart of the first sentence was seventh on the list.) Members of a minimal pair were thus separated by intervening items. The average number of items intervening between minimal pairs was 6, the maximum was 8, the minimum was 4. Every patient was given the test five times.

Table 1
Patients' responses for grammatical sentences

TASK	JUDGEMENT	
	Correct	Wrong
AGREEMENT BETWEEN A RELATIVE PRONOUN AND ITS HEAD	28	2
AGREEMENT OF RECIPROCAL ANAPHORA	30	0
ALL 3 ARGUMENTS PRECEDE THE VERB	30	0
ANAPHORIC AGREEMENT IN PERSON AND NUMBER	30	0
ANAPHORA + CASE HIERARCHY	11	19
ARGUMENT + CASE ENDING	30	0
ASPECT	18	12
GAPPING	11	19
pro-SUBJECT	16	14
SELECTIONAL RESTRICTIONS	23	7
SENTENTIAL INTERTWINING	13	17
UNFOCUSSABLE SENTENCE- ADVERBIAL IN FOCUS	30	0
V-ANAPHORA	30	0
VP-ANAPHORA	20	10

Sentence patterns were filled with different (though equally frequent) words in each test but we did not change the sentence structures themselves. At the end we had $6 \times 5 = 30$ sets of grammaticality judgements made by the patients. Hesitations were disregarded.

5.4. Results

Table 1 and Table 2 show the distribution of judgements according to particular syntactic constructional categories.

Table 2
Patients' responses for ungrammatical sentences

TASK	JUDGEMENT	
	Correct	Wrong
AGREEMENT BETWEEN A RELATIVE PRONOUN AND ITS HEAD	18	12
AGREEMENT OF RECIPROCAL ANAPHORA	3	27
ALL 3 ARGUMENTS PRECEDE THE VERB	2	28
ANAPHORIC AGREEMENT in PERSON and NUMBER	30	0
ANAPHORA + CASE HIERARCHY	14	16
ARGUMENT + CASE ENDING	30	0
ASPECT	14	16
GAPPING	15	15
pro-SUBJECT	17	13
SELECTIONAL RESTRICTIONS	12	18
SENTENTIAL INTERTWINING	9	21
UNFOCUSSABLE SENTENCE- ADVERBIAL IN FOCUS	2	28
V-ANAPHORA	30	0
VP-ANAPHORA	14	16

Table 3 in the Appendix shows the statistical description of data using BMDP statistical software. Table 3 presents the mean of correct/wrong judgements for the six patients and for each sentence-type and presents the standard deviation of correct/wrong judgements for the six patients and for each sentence-type.

According to an analysis of variance for correct judgements: (i) effect of the sentence-type for correct judgements was significant ($F(13, 65) = 48.93, p < 0.05$), (ii) effect of grammaticality for correct judgements was significant ($F(1, 5) = 90.57, p < 0.05$) and (iii) effect of the interaction of sentence type and grammaticality was significant for correct judgements ($F(13, 65) = 47.42, p < 0.05$).

5.5. The results of the five tests have been evaluated in the following way. Those sentences whose acceptable variants were always judged as good and whose unacceptable variants were always judged as bad by the patient were considered as easy tasks from the point of view of grammaticality judgements. Tasks where the patient did not judge correctly (acceptable sentences were termed as bad, and unacceptable sentences were termed as good) were considered as difficult tasks from the point of view of grammaticality judgements. Only those tasks were classified as easy tasks where every patient gave correct judgements in every test. Hesitations were disregarded.

Discussion

The fact that Broca's aphasics are capable of making correct grammaticality judgements with some Hungarian sentences and not with others is a problem that deserves further study. The question is the following: What are the factors facilitating or impeding judgement on certain sentences? Let us suppose that grammaticality judgements require some kind of (implicit) analysis of these data. Let us examine what kind of information has to be used with easy tasks and what kind of information should be used with hard tasks.

6. Empirical division of the test-material into easy and hard tasks: the first analysis of relevant factors of judgements

6.1. Easy tasks

Easy tasks require the use of the following kinds of information.

6.1.1. The categorizational selections of the verb and the case ending frame of the verb have to be retrievable.

Control of case ending assignment to main syntactic constituents should be possible. The parser has to be capable of checking whether every case ending required by the verb has been assigned, and whether every argument has received a case ending (the tasks of **Argument+case ending**).

Examples from the sentence material (the glosses below contain relevant details only):

ARGUMENT + CASE ENDING

Judgements of case endings assigned by the Verb to NPs, agreement in person, number and definiteness between Verb and NPs

- (5) (a) A gyerek ül a széken.
 the child-nom sit-3sg the chair-on
 'The child sits on the chair'
- (b) * A gyerek ül a szék.
 the child-nom sit-3sg the chair-nom
- (6) (a) Mari szeret úszni.
 Mary-nom like-3sg/present swim-inf
 'Mary likes to swim'
- (b) * Mari szeret úszik.
 Mary-nom like-3sg/present swim-3sg/present
- (7) (a) Erzszi bízik az orvosban.
 Liz-nom trust-3sg/present the doctor-in
 'Liz trusts the doctor'
- (b) * Erzszi bízunk az orvos.
 Liz-nom trust-1pl/present the doctor-nom
- (8) (a) Róbert nézi a könyvet.
 Robert-nom look-3.sg/present/def the book-acc
 'Robert looks at the book'
- (b) * Róbert nézi téged.
 Robert-nom look-3sg/present/def you-2sg/acc

- (9) (a) A papá-nak kölcsönadott a fiú egy könyv-et
 the father-dat lend-3sg/past the boy-nom a book-acc
 'The boy lent a book to the father'
- (b) * A papá-ra kölcsönadott a fiú egy könyv-et.
 the father-on lend-3sg/past the boy-nom a book-acc

6.1.2. The parser has to be capable of sequentially checking grammatical agreement (person and number) of syntactic constituents and that of the suffixes expressing person and number. (Tasks related to **subject and object agreement in person, number and definiteness, antecedent-reciprocal agreement in person and number.**) See tasks Argument + case ending (above) and tasks **Anaphoric agreement in person and number** below:

ANAPHORIC AGREEMENT IN PERSON AND NUMBER

Judgements of agreement in person and number between anaphora (*himself*-type) and its antecedent (content NP):

- (10) (a) A gyerek látta magát a tükörben.
 the child-nom see-3sg/past/def him+self-3sg/acc the mirror-in
 'The child saw himself in the mirror'
- (b) * A gyerek látta magadat a tükörben.
 the child-nom see-3sg/past/def you+self-2sg/acc the mirror-in

6.1.3. The parser has to be able to take the verb of the sentence as the starting point of dependencies to be analysed. (For instance: tasks of one argument **V-anaphora**):

V-ANAPHORA (copying only bare V)

- (11) (a) János magas volt és Mari is.
 John tall was and Mary too
 'John was tall and Mary too'
- (b) * János magas volt és ezt csinálta Mari is.
 John tall was and this-acc did Mary too
 * 'John was tall and so did Mary'

6.2. Hard tasks

Hard tasks require different kinds of grammatical information for judgements.

6.2.1. The structure of the entire sentence has to be stored in memory, and in the stored structure it is necessary to retrieve and compare lexical material filling two distinct syntactic positions. This is necessary for the following reasons: (i) one has to determine whether it is possible to repeat a constituent that has occurred earlier (**pro-Subject, Sentential intertwining**); (ii) or it is necessary for judging the grammaticality of backward reference to some constituent as antecedent in a coordinating clause (**VP anaphora**); (iii) or for judging with verbs that can be deleted when repeated, whether the syntactic environment of the explicit occurrence of the verb is in contrast with the syntactic environment of the deleted form of the verb (**Gapping**). Thus contrast is impossible if a noun phrase from the first clause is repeated in the second clause, and this NP is adjacent to the position containing the gap (see the sentence with an * with the gapping task).

Examples from the sentence material; glosses below contain relevant details only:

pro-SUBJECT

(*pro* in the position of repeated Subject. Judgements of overt lexical material in the syntactic position of the repeated Subject)

- (12) (a) Anyukám azt gondolta, hogy megkapta az állást.
 'My mother_i thought that [pro]_i had got the job.'
- (b) * Anyukám azt gondolta, hogy Anyukám megkapta az állást.
 *'My mother_i thought that my mother_i had got the job.'

SENTENTIAL INTERTWINING

(Judgements of lexical material in the syntactic position of an NP, moved from the subordinate clause into the main clause. Capitals and " stand for heavy stress-bearing Focus position)

- (13) (a) Mari a "KÖNYVET mondta, hogy megveszi Jánosnak.
 Mary the book-acc said that (she) buys John-dat
 'As for Mary, it was the book_i that she said she would buy (it)_i for John'

- (b) *Mari a "KÖNYVET mondta hogy a kabátot megveszi Jánosnak.
 Mary the book-acc said that the coat-acc (she) buys John-dat
 * 'As for Mary, it was the book that she said she would buy the coat for John'

VP ANAPHORA

(Judgements of choice between structures like *so did Liz* and *so was Liz*.)

- (14) (a) Péter festette a kaput és ezt csinálta Erzsébet is.
 Peter painted the gate-acc and this-acc did Liz too
 'Peter painted the gate and so did Liz'
- (b) *Péter festette a kaput és ilyen volt Erzsébet is.
 Peter painted the gate-acc and such was Liz too

GAPPING

- (15) (a) János látott egy kutyát és Péter egy macskát.
 John saw a dog-acc and Peter a cat-acc
 'John saw a dog and Peter a cat'
- (b) *János látott egy kutyát és Péter egy kutyát.
 John saw a dog-acc and Peter a dog-acc

6.2.2. One has to assess the compatibility of lexico-semantic features of two items that occupy distinct syntactic positions. The problem arises with the occurrence of the second lexical unit, and in order to judge compatibility, the lexical insertion into a preceding syntactic position has to be recalled (features of **Relative pronoun and its head**, compatibility of **Aspect** and **time adverbial** in the sentence, compatibility of **Selectional restrictions** assigned by the verb and features of NPs in argument position, interpretation of **Unfocussable sentence adverbial in focus position**). These tasks require the comparison of features like +alive/–alive, concrete/abstract, progressive/perfective, instrument/object/agent etc.

Examples from the sentence material (glosses contain relevant details only):

AGREEMENT BETWEEN A RELATIVE PRONOUN AND ITS HEAD

(Judgements of *the pot that* versus * *the pot who*)

- (16) (a) Erzsi letette az edényt, amely nehéz volt.
Liz down put the pot-acc that heavy was
'Liz put down the pot that was heavy'
- (b) * Erzsi letette az edényt, aki nehéz volt.
Liz down put the pot-acc who heavy was

ASPECT

(Judgements of the compatibility of (progressive or perfective) aspect of the verb and the time adverbial)

- (17) (a) Két napon át készítette az ebédet.
for two days (she) was making the dinner-acc
'She was making dinner for two days'
- (b) * Két napon át elkészítette az ebédet.
for two days (she) has made (= 'completed making') the dinner-acc

SELECTIONAL RESTRICTIONS

(Judgements of the compatibility of thematic roles, selectional restrictions and lexical features of NPs in argument positions)

- (18) (a) A mama elküldte a gyereket a boltba.
the mother sent the child-acc the shop-in
'The mother sent the child in the shop'
- (b) * A mama elküldte az érzést a filozófiába.
the mother sent the feeling-acc the philosophy-in

UNFOCUSSABLE SENTENCE ADVERBIAL IN FOCUS

(Presumably-/perhaps-type of unfocussable adverbials in the position dominated by the 'S' node and in the Focus position—receiving heavy stress and immediately preceding the Verb; capitals and " stand for the Focus position.)

- (19) (a) János talán elkésett.
'John perhaps came late'

- (b) * János "TALÁN késett el.
John PERHAPS came late
'It is PERHAPS that John came late'

6.2.3. One of the conditions of an appropriate grammaticality judgement is the comparison of an internal/final position of sentence structure (stored in memory) with the first position, which has to be accessed again. This requires reanalysis of sentence structure (following lexical insertion), in such a way that a stepwise check of case endings and agreement markers on **adjacent** constituents does not yield correct grammaticality judgements. (For case agreement: **Anaphora and case hierarchy**, for number agreement: **Agreement of reciprocal anaphora**.)

Examples from the sentence material; glosses contain relevant details only:

ANAPHORA + CASE HIERARCHY

(Judgements of case assignment to anaphora and antecedent. For instance: NP+*nom* and *himself-acc* is grammatical but the reverse is not.)

- (20) (a) A vezető látta önmagát a tükörben.
the driver-nom see-3sg/past/def himself-acc the mirror-in
'The driver saw himself in the mirror'
- (b) * Önmaga látta a vezetőt a tükörben.
Himself-nom see-3sg/past/def the driver-acc the mirror-in

AGREEMENT OF RECIPROCAL ANAPHORA

(Judgements of the dependency between reciprocal (*each other* type) and antecedent NP with or without coordinating structure. The NP and the reciprocal are not adjacent.)

- (21) (a) A férfi meg a nő beszélgetett egymással.
the man-nom and the woman-nom talk-3sg/past each other-with
'The man and the woman talked to each other'
- (b) * A nő beszélgetett egymással.
the woman-nom talk-3sg/past each other-with

6.2.4. The correctness of case assignment to NPs has to be assessed without any knowledge of the V that assigns case; or, once the V becomes known the entire chain has to be recalled and case/number/person agreement verified: **All three arguments precede the verb.**

Examples from the sentence material; glosses contain relevant details only:

ALL THREE ARGUMENTS PRECEDE THE VERB

(Judgements of case endings and agreement of person and number suffixes between NPs and Verb. All three NPs precede the Verb)

- (22) (a) A gyereket a boltba a mama elküldte.
 the child-acc the shop-to the mother-nom send-3sg/past
 'The mother sent the child to the shop'
- (b) * A gyerek a boltba a mama elküldte.
 the child-nom the shop-to the mother-nom send-3sg/past
- (23) (a) A papá-nak a fiú egy könyv-et kölcsönadott.
 the father-dat the boy-nom a book-acc lend-3sg/past
 'The boy lent a book to the father'
- (b) * A papá-ra a fiú egy könyv-et kölcsönadott.
 the father-on the boy-nom a book-acc lend-3sg/past

7. Alternative possibilities for the interpretation of data

7.1. At first sight it appears that some of the hard tasks can be explained in terms of **length**. The sentences of some hard tasks are longer than the sentences of some easy tasks. However, this is not invariably so. This is because there were some really short hard tasks: **Aspect, Unfocussable sentence adverbial in focus, Anaphora + case hierarchy, Selectional restrictions, Agreement of reciprocal anaphora.**

7.2. Another explanation that can be ruled out is that hard tasks contain **long distance** referential dependencies between non-adjacent elements in the sentence, whereas easy tasks involve no such interval. In several of the hard tasks, however, the two referentially dependent critical elements are immediately adjacent (**Agreement between a relative pronoun and its head, Aspect**) and some of the easy tasks involve long-range dependencies (**V-anaphora**). We cannot use the

Double Dependence Hypothesis (Maurer–Fromkin–Cornell 1993) because there were hard tasks which did not contain two critical referential dependencies (**Aspect, Selectional restrictions, Unfocussable sentence adverbial in focus, All three arguments precede the verb**) and there were easy tasks which involved referential dependency (**V-anaphora**).

7.3. Suppose that we follow the non-modular approach of Bates/MacWhinney and we think in terms of cues. Inflectional endings are one set of cues, used to calculate certain kinds of grammatical relationships (such as complement/verb agreement). The root of a word is another cue, used to retrieve lexical information (which must be employed in more complex syntactic and semantic processes).

Suppose that in normal language functions the word root cue and the case marking cue are used independently and more or less simultaneously. Then consider the following hypothesis: Broca's aphasia involves a reduction in attentional resources, with the result that Broca's aphasics cannot simultaneously process lexical and inflectional cues, leading either to the neglect of inflection in order to attend to meaning, or to the preservation of inflectional patterns with resultant delays or derailings of lexical access. This is a perfectly plausible theory and one which is compatible with the data of our repetition task. As for grammaticality judgements, I do not think that the Competition Model could be ruled out.

On the basis of grammaticality judgement tests, Frazier–McNamara (1995) stated that "the representation of the referential/descriptive content of a phrase **supplants** its computational description at points where processing demands threaten to exceed processing capacity" (237).

The real nature of "impaired processing capacity", however, whether it is capacity of memory or capacity of attentional resources or general capacity of the language processor, remains unclear.

I assume that the impaired component is one of the language processing modules itself, not processing capacity in general. I suppose the seriality of processing modules as well. There are two main reasons for this approach: (1) the contradiction between patients' performance in repetition tasks and in grammaticality judgements; (2) the distribution of the grammaticality judgements.

7.4. The role of closed class morphemes

7.4.1. Natural languages tend to contain two quite different sorts of morphemes, those that are primarily of the world (open class items: nouns, adjectives, adverbs with their own lexical-semantic content) and those that are primarily of the grammar (closed class items). The closed class is generally taken to include case endings, prepositions, determiners, pronouns, conjunctions, auxiliaries, inflectional

affixes and a variety of other expressions (Carlson–Tanenhaus 1984; Kean 1981; Lapointe 1983). Linguistic symptoms of Broca's aphasia are sometimes defined as the impairment of access to closed class morphemes. Indeed, the fragmentation or agrammaticality of spontaneous speech, poor sentence repeating skills and good sentence comprehension skills may be correlated with this fact. Berndt *et al.* (1983) state that "...the special closed-class access route... serves a **syntactic function**. As input to a parser, the closed class items signal, for example, the introduction of a noun phrase, the distinction between main and subordinate clause, the difference between active and passive sentences, and so on" (21).

7.4.2. Speakers access open class words and closed class morphemes by two distinct access systems. The two access systems have to interact, especially during on-line sentence comprehension. (Saffran 1985; Saffran–Martin 1988; Zurif–Swinney–Garett 1990). This interaction is important for Hungarian speaking aphasics. In case of Hungarian the inflectional endings, especially surface case ending frames subcategorized for by verbs (predicates) provide a highly automatized complex device for processing surface sentence structure.

From the point of view of the **mental lexicon**, there is a level at which theta assigning predicates, like verbs, are members of the **computational vocabulary** (Frazier–McNamara 1995). Verbs and their subcategorizational frames that include surface case endings constitute complex lexical entries. Surface case endings are parts of subcategorizational frames of verbs and mark theta role assigned by the verb on the complements.

7.5. Asynchrony between syntactic and lexical processes: time-based approaches

7.5.1. Impairments of the surface syntactic parser appear to include **the slowing down of critical functions**. According to Haarman–Kolk (1994), Broca's aphasia affects sentence processing by either slowing down the rate at which new elements are constructed or increasing the rate at which they decay. But not both at the same time. Kolk (1995) argues for computational simultaneity or synchrony. His computational model, SYNCHRON, simulates the temporal course of building up a sentence structure representation. Simultaneity or synchrony is associated with bottom-up features. Two critical parameters are involved. In the "slow activation" case, it takes longer for the parser to begin processing an item. The critical activation level is reached too late, thus the item does not become available for further processing tasks. On the other hand, "Fast decay makes elements unavailable when they fall below their critical level too soon to be combined with other elements..." (284).

7.5.2. Cornell (1995) introduced a new computational model, GENCHRON, based on Haarman and Kolk's model. GENCHRON produces semantic representations in accordance with the double dependence hypothesis (Mauner *et al.* 1993). The grammar used by GENCHRON is a constraint based phrase structure grammar in which rules combine both syntactic and semantic constraints. Cornell's computational model is bottom-up, parallel, and it has the property of simultaneity. The Extended Simultaneity Condition is the following: "Construct a superordinate constituent node, and solve its associated constraints, only if there is a point in time at which all of its subordinate constituent nodes are simultaneously available in memory" (306).

In addition to a component of grammar, the GENCHRON system has parameter files to control the rate at which nodes become available in memory and with which they decay away.

According to Cornell (1995) **retrieval time models** represent the following deficit: lengthening the time period which it takes to process a new element "increases the likelihood that earlier arriving constituents will have faded from working memory by the time the later arriving constituents are finally constructed" (316).

In processing simulation, however, Cornell used a **memory time model**. This refers to the period during which an element is available in working memory. "Shortening this time period increases the likelihood that earlier arriving constituents will have faded from working memory before later arriving constituents are made available" (Cornell 1995, 316).

In processing simulation memory-time parameters were varied according to the open-class/closed class distinction. Cornell made the following parameter settings:

Open-class items persist for:	6 clock cycles;	
Closed-class items persist for:	3 clock cycles;	
Retrieval time for all items:	1 clock cycle	(Cornell 1995, 317).

Differences between memory time for open-class and closed class items are important. According to the parameter settings above, closed-class items fade away so fast from memory that the construction of a proper NP (for instance) is doubtful.

7.5.3. Cornell supposes that a processing account of asyntactic comprehension should make predictions for correct/incorrect grammaticality judgements as well. He suggests as a next step that "The version of GENCHRON used in these simulations

is subject to the extended simultaneity condition: it waits until all subtrees have been parsed and then attempts to solve all of the constraint at once.

Generalized Simultaneity Condition:

The output of a particular task only becomes available when and if the output of all of its subtasks is available at some point in time. At that point in time the superordinate task begins to make its output available" (323).

7.6. Judgements are based on the possibility of partial (incomplete) process of sentences

Cornell's interesting computational model has a high heuristic value. I believe, however, that grammaticality judgement tasks do not involve this kind of extended simultaneity. These tasks are easier than comprehension tasks in aphasia. Grammaticality judgements require shorter availability of the syntactic representation in memory than comprehension tasks and are therefore less easily disrupted.

Solving judgement tasks does not require that the parser waits "until all subtrees have been parsed and attempts to solve all of the constraint at once". It is not necessary that a syntactic tree for a full sentence should be available. Judgement of grammaticality is possible as soon as **minimally sufficient structural information** has been made available. Patients' performance in judgements depends on the type of grammatical error hidden in the task, i.e., on the availability of the minimally sufficient structural information which is necessary for correct judgement.

7.7. There is an initial structure building stage of sentence processing

7.7.1. In what follows I would like to apply the first-pass parse hypothesis. The hypothesis of initial structure building operations has been proposed by a number of psycholinguists (e.g., Frazier–Clifton–Randall 1983; Saffran 1985). In accordance with this hypothesis I assume that in the case of grammaticality judgements an initial structural analysis is computed and is subsequently interpreted. This is followed by later processing operations involving constraints on the indexing of structures. In the sense of Saffran (1985), the first-pass parser protects some of the processed syntactic information during first-pass parse and a working memory deficit restricts further processing operations.

7.7.2. The solution of a grammaticality judgement task is based on a minimally sufficient structural representation. (For aphasic subjects, grammaticality judgement tasks are easier than comprehension tasks.) What counts as a minimally sufficient structure, within a given language, will change from task to task. 'Easy-to-judge task' means that minimally sufficient structure is available and 'hard-to-judge task' means that minimally sufficient structure is not available.

As for Hungarian speaking aphasics, I claim that the first-pass parser is based on the verb, its subcategorizational selections for syntactic category of complements and for case endings (that marks theta role on surface structure). This constitutes important syntactic information for the possible syntactic structure, the possible linear order of categorized syntactic slots and the hierarchy of nodes of the structure. According to the Projection Principle, syntactic representations must be projected from the lexicon in that they observe subcategorizational properties of lexical items.

8. Judgements in easy tasks are based on initial structure building operations

8.1. There were three types of easy tasks: Argument + case ending, Anaphoric agreement in person and number, V-anaphora. According to our analysis of grammatical information used in judgements (in 5.6), with easy tasks correct judgements were based on two kinds of processes. The first one is the retrieval of the verb and its subcategorizational frame (including surface case endings) from computational vocabulary. The second one is a set of step-by-step checking movements on surface inflectional endings crosschecking them in person, number and definiteness.

8.2. Processes are effected in stepwise checks. This could be paraphrased as follows: "Take verb X and its case frame as a starting-point. Assign cases from the case frame and make the case of constituent Y agree with that of constituent X; make constituent Y agree with the verb in person, number and definiteness; let constituent Z agree in person and number with constituent W, etc."

8.3. Working memory (temporal) deficits do not affect the initial structure building operations

8.3.1. Kolk (1995) states: "The nodes ... take some time to reach their "memory time phase", that is to become available to interact with other nodes. ...this memory time is limited; if it is exceeded, elements disappear from memory. ...The type of elements affected by the temporal deficit do make a difference, however. When function word nodes are affected, the required pattern does not emerge. It appears only when phrasal category nodes are impaired" (284).

How can temporal deficit or working memory deficit be reconciled with these easy-to-judge conditions? One can ask why memory time would not be required for number agreement tasks. Of course, judgements of these tasks require some work-

ing memory capacity, but this does not exceed the limitations of the first-pass parser. Although the patient's restricted working memory time may not be sufficient to produce full syntactic representation, it is nevertheless sufficient for the judgement of a verb and a string of inflectional endings (related to that verb).

Judgements in easy tasks are based on information that **can be used** fast and extracted by processing short phoneme sequences which have high frequency. This operation is carried out by the parser in the form of **its changes** from one state to another ("what it is seeking to match what"), and is retained while parsing goes on.

8.3.2. Another problem is related to a kind of adjacency relation of inflectional endings. The easy-to-judge **Anaphoric agreement in number and person** condition involves retrieving referential dependency and comparing lexical material filling two distinct syntactic positions in order to check agreement. As a matter of fact, minimally required syntactic information for correct judgement is simply based on an agreement of inflectional endings. This is shown in (24):

- (24) (a) A gyerek látta magát a tükörben.
 the child-nom see-3sg/past/def him+self-3sg/acc in the mirror
 'The child saw himself in the mirror'
- (b) * A gyerek látta magadat a tükörben.
 the child-nom see-3sg/past/def your+self-2.sg/acc in the mirror

Patients do not need the processing of referential dependency to judge these sentences correctly. They simply have to check whether two neighbouring inflectional endings are compatible. The inflectional ending of the verb (*látta*) is member of the transitive paradigm and marks third person singular. The inflectional ending of the anaphora (*magá-T*) marks accusative case and **third person** singular as well. In the ungrammatical version the anaphora was given an inflectional ending (*magaDAT*) which marks accusative case and **second person** singular, after the same verb (*látta*). The contradiction between the inflectional ending attached to verb (definite + 3sg) and the inflectional ending attached to anaphora (accusative + 2sg) was easily detected. The associated referential dependency problem (anaphora) did not make patients misjudge the sentence as this dependency was not part of the minimally sufficient structural information to judge **this type** of tasks. From the point of view of judgement, the **Anaphoric agreement in person and number task** is very similar to the prototypical of easy-to-judge **Argument + case ending** task.

- (25) (a) Róbert nézi a könyvet.
 Robert-nom look-3sg/present/def the book -acc
 'Robert looks at the book'
- (b) * Róbert nézi téged.
 Robert-nom look-3sg/present/def you-2sg/acc

(Among the hard conditions there are tasks which, in addition to the compatibility of inflectional endings, involve a referential dependency problem as well. Patients produced systematic misjudgements at these tasks. (**Agreement of reciprocal anaphora**). It is remarkable that the hard task **Agreement between relative pronoun and its head** contained two referentially dependent critical constituents that were immediately adjacent. The task was difficult, because correct judgement presupposed the processing and comparing of lexical features of open class items filling two distinct syntactic positions.

8.4. A hypothesis about first-pass parse

8.4.1. Closed class morphemes are the elements of a structure-analysing and structure-building complex. **On-line** identification of closed class elements play an important role. Kean (1981) states that "...the **rapid** retrieval of clitics [=closed class items] would make available a rich source of information for making **initial** hypotheses as to local syntactic structure..." (195).

8.4.2. The hypothesis that I wish to explore is the following. The **distribution** of grammaticality judgements in our test supports a time-based theory. Impairments on accessibility of closed class items create syntactic difficulties: the slow activation of closed class morphemes causes a **delay** in the building of the syntactic structure. This leads to **desynchronization** in the integration of syntactic slots with lexical material.

Suppose that the syntactic parser produces a structural frame for all possible Hungarian sentences. That syntactic frame contains categorized slots. The category of Verb, its subcategorized complements, its case ending frame (and other grammatical function morphemes) would be generated by the syntax in accordance with the Projection Principle. Open class lexical material (like content words) have to be inserted into their categorized slots of the syntactic frame, and closed class items have to be integrated with their categorized slots as well. According to Kolk (1995) these two kinds of integration require synchronization.

Suppose that the working memory deficit immediately affects the accessibility of closed class items. This impairment will lead to the slowing down of structure building functions.

8.4.3. The distribution of grammaticality judgements in our test shows that **initial** sentence processes could be performed under slowing down of access to closed classes. **Easy-to-judge** tasks do not show consequences of syntactic slowing down, although correct judgements in easy tasks involved the processing of surface case ending frames. The assessment of grammaticality in the easy conditions turns on dependencies that are computed during first-pass parse and that are protected from working memory deficit, because critical elements of these dependencies are carried along as **alterations of the internal state of the parser** ("what it is seeking to match what"). Patients were able to use initial structure building operations which were based on a verb and a string of inflectional endings related to that verb. This was minimally sufficient structural information for correct judgement.

I emphasize that it is the initial phase of sentence processing for which this is valid. Consequences of syntactic slowing down appear in the further processing.

8.4.4. Our data in Table 1 and Table 2 show: if the grammaticality judgement of an utterance required synchronization of syntactic and lexical information, patients' performance deteriorated in our test.

Impairments on the access system of closed class items involve the slow activation of these items. The case ending frame assigned by the category of the verb and other inflectional endings **open up a syntactic slot for integration with a content word filler**. The slow activation of closed class items causes **a delay in opening up syntactic slots**. According to Kolk (1995), "a syntactic slow down will lead to desynchronization in integrating syntactic slots with lexical fillers" (292). This means that the point in time at which closed class morphemes deliver a syntactic slot for an open class lexical filler is in synchrony with the **late phase** of lexical selection.

9. Hard tasks

9.1. Syntactic and lexical processes should have been integrated

Hard tasks contained different types of grammatical error which would have been detected in a synchronization of syntactic and lexical processes. Synchronization

means that syntactic slots are opened up in synchrony with the middle (safe) period of lexical activation of open class items (cf. Kolk 1995). Setting up minimally sufficient structural information for correct judgements exceeds the limitation of an impaired parser in hard tasks. Because of a temporal deficit, the syntactic parser **cannot** build and identify surface syntactic structure **before** the order-preserving **lexical representation** of the heard utterance **faded away** from working memory. In this case the lexically processed material would have to be retained in working memory **too long** because of the slowdown of the surface syntactic parser, thus some lexical information will decay.

9.2. Random judgements versus systematic misjudgements

9.2.1. Easy tasks form one homogeneous set; they almost entirely involve judgements of cooccurrence restrictions among surface inflectional forms. Hard tasks are not grammatically homogeneous, covering as they do a wide range of **distinct** grammatical patterns; nor are they experimentally homogeneous.

Tables 1–2 above and Table 3 in the Appendix show that there are not only two interesting cases (easy and hard tasks) but at least three:

(A) Easy tasks (acceptable sentences were judged 100% as good, unacceptable counterparts were judged 100% as bad);

(B) hard tasks where judgements were essentially **random** and chaotic from a statistical point of view (the patients attempted to make a distinction, but failed to be consistently correct in their judgements), and

(C) hard tasks where acceptable sentences were judged as good with 100%, but **unacceptable counterparts** were judged as good with 100 % or at least close to 100%.

As for case (A), there were three types of easy tasks: **Argument + case ending**, **Anaphoric agreement in person and number**, **V-anaphora**.

Case (B) contains the hard tasks in which the patients were **guessing**. These are the following categories: **VP-anaphora**, **Gapping**, **Sentential intertwining**, **pro-Subject**, **Anaphora + case hierarchy**, **Agreement between a relative pronoun and its head**, **Selectional restrictions**, and **Aspect**.

Case (C) shows **systematic misjudgements**. These are the following categories: **Agreement of reciprocal anaphora**, **Unfocussable sentence adverbial in focus** and **All three arguments precede the verb**.

9.2.2. We have reanalyzed this data in a **posthoc statistical analysis** (using BMDP statistical software). According to an analysis of variance for correct judgements, for type (A), (B) and (C): (i) effect of type A/B/C for correct judgement was significant ($F(2, 10) = 165.46, p < 0.05$), (ii) effect of grammaticality for correct judgement was significant ($F(1, 5) = 355.01, p < 0.05$), and (iii) interaction of type A/B/C and grammaticality was significant ($F(2, 10) = 221.24, p < 0.05$).

9.3. Guessing

Case (B) is the random picture resulting whenever the parser is overloaded. Case (B) contains the tasks in which the patients were more or less **guessing**.

9.3.1. The first subclass of these tasks contained two verbs. Cooccurrence restrictions among surface inflectional endings were affected in connection with the relation between the two verbs. But the tasks were **more complex** because they required the patients to judge two syntactic dependencies involving two verbs **and** referential dependencies between two arguments (phonologically empty or non-empty arguments) of these two verbs (tasks of **VP-anaphora**, **Gapping**, **Sentential intertwining**, **pro-Subject**). I assume that judgements of these relations overtaxed the working memory.

9.3.2. The second subclass of type (B) tasks required the patients to process two local syntactic relations involving a referential dependency and a constraint on the type of case ending attached to the syntactic category (tasks of **Anaphora+case hierarchy**). To sum up: in the first and second subclasses of case (B), although surface inflectional forms were affected in connection with syntactic errors, correct judgements should have required radically more complex syntactic and lexical processing in the patient's decisions.

9.3.3. The third subclass of these tasks involved the verification of semantic compatibilities, where the errors involved incompatibility of lexical–semantic features (tasks of **Agreement between a relative pronoun and its head and Selectional restrictions**). Alternatively, the tasks required the processing of a relation between the meaning of time adverbial and the point of time specified by the tense-marker suffix and prefix of the verb (the **Aspect** task).

9.4. Systematic misjudgements

Case (C) shows systematic misjudgement where both acceptable sentences and their unacceptable counterparts were judged as good in 100% or, in the latter case,

at least close to 100%. These are the following categories: **Agreement of reciprocal anaphora, Unfocussable sentence adverbial in focus, All three arguments precede the verb.**

These tasks are not grammatically homogeneous, they cover a wide range of distinct grammatical patterns. They contain only one verb and involve a non-complex **syntactic error which cannot be detected with the help of the surface case frame of the verb**, for two reasons. First: the case ending frame is the same in the grammatical and ungrammatical sentences. Second: the syntactic error is connected to the case ending frame itself but the surface syntactic parser is not given its starting point for processing in due time.

9.4.1. In the task **Agreement of reciprocal anaphora**, the syntactic error is related to the referential dependency between the reciprocal and the nominative noun phrase with or without a coordinating structure (glosses contain relevant details only):

- (26) (a) A férfi meg a nő beszélgetett egymással.
 the man-nom and the woman-nom talk-3sg/past each other-with
 'The man and the woman talked to each other'
- (b) * A nő beszélgetett egymással.
 the woman-nom talk-3sg/past each other-with

The surface case frame (case endings) assigned by the verb to NPs are **the same** in the grammatical and ungrammatical sentences. The syntactic error cannot be detected with the help of case endings.

9.4.2. In the task **Unfocussable sentence adverbial in focus** the syntactic error is related to the syntactic position of the sentence adverbial and a contextual correction relation implied by the sentence. If it is in the syntactic position of Focus, the sentence will be ungrammatical, otherwise it is grammatical. Capitals and " stand for the Focus receiving heavy (main) stress:

- (27) (a) János talán elkésett.
 'John perhaps came late'
- (b) * János "TALÁN késett el.
 John PERHAPS came late
 'It is PERHAPS that John came late'

Again, the surface case frame of the verb is **the same** in acceptable and unacceptable sentences alike. Patients accepted the grammatical versions because of the grammatical surface case frame. To judge ungrammatical sentences correctly, patients should have refused sentences with a focused adverbial and should have judged contextual correction relation implied by focused sentence: the relation between **PERHAPS** and **CERTAINLY**. Patients accepted the ungrammatical versions because of the grammatical surface case frame and neglected the special contextual relation. (It is worth mentioning that **this kind** of ungrammatical sentence with focused 'modality-adverbial' is not suitable for any correction of modality in Hungarian.)

9.4.3. The task All three arguments precede the verb involved syntactic errors with the surface case frame itself.

The unacceptable sentence contains two separate Noun Phrases with (two separate) nominative case endings:

- (28) (a) A gyereket a boltba a mama elküldte.
 the child-acc the shop-to the mother-nom send-3sg/past
 'The mother sent the child to the shop.'
- (b) * A gyerek a boltba a mama elküldte.
 the child-nom the shop-to the mother-nom send-3sg/past

The unacceptable sentence contains a case ending (*-ra*) that **cannot occur grammatically in the case frame of the verb** (Hungarian equivalent of *lend*):

- (29) (a) A papá-nak a fiú egy könyv-et kölcsönadott.
 the father-dat the boy-nom a book-acc lend-3sg/past
 'The boy lent a book to the father.'
- (b) * A papá-ra a fiú egy könyv-et kölcsönadott.
 the father-on the boy-nom a book-acc lend-3sg/past

In the acceptable sentences the surface case frame was correct. The unacceptable counterpart contained an incorrect instance of case assignment (there were two separate nominative case endings in the sentence), or contained an ordinary Hungarian case ending (like *-ra*) which was ungrammatical within the surface case frame of **the given verb**. As indeed all three argument NPs preceded the verb (the verb was the last syntactic constituent in the surface string) the correctness of case assign-

ment to NP's had to be assessed without any knowledge of the verb that assigns case frame; or, once the verb becomes known the entire string has to be recalled and case endings verified.

It is remarkable that the patients' performance was 100% correct with the **Argument + case ending** task (classified as an easy task) in which only one argument NP preceded the verb and the other two argument NPs followed the verb. The main difference between the easy **Argument+case ending** task and the type (C) hard task **All three arguments precede the verb** is the syntactic position of the verb in the surface string relative to the positions of its argument NPs. In the task **Argument+case ending** the verb is in a non-final position and its argument NPs surround it. In the task **All three arguments precede the verb** the verb is in the final position of the surface string.

The surface position of the verb is critical for Hungarian Broca's aphasics. (Hungarian is more or less a "free phrase order" language (Kornai 1992, Kiefer–É. Kiss 1994).) For Hungarian Broca's aphasics involved in our experiments, the judgement of the case ending frame turns out to be easy under the following condition: a verb with three or more argument NPs must occur in non-final position in the surface string. At least one argument NP (from the three) must follow the verb in surface position.

The difference between patients' performance in the easy task **Argument + case ending** and patients' performance in the hard task **All three arguments precede the verb** reflects the slowdown of the parser: if the verb is in the final position of the string (preceded by all three arguments), the slow parser is too late to receive its starting point (verb + subcategorizational and case ending frame) and patients' performance deteriorates.

10. Summary

10.1. The pattern of patients' performance on the grammaticality judgement tasks reflects the structural preoccupations of the parser during a first-pass parse.

10.2. Easy tasks required using a verb and its subcategorizational frame (surface case frame) for correct judgements. It was necessary that this minimally sufficient syntactic information would be retrievable for the impaired parser.

10.3. With hard tasks to be judged correctly a synchrony between syntactical and lexical information would have to be available. Access to closed class morphemes is impaired therefore syntactic structure building process is slow and the integration

and interpretation of some lexically processed sequence of open class items is deferred. This input sequence would have to be retained too long in the working memory because of the slowing down of the syntactic parser, so lexical information in the working memory is already gone when needed. The subjects are unable to integrate the output of the syntactic parser with the segments of the lexical process.

Appendix

Table 3
Descriptive statistics of data

Symbols: gr = grammatical, ungr = ungrammatical, c = correct judgement, w = wrong judgement

Abbreviations stand for **sentence-types** as in Table 1 and Table 2. For instance:

Relative.gr/c. = Correct judgements for *Grammatical* versions of "Agreement between a relative pronoun and its head" tasks.

VARIABLE NO. NAME	TOTAL FREQ.	MEAN	STANDARD DEV.	ST. ERR. OF MEAN
1 Relative.gr/c.	6	4.6667	.81650	.33333
2 Relative.gr/w.	6	.33333	.81650	.33333
3 Relative.ungr/c.	6	3.0000	.63246	.25820
4 Relative.ungr/w.	6	2.0000	.63246	.25820
5 Recipagr.gr/c.	6	5.0000	0.0000	0.0000
6 Recipagr.gr/w.	6	0.0000	0.0000	0.0000
7 Recipagr.ungr/c.	6	.50000	.54772	.22361
8 Recipagr.ungr/w.	6	4.5000	.54772	.22361
9 3arg.gr/c.	6	5.0000	0.0000	0.0000
10 3arg.gr/w.	6	0.0000	0.0000	0.0000
11 3arg.ungr/c.	6	.33333	.51640	.21082
12 3arg.ungr/w.	6	4.6667	.51640	.21082
13 Anaphagr.gr/c.	6	5.0000	0.0000	0.0000
14 Anaphagr.gr/w.	6	0.0000	0.0000	0.0000
15 Anaphagr.ungr/c.	6	5.0000	0.0000	0.0000
16 Anaphagr.ungr/w.	6	0.0000	0.0000	0.0000
17 Anaphcase.gr/c.	6	1.8333	.75277	.30732
18 Anaphcase.gr/w.	6	3.1667	.75277	.30732
19 Anaphcase.ungr/c.	6	2.3333	.51640	.21082
20 Anaphcase.ungr/w.	6	2.6667	.51640	.21082
21 Argumcase.gr/c.	6	5.0000	0.0000	0.0000

VARIABLE NO. NAME	TOTAL FREQ.	MEAN	STANDARD DEV.	ST. ERR. OF MEAN
22 Argumcase.gr/w.	6	0.0000	0.0000	0.0000
23 Argumcase.ungr/c.	6	5.0000	0.0000	0.0000
24 Argumcase.ungr/w.	6	0.0000	0.0000	0.0000
25 Aspect.gr/c.	6	3.0000	.63246	.25820
26 Aspect.gr/w.	6	2.0000	.63246	.25820
27 Aspect.ungr/c.	6	2.3333	.51640	.21082
28 Aspect.ungr/w.	6	2.6667	.51640	.21082
29 Gapping.gr/c.	6	1.8333	.75277	.30732
30 Gapping.gr/w.	6	3.1667	.75277	.30732
31 Gapping.ungr/c.	6	2.5000	.54772	.22361
32 Gapping.ungr/w.	6	2.5000	.54772	.22361
33 pro-S.gr/c.	6	2.6667	.81650	.33333
34 pro-S.gr/w.	6	2.3333	.81650	.33333
35 pro-S.ungr/c.	6	2.8333	1.1690	.47726
36 pro-S.ungr/w.	6	2.1667	1.1690	.47726
37 Select.gr/c.	6	3.8333	.75277	.30732
38 Select.gr/w.	6	1.1667	.75277	.30732
39 Select.ungr/c.	6	2.0000	.63246	.25820
40 Select.ungr/w.	6	3.0000	.63246	.25820
41 Intertw.gr/c.	6	2.1667	.75277	.30732
42 Intertw.gr/w.	6	2.8333	.75277	.30732
43 Intertw.ungr/c.	6	1.5000	.83666	.34157
44 Intertw.ungr/w.	6	3.5000	.83666	.34157
45 Unfoc.gr/c.	6	5.0000	0.0000	0.0000
46 Unfoc.gr/w.	6	0.0000	0.0000	0.0000
47 Unfoc.ungr/c.	6	.33333	.51640	.21082
48 Unfoc.ungr/w.	6	4.6667	.51640	.21082
49 V-anaph.gr/c.	6	5.0000	0.0000	0.0000
50 V-anaph.gr/w.	6	0.0000	0.0000	0.0000
51 V-anaph.ungr/c.	6	5.0000	0.0000	0.0000
52 V-anaph.ungr/w.	6	0.0000	0.0000	0.0000
53 VP-anaph.gr/c.	6	3.3333	1.0328	.42164
54 VP-anaph.gr/w.	6	1.6667	1.0328	.42164
55 VP-anaph.ungr/c.	6	2.3333	1.0328	.42164
56 VP-anaph.ungr/w.	6	2.6667	1.0328	.42164

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THE EFFECT OF VERB COMPLEXITY ON AGRAMMATIC APHASICS' SENTENCE PRODUCTION*

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Abstract

The aim of the present study is to investigate the influence of the "representational complexity" of verbs on the sentence production of two agrammatic Broca's aphasics. The meaning representations of the types of tested verbs differ in the mental lexicon thus affecting their lexical accessibility. Based on the proportion of the activated target verbs named by the patients in an "action naming" test, order of verb difficulty was found. The patients produced fewer verbs of those types which assign a more complex argument structure. Morphological complexity of the verb proved to be another relevant factor in the verb retrieval process. The data show that argument structure and thematic information are partly accessible from the lexical entry of the verb (the order of the isolated argument nouns or noun phrases produced by the patients was not random but related to the 'thematic hierarchy'). At the same time the patients failed to construct full syntactic representations of simple sentences because of a syntactic 'mapping deficit': monitoring/controlling of the mapping of multiple arguments into the appropriate syntactic function was disturbed.

1. Introduction

The term 'agrammatism' covers different phenomena which are regarded as characteristic of Broca's aphasic language performance. The status of agrammatism as a "natural category" or "diagnostic class" has been heavily debated, nevertheless no researchers doubt the existence of agrammatic symptoms manifested in different language modalities (Badecker-Caramazza 1985a, b; Caplan 1986; 1991; Miceli-Silveri-Romani-Caramazza 1989). The most striking feature of agrammatism is the dysfunction of the ability to produce sentences or syntactic structures. Using Thompson, Shapiro and Roberts' summary (1993) the deficit of sentence production can be characterized by the following main phenomena: "reduction in the use of free and bound inflectional morphology; lack of grammatical agreement; 'tele-

* The investigations were made in the National Institute for Medical Rehabilitation at the Department for Rehabilitation of Head and Brain Injured Patients

graphic' style; reduction in the use of complex sentence structures (including passives, wh-questions, and relative clauses...; misordering of arguments (e.g. noun phrases) in sentence production...; a 'mapping' deficit...; and the deletion or misselection of terminal non-lexical elements (e.g. inflections, agreement, and complementizers in the phrasal geometry of a sentence...)'' (111–112). Parallel to agrammatic sentence production many agrammatics show a syntactic deficit in language comprehension as well. Some agrammatics' comprehension of certain syntactic structures seems to be better preserved, their performance in 'grammatical well-formedness' tasks may be intact (Linebarger *et al.* 1983).

Agrammatism is a complex dysfunction encompassing several factors. The early definition of agrammatism merely concentrated on omission errors of elements of closed class vocabulary. Selective disorder of formatives indicates that 'inflectional' and 'function word' components of morphological processing could form a functionally autonomous subcomponent of the lexicon. Selective damage of this subcomponent may be connected with disrupted information coming from the 'grammatical marker lexicon' or it could be related to the dysfunction of mechanisms responsible for assigning and interpreting syntactic features of sentences (Miceli–Caramazza 1988; Miceli–Silveri–Villa–Caramazza 1984). The deficit observed in grammatical marker production is, however, only one component of the underlying disturbance in agrammatism. Sentence formation and parsing of sentences presuppose the interaction of subsystems of the lexicon with modules of grammar. Construction of a simple sentence, for example, presumes different cognitive mechanisms operating simultaneously or successively: semantic selection/lexical access of elements belonging to different syntactic categories, verb processing e.g. access to the predicate-argument structure, mapping of thematic roles into argument noun phrases (NPs), construction of the base sentence structure according to the phrase structure rules of the given language, and assigning syntactic features e.g. overt case, verb tense, agreement.

Agrammatic aphasics who are native speakers of typologically different languages produce various kinds of symptoms in sentence production which can be explained by the parametric differences of their languages although the symptoms can most likely be traced back to the principles of Universal Grammar. The 'mapping deficit', for example, can manifest itself in a word order disorder or misordering of arguments in English, but in Hungarian misordering of arguments is not relevant as different permutations of the major constituents of the sentence can be equally grammatical. It is rather the deletion/substitution or misinterpretation of case markers that signs the 'mapping deficit' in Hungarian agrammatics' verbal output and sentence comprehension as the syntactic function of constituents is marked nonconfigurationally, by overt case markers. In configurational languages

like English the subject and object behave differently because of their positional asymmetry in the sentence structure hierarchy. The subject is in a higher position—dominated by the S node—than the object which is dominated by the VP node (Fig. 1). The object is lexically governed by the V as a complement, it receives its theta-role from the V while the subject is theta marked by the VP (Chomsky, 1981, 1986).

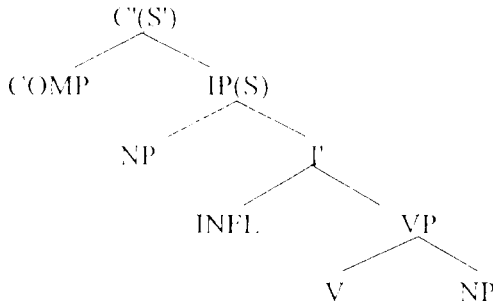


Fig. 1.
Phrase structure of English

In Hungarian, the hierarchy of predicate–argument relations cannot be identified through relations in the phrase structure (in English the relationship between phrase structure and lexical structure can be described by identity). In Hungarian the syntactic function of constituents does not play a role in sentence structure hierarchy, the subject does not have a prominent position, the subject and the object are structurally parallel and they are equally dominated by the VP (Fig. 2.). The predicate and its complements are generated under the V' node: the verb is generated in an initial (head) position and its arguments are generated in an arbitrary order. In the

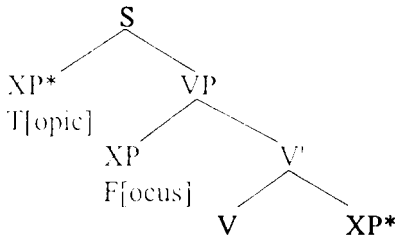


Fig. 2.
Phrase structure of Hungarian
(*: arbitrary number of phrases in the given position)

base structure all arguments are sisters, the subject and the object have the same syntactic status (É. Kiss 1987; 1994).

The sentence initial Topic position [XP, S] can be filled with an arbitrary number of unstressed maximal categories (including null). A constituent in Focus position [XP, VP]—which has primary stress—can be the verb itself or a maximal category preceding the V. The verb can be followed by an arbitrary number of maximal categories. (With rewriting rules: $S \rightarrow XP^* VP$; $VP \rightarrow XP V'$; $V' \rightarrow V XP^*$.) The different constituent orders of Hungarian sentences can be produced by two transformation rules: topicalization and focusing, and by parallelly used stress-rules. (Focusing: to propose an XP from the [XP,V'] position to the [XP,VP] position; topicalization: to carry an XP from the [XP,V'] position to the [XP,S] position.) If we want to interpret aphasic data in the theoretical framework of Government and Binding Theory (Chomsky 1981; 1986), we have to consider the language specific constraints.

Assuming that the sentence processing system is composed of two basic subsystems, a syntactic and a thematic processor (Rayner–Carlson–Frazier 1983; Tanenhaus–Carlson–Trueswell 1989), agrammatics can fail to produce simple sentences if they activate only partial information from the lexical entry of the verb (e.g. verb-based thematic information and argument structure) or if they are not able to construct full structural representations.

In this study we investigated these processes in more detail, analysing Hungarian agrammatic Broca's aphasics' verbal production using an 'action picture description' test.

2. Verb processing in agrammatism

Since the 80's several studies have examined agrammatic aphasics' ability to produce verb phrases and process verb information. Results from different types of elicitation tasks demonstrate that verb retrieval is significantly more impaired than noun retrieval in agrammatic aphasics. Agrammatics show a marked deficit in naming actions, verbs are underrepresented in their spontaneous speech, verb inflection and auxiliaries are also affected (Saffran–Schwartz–Marin 1980; Zingeser–Berndt 1990; Miceli–Silveri–Villa–Caramazza 1984; McCarthy–Warrington 1985; Marshall–Pring–Chiat 1993). The reduced proportion of verbs in agrammatic output raises the question whether the difficulty of producing main verbs and grammatical markers is closely or accidentally related. Does the tendency to omit verbs imply a lexical or a syntactic processing deficit in agrammatism (Miceli–Silveri–Villa–Caramazza 1984)? Several other studies focussed on the role of verbs in sen-

tence comprehension. Schwartz–Saffran–Marin (1980) examined word order impairment in English Broca's aphasics using simple active declarative sentences involving two-place predicates (like *The horse kicks the cow*). Recognition of the syntactic functions of the argument NPs in these sentences was based on the interpretation of information manifest in the surface word order. Agrammatic aphasics failed to analyse the basic relational structure of the sentences or to decode the syntactic relations because of a dysfunction of those processes which map/assign the thematic roles onto the grammatical categories, e.g. to subject, direct object argument NPs. Other results also confirmed that agrammatics' inability to interpret certain structures could be explained by the deficit of a 'mapping' procedure (Schwartz *et al.* 1987; Linebarger *et al.* 1983; Caramazza–Miceli 1991).

In spite of a 'mapping disorder', activation of a verb's argument structure and access to a verb's thematic information itself could be normal in agrammatic Broca's aphasics (Shapiro–Levine 1990).

We have to presume different operations involved in the mapping procedure. Experimental results—which showed that agrammatics were able to understand semantically nonreversible simple active sentences and center embedded relative clauses correctly, but could not parse semantically reversible or passive sentences—demonstrated that the interpretation of a sentence also depends on special perceptual/cognitive strategies (Bever 1970). In reversible sentences for example, aphasics cannot use 'animacy contrast' information because the [+animacy] semantic constraint is removed. The patients cannot use the principle "use the animate NP as Agent", therefore they assign inappropriate thematic roles to the NPs of the sentence. In the case of passive constructions NPs are moved out of their canonical positions, therefore the English agrammatics cannot use the other 'general mapping principle': "the Agent thematic role is assigned to the subject NP constituent which occupies the first NP position in SVO sentences". In this way the patients can interpret the clause-initial NP as an Agent in a passive sentence, and because the preposition *by* in the adjunct PP assigns the role of Agent to its sister NP, the aphasic patients choose the Agent randomly (Grodzinsky 1984; 1986).

While in Hungarian the 'animacy effect' also works during sentence comprehension, morphological case marking was found to play the leading role in the interpretation of syntactic relations in a comprehension test. Hungarian aphasics decoded the unmarked NP as Agent/subject in simple sentences which involved transitive verbs but in those cases when the case markers were removed, tendency was found to interpret the N-V-N strings as SVO structures (MacWhinney–Osman–Sági 1991).

The syntactic complexity of verbs seems to be another decisive factor in decoding or generating sentences both in normal and agrammatic persons. Saffran *et al.* (1980) observed that agrammatic aphasics have more problems in understand-

ing verbs with two or three arguments than in decoding those verbs which assign only one Agent/subject participant (e.g. *follow*, *push away* vs. *smile*, *cry*).

Shapiro–Zurif–Grimshaw (1987) investigated the effect of the ‘representational’ complexity of verbs in normal speakers’ sentence comprehension and found that the amount of representation information affects the sentence processing. They examined verbs that differed from each other in their ‘subcategorization complexities’ and ‘argument structure complexities’ (verbs that allow one or more subcategorization and argument structure possibilities).¹ The following order of verb difficulty was determined on the basis of reaction times (RT) in a Cross-Modal Lexical Decision Task (CMLD): **transitive < nonalternating dative = alternating dative = two complement < four complement**.

The authors concluded that a verb’s potential for different thematic structures seemed to be a relevant factor for the sentence processing complexity. The nonalternating and alternating dative verbs did not yield significant differences in RT because their argument structures were the same even though they allowed different syntactic subcategorization possibilities. In the group of ‘four complement’ verbs longer RTs were observed compared to the ‘two complement’ group. Even though both verb types select the same subcategorization frame the ‘four complement’ verbs allow more ‘semantic types’ (P, Q, I); that is, “the relevant verb complexity metric for sentence processing involves the argument structure of verbs and not the syntactic subcategorization” (Shapiro *et al.* 1987, 241).

In the second part of their experiment, Shapiro–Zurif–Grimshaw (1987) investigated the ‘argument structure complexity’ effect with respect to the role of optional (implicit) vs. obligatory arguments. The data showed that verbs allowing only one argument structure arrangement (transitive and obligatory three-place predicates, like *hand*) did not differ significantly in contrast to those types of verbs that allowed

¹ The ‘transitive’ group involved verbs that took single direct object NPs; the ‘alternative dative’ verbs like *send*, allowed [_NP], [_NP NP] and [_NP PP] subcategorization alternations, and (x,y), (x,y,z) argument structure possibilities; the ‘nonalternating dative’ verbs like *carry*, allowed two subcategorization possibilities: [_NP] and [_NP PP], and two argument structure alternations: (x,y), (x,y,z); the ‘two complement’ group consisted of verbs that allowed two subcategorizations and two argument structures:

<i>accept</i>	[_NP	(x, y)
	S’]	(x, Proposition)

Those verbs belonged to the ‘four complement’ group that allowed two subcategorizations and four argument structures (Grimshaw 1979):

<i>remember</i>	[_NP	(x, y)
	S’]	(x, Proposition)
		(x, Question)
		(x, Interrogative)

both a two-place and an optional three-place argument structure (alternating and nonalternating dative verbs). This suggested that "the crucial metric for sentence processing complexity is the number of possible argument structure arrangements" (Shapiro *et al.* 1987) and not the number of arguments within a given arrangement.

Investigating agrammatic Broca's aphasics with the above mentioned test materials and method, Shapiro–Levin (1990) found that agrammatic aphasics showed the same RT pattern as the normal subjects in both CMLD probes. Shapiro–Levine concluded that the device that activates the verb and its structural properties operates normally during sentence comprehension in Broca's aphasics. The difficulties observed in the understanding of complex structures (passives, relative clauses) thus arise from the dysfunction of the postactivation processing which is responsible for the assignment of thematic roles to argument NPs.

Other experimental results showed that misselection of a special semantic feature assigned in the semantic representation of the verb could also result in a 'mapping deficit' which could be manifested in argument reversing. Jones (1984) found that understanding sentences containing 'directional motion verbs' (e.g. *follow*, *push*, *pull*) was significantly more difficult for agrammatic aphasics than processing sentences containing 'nonmotion verbs'. The directional motion verb has a special semantic property which alone determines the relationship of the arguments. These verbs involve 'inherent embedded prepositions' that specify a directional/spatial relation between their (Agent–Theme/Patient) arguments. Misinterpretation of the perceptual feature of the verb (direction expressed by the inner preposition: e.g. *follow* ((NP₁ NP₂) [MOTION, NP₁ **before** NP₂]) causes a 'mental reversing' which presents itself in an argument misordering (e.g. instead of *The man follows the girl* > *The girl follows the man*).

In our unpublished material (Kiss–Mészáros–Kiefer 1992) we observed the same phenomena in aphasics' verbal output (using an action description test where the actions were presented on video). The 'place-coordinates' of the directional motion verbs were often inverted, the directional features ('moving away' or 'approaching') were switched which resulted in verb substitutions (e.g. *The girl is pushing the car into the garage* > *She is pulling it*). In the case of three place predicates which take 'dative' complements, the 'converse approach' was also observed. The verb substitution was caused by replacing the Agent (Giver) and Benefactive (Receiver) roles (e.g. *The girl gives the plate to the boy* > *The boy takes the plate from the girl*). A similar 'converse approach' was found in the case of two-place causative verbs when the aphasic patients often approached the event not from the viewpoint of the Agent but from that of the Patient. This resulted in the deletion of the obligatory accusative argument and as a result of "decausativation" an active intransitive verb was used (e.g. *he makes the horse jump* > *it is jumping*). The con-

verse approach seems to be a compensation strategy in the case of causatives because the 'change of perspective' gives the possibility of selecting a less complex verb which could be more easily retrieved.

The above data show that some typical Broca's aphasic phenomena are closely related to the dysfunction of verb processing.

2.1. Representation of verbs

Since verbs have a critical role in the sentence planning processes, we can assume a causal connection between disorder of sentence production and dysfunction of verb retrieval in agrammatics. The lexical-semantic information specified in the lexical entry of the verb determines the relations of the minimal constituents in a sentence. According to Government and Binding Theory (Chomsky 1981; 1986) each verb has selection properties which are represented in the mental lexicon via the 'subcategorization frame' and the 'argument structure'. Subcategorization (category selection property) is a restriction between the verb and the syntactic category of its complements, the semantic selection entails a restriction between the predicate and the semantic types of its complements. Every complement of the verb must be semantically selected.

The subcategorization frame of the verb involves the list of complements which are obligatory constituents of the verb phrase. A verb subcategorizes for a complement if it is lexically governed by the verb. The form of the complements can be different: NP (noun phrase), PP (prepositional phrase), S' (sentential clause) or combinations of these phrases. Some verbs allow more subcategorization alternations, e.g. the verb *carry* or *believe*. Other verbs like *meet* have only one subcategorization possibility.

The predicate-argument structure and thematic information are also part of the lexical entry of the verb. The arguments are those NPs to which thematic roles are assigned by the verb. The thematic roles like Agent, Theme, Goal are certain types of semantic/conceptual information which define specific semantic relationships between the verb and its arguments (Jackendoff 1972). The thematic roles must be assigned to the arguments which have to be realized structurally in an appropriate syntactic position. Each verb selects its arguments and assigns them thematic roles idiosyncratically. Some verbs like *send* or *buy* allow two types of realization of their arguments: a two-place (x, y) and a three-place (x, y, z) structure.

- | | | | |
|-----|-------------|---------------|--|
| (1) | <i>send</i> | a-structure: | (x, y)
(x, y, z) |
| | | thematic grid | (Agent, Theme)
(Agent, Theme, Goal) |

The Goal argument can be regarded as an 'implicit' argument because its structural realization is optional. Other verbs like *hand* are obligatory three-place verbs, their third Goal arguments must always be realized syntactically.

Because strict subcategorization is relevant to syntax (it imposes well-formedness conditions on a syntactic level) and semantic selection is relevant both to semantics and syntax, the representational complexity of a predicate has an effect on the generation of simple sentences in agrammatic aphasics.

In this study we investigated the role of verb complexity in the semantic and syntactic mapping processes using verbs of different argument structure complexities with different morphological complexities. We concentrated on the question of what kind of information is attainable from the lexical representation of a verb and what kind of operations and mechanisms are used in the syntactic structure building processes if the lexical accessibility of the verb is disturbed.

2.2. The structure of the verbs used in the present study

Based on their argument structure complexities, the tested verbs of the present study formed three main groups. **Group I.** involves one-place intransitive predicates which take only one Agent or Experiencer argument. **Group II.** involves two-place verbs, **Group III.** involves three-place predicates.

Each main verb group is represented by several subgroups.

Group I/A contains morphologically and semantically simple one-place verbs (S), e.g. *alszik* 'sleep', *ásít* 'yawn'.

Group I/B contains one-place reflexive verbs (R), e.g. *borotválkozik* 'shave oneself', *zuhanyozik* 'take a shower', *vakarózik* 'scratch oneself', *nyújtózkodik* 'stretch oneself'. These types of reflexives assign an 'inner' Patient (Theme) argument. Because it is only an 'inner' argument, syntactic function does not belong to it, it cannot be mapped into an overt object NP. The inner Patient argument is identified by the semantic representation of the predicate, the Patient is identical with the Agent (Kömlösy 1994), e.g.:

- (2) *fésülködik* semantic representation: 'x fésüli y-t x=y'
 'comb oneself' ('x-nom combs y-acc')

Reflexives are morphologically complex because they are derived from a verb stem by a reflexive suffix.

Group I/C contains one-place verbs which are derived from a noun by a denominal derivational suffix (N>V) e.g. *teniszeznek* 'play tennis', *síel* 'ski', *csónakázik* 'boat'.

The derived predicates in **Group I/C** contain an 'atomic predicate' in their semantic representation, like 'MOVE/GO', 'PLAY', 'USE', which assign the original noun stems as argument. Because of word formation/derivation these comple-

ments become 'inner' semantic arguments, they are not expressed syntactically but are identified by the semantic representation of the derived predicate (Jackendoff 1987; Komlósy 1994). The derived verb *gitározik*, for example, has the following semantic representation:

- (3) *gitározik*
 'play the guitar':
- Morphological form:
gitár - *ozik*
 stem suffix
- Semantic representation:
JÁTSZIK *a gitáron*
 PLAY-3sg the guitar-on
 [atomic predicate] [inner argument]
 '(he) plays the guitar'

Table 1
 Main features of the verbs in Group I

	I/A simple	I/B reflexive	I/C N>V
syntactic complexity	<i>sír</i> (x) 'cry' (Agent)	<i>fésülködik</i> (x) 'comb oneself' (Agent)	<i>gitározik</i> (x) 'play the guitar' (Agent)
morphological complexity	—	stem+ - <i>kozik/közik/kőzik</i> - <i>kodik/kődik</i> - <i>ózik, -ódzik</i> reflexive suffix	noun stem+ - <i>z(ik)</i> - <i>l/al/el</i> derivational suffix
semantic complexity	—	'inner' Patient argument	'inner' argument

Group II contains three subgroups:

Group II/A contains reversible transitive predicates: the Theme argument is mapped to an object NP in which the noun is specified as [+animate].

- (4) *megvigasztal* 'comfort' [NPnom, NPacc]
 A férfi megvigasztalja a lányt.
 the man-nom prefix-comfort-3sg.def the girl-acc
 'The man comforts the girl'

Group II/B contains irreversible transitive verbs: there is animacy contrast between the Agent and Patient/Theme arguments, the Theme/Patient-object argument has [-animate] semantic feature.

- (5) *hámoz* 'peel' [NPnom, NPacc]
 A *fiú* *meghámozza* a *banánt*.
 the boy-nom peel-3sg.indef the banana-acc
 'The boy peels the banana'

Group II/C contains predicates that assign an Agent thematic role to the subject and Goal/Source/Location thematic role to their locative arguments.

- (6) *átmegy* 'cross' [NPnom, NPsuperess]
 A *férfi* *átmegy* az *úttesten*.
 the man across-go-3sg the road-on
 'The man is crossing the road'

Group III contains two subgroups:

Group III/A contains verbs that assign Agent–Theme–Goal/Source/Location thematic roles which have to be mapped into the subject, object and locative NPs.

- (7) *beletesz* 'put into' [NPnom, NPacc, NPillative]
 A *férfi* *beteszi* a *bőröndöt* az *autóba*.
 the man-nom into-put-3sg.def the suitcase-acc the car-into
 'The man puts the suitcase into the car'

Group III/B contains verbs that assign Agent–Theme–Benefactive/Goal thematic roles, requiring subject, object and dative complements.

- (8) *bemutat* 'introduce' [NPnom., NPacc, NP dat]
 A *fiú* *bemutatja* a *lányt* a *barátjának*.
 the boy-nom prefix-introduce-3sg.def the girl-acc the friend-gen.3sg-dat
 'The boy introduces the girl to his friend'

2.3. Method

Subjects. The verbal performance of two agrammatic Broca's aphasic patients was analysed. Both patients are native speakers of Hungarian.

A.N. 55-yr-old, female, right-handed nurse (education: secondary school) was hospitalized again 20 month post-onset when deterioration was observed in her condition, as a result of a second cerebrovascular insult.

L.I. 37-yr-old, female, right-handed radiological assistant (education: specialized matriculation examination) was investigated 36 month post-onset.

Both patients suffered left lateral cerebrovascular accident. CT scan of A.N. showed previous parieto-occipital involvement and frontal hypodensity which was the sign of a second, acute vascular lesion. L.I.'s CT scan showed large temporo-parieto-occipital hypodensity which signalled a middle cerebral artery and posterior artery infarct. Classification of aphasia type was made by the Hungarian variant of the Western Aphasia Battery (Osman-Sági 1991). (A.N.'s WAB AQ: 49; L.I.'s WAB AQ: 65.4.)

A.N.'s spontaneous speech showed reduced fluency, telegraphic style and severe speech initiation difficulty, it hardly contained intact propositions or sentences. Her speech consisted of automatic, stereotyped phrases, isolated words and paraphasias. Spontaneous speech sample of A.N.:

(9) "Istenem!...Beteg voltam...Marika...Nem tudom...kórház...professzor...Szent János Kórház...Jó napot, óó, nem nem!...Ó Istenem!...Nem tudok...Beszéd... Nem..."

(Oh, my God!...I was ill...Mary...I do not know...hospital...professor... St John Hospital...Good morning, oh no, no!...Oh God!...I cannot... Speech...No....)

After a 3-month therapy period she showed some improvement according to the Western test (WAB AQ: 54.6), but the character of her spontaneous speech did not really change. She was tested with the 'action description test' at the beginning of therapy and 3 months later. In the present study we analysed her answers given in both of the 'action naming tests'.

L.I.'s spontaneous speech was also nonfluent, characterized by marked anomia and agrammatic symptoms. She often used more automatic speech 'panels' or expressions, e.g. "I knew that something was wrong", "I am fed up", "It was evening when it happened", "I could not do anything". She filled in the hesitation gaps caused by word finding difficulties with these grammatically well-formed phrases and with some adverbs. She was able to use active non-stereotype simple clauses but she had difficulty producing complex sentences. She produced many incomplete phrases (VPs and DPs as well) or sentences (with many often incomplete subordinate clauses). Semantic selection and access problem of the 'lexical verbs' was an outstanding symptom in her speech; the type/token ratio of verbs was relatively low in her spontaneous speech, she retrieved mostly modal verbs (e.g. *must*, *can*, *ought*,

might) and she often used the verb *know*. Omission and morphological errors of verb inflection and case marking of nouns were also observed. Speech sample of L.I.:

- (10) “L.I.: Lehet, hogyha valami vé végett kellene úszni, aa..akkor lehet, hogy jó lenne, de... most most nem. És és nem nem tudok. Olyan olyan nem félsz... Csak csak olyan... olyan elegem van és és nem tudok. Mindegy, hát ez...
 Therapist: És mit sportolt még?
 L.I.: Énnkem? Ajaj! ..Egy vi vitorlázó ..gépet...Hát a zzzzzz....
 T: Repülő? Vitorlázó repülő?
 L.I.: Igen! Dehát a anyám a azt mondta, hogy...hogy nem. Nem lehet, mert...
 T: Mert?
 L.I.: Hát hát a szülők...nem...nem..Tudják, hogy hogy lehet, hogy valami baj van, vagy...dehát az...De de az az az jó volt.”
 (L.I.: Maybe if it should...sw..swim..because because of something, then then.. maybe it would be OK. but ..now..now not. And and I cannot cannot. Like like you do not fear....It is it is like...like I am fed up and and I cannot. It does not matter, well this...
 T: And what kind of other sport did you do?
 L.I.: For me? Huu! ...A gli..a glider...Well a zzzzzz....
 T: A plane? A glider?
 L.I.: Yes! But my mother told me, that...that no. It is impossible because....
 T: Because?
 L.I.: Because the parents...no, no..They know that that it can happen that something is wrong or..but that...But but that that that was good.)

Material. The test material contained 124 target verbs which belonged to 8 verb types (Group IA–C, IIA–C, IIIA–B, as described above). Our elicitation method was an ‘action naming’ / ‘picture description’ test. The pictures that represented the target verbs/actions were assembled from Jacqueline Stark’ collection “Everyday life activities (photo series)” (Stark 1992). Each coloured photocard of the series represents one particular action.

Procedure. The subjects were tested individually, the photocards were randomly presented one after another. The aphasics were instructed to describe or tell us ‘what happened in the picture’, who the actors were, what they were doing. Responses were tape recorded and transcribed. General help like ‘Could you tell me anything more?’, phonemic cues (whispering of first syllable), questions referring to an argument noun or supplying of an argument noun were used only when the patients asked for help. In the statistical analysis we used only the independent, spontaneous answers.

3. Results

Table 2 shows the proportions of the verbs produced by the aphasics according to different types of predicates and the distribution of the complete, grammatically well-formed sentences involving the target verbs. We regarded an answer to be 'complete' if the patients were able to build the whole VP or sentence. It means that the verb and its complements were lexically accessible, the argument NPs were supplied with the appropriate overt case marker, noun-verb agreement was intact and nonterminal node deletion did not occur. If an inflectional or a derivational ending or a determiner was omitted or any argument was missing we did not accept the incomplete clause as a "correct" response even if the verb retrieval itself was successful e.g. **Nem kártya. Fiúnak odaadta.* (Not card-nom. Boy-dat prefix-give-3sg.def.past) **Önteni önteni a limonádét.* (To pour to pour the lemonade-acc). **Doktornő, doktor megvizsgálja.* (Doctoress-nom, doctor-nom examine-3sg.def). **Nézeget az óra.* (Look-frequent.suff-3sg.indef the clock-nom).

Since Hungarian is a pro-drop language, the subject pronoun may be left unexpressed. If there is no overt subject NP in the sentence the Agent thematic role is assigned to a phonetically empty pronoun (*pro*). The verb inflection refers to the number and person of the subject (in the case of the target verbs it was the 3rd person singular form). We accepted those answers as 'complete clauses' in which the aphasics did not assign an overt subject NP but used the right inflected verb form e.g. *Felébreszti a fiút* ((*pro*) wake-3sg.def up the boy-acc).

Predicates 'precisely' describing the action represented in the given picture constitute the target verbs. Verb substitutions contain irrelevant responses or verbs which do not 'exactly' express the given action although they are adequate to the situational context, e.g.

target verb: *The man goes upstairs.* > substituted verb: "he is sitting"

target verb: *The boy wipes the milk.* > substituted verb: "he spills"

target verb: *The girl wakes up the boy.* > substituted verb: "he is sleeping"

target verb: *The man kisses the woman.* > substituted verb: "he loves her"

target verb: *The man puts the suitcase into the car.* > substituted verb: "mum packs up"

The analysis of the data shows that the mean scores of the complete clauses were much higher in the 'one-place' verb group (39.6) than with the 'two-place' (3.8) or 'three-place' (6.3) predicates. In the latter two groups the ratios of complete clauses were very low.

Table 2

Distribution of complete clauses and verbs (percentage values are enclosed in parentheses)

	1-place I/A simple	I/B reflex.	I/C N>V	2-place II/A [+anim]	II/B [-anim]	II/C locative	3-place III/A locative	III/B dative
number of target verbs	12	9	21	15	35	11	13	8
total number of responses	36	27	63	45	105	33	39	24
complete clauses	26 (72.2)	8 (29.6)	16 (25.3)	2 (4.4)	5 (4.7)	0 (0)	1 (2.5)	3 (12.5)
mean score of complete clauses	(39.6)			(3.8)			(6.3)	
target verb	26 (72.2)	8 (29.6)	16 (25.3)	11 (24.4)	24 (22.8)	0 (0)	4 (10.2)	4 (16.6)
verb substitut.	5	7	6	29	41	25	20	15
total verb answers	31 (86.1)	15 (55.5)	22 (31.7)	40 (88.8)	65 (61.9)	25 (75.9)	24 (61.5)	19 (79.1)
mean of total verb responses	(54.8)			(71.0)			(66.6)	

Not surprisingly, constructing a surface sentence which involved a one-place predicate was easier for the agrammatic aphasics than constructing a syntactic structure which contained a two or three-place verb. If the patient was able to access the one-place predicate she could also construct the whole VP. In the case of the two and three place predicates however, retrieval of the verb's phonetic form did not mean a simultaneously successful syntactic structure building. The construction of the surface sentence was perfect for roughly one quarter of those answers which contained the target verb. This phenomenon shows a mapping disorder, the patients are limited in the 'monitoring' of the assignment of multiple arguments into the appropriate slots of the syntactic frame.

Comparing the distribution of the retrievable target verbs within each verb group we found the following 'verb difficulty order': **simple 1-place > morphologically complex 1-place (R and N>V) = transitive (2-place) > 3-place (with locative and dative complement) > 2-place with locative complement.**

Access to the 'simple one-place' verbs was outstandingly successful (72.2).

The lexical selection of the 'two-place verbs with locative complement' proved to be the most difficult for the patients (they could not retrieve any verb in this group). These predicates were directional motion verbs. The lexical representations of these verbs integrate mental knowledge related to the cognitive representation of space or spatial relations. These verbs include such contents as direction of the motion, place-coordinates, starting point and end point. This information is encoded in the semantic representation and thematic roles of the predicate. Processing of this information seemed to be more difficult for our patients, they produced marked selection disorder when attempting to produce these verbs.

We did not find outstanding differences in the proportion of activated verbs among the 'one-place reflexive' (29.6), 'one-place derived from noun' (25.3) and 'two-place transitive' (24.4; 22.8) verb groups. Proportions of these verbs were lower in contrast to the 'simple one-place verb' group.

The ratios of the three-place verbs (10.2; 16.6) were lower than the proportions of the one-place and two-place verbs (except the '2-place locative' group).

The results show that the 'representational complexity' of the predicate has a direct effect on the lexical accessibility of the verb for agrammatic aphasics. The argument-structure complexity of the verb (number of obligatory arguments) plays an important role in verb retrieval but it is not the only factor. The morphological and semantic representational complexity of the 'one-place derived verbs' (I/B, I/C) and the semantic representational complexity of the 'two-place locative' verbs also had an effect on the lexical-semantic selection of the predicates.

In the next part of the study we would like to present some further data which refer to particular 'tendencies' or 'strategies' observed in the aphasic patients' performance. These tendencies were outlined via 'error analysis'. (We need further investigation and more data to interpret these results more precisely.)

3.1. Effects of morphological complexity

In Group I/C two types of answers were found which were related to the morphological structure of the verb:

- (a) noun stem (only)
- (b) verbs:
 - noun stem > target verb derivation
 - target verb
 - verb substitution

Table 3
Proportion of answers belonging to the different types

Nstem	22.22
Nstem > target V	30.15
target V ²	44.44
substituted V	3.17

The noun stem appeared in more than half of the answers, which means that the noun stem was activated first in many cases and it was used as 'access code' or 'mediator' in the retrieval process of the derived verb form, if the direct semantic access to the verb was not possible. The patients used an indirect retrieval method for the predicate by activating morphological processes/word formation rules. The noun stem was assigned first both in cases where the stem and derived form were regular and in those where they were not, e.g. *ló* > *lovagol* 'horse > ride a horse'. This strategy was found both in independent answers and in answers given by phonemic cue.

The data show that morphological complexity of the verb is a decisive representational factor that has an effect on the accessibility of the verb.

3.2. Types of answers

In this part we analyse the different types of answers given by the subjects in the two- and three-place verb groups. In the analysis of the data three kinds of answer types can be distinguished.

Type A. Isolated argument/s – activation of one argument or list of arguments (N or DP, case marked or caseless forms)

Type B. Argument/s assignment > followed by **Verb selection / Clausal answer** (involving the target or substituted/paraphasia verbs which were one-place or two-place predicates)

• **Type C. Clausal answers** (no previous argument N or DP assignment)

Type D. Other: e.g. *I don't know* answer, noun associations. (In the further analysis these answers were not included.) These answers were rare: 12/372 total answers.

(See Appendix I. for examples)

² The number of the target verb answers is higher here than in Table 2 because those answers which were not accepted as 'correct' were also considered during 'error analysis' that is answers given by phonemic cue, infinitives, morphologically ill-formed forms.

Table 4

Distribution of answers in the 'A-C' types and distribution of target and substituted verbs in clauses

	II/A 2-place [+animate]	II/B 2-place [-animate]	II/C 2-place (locative)	III/A 3-place (locative)	III/B 3-place (dative)
total nr. of answers	45	96	30	38	23
total nr. of clausal answers	40	65	25	24	19
Type A	11.1	32.2	16.6	36.8	17.3
Type B	28.8	39.5	43.3	52.6	43.4
Type C	60.0	28.1	40.0	10.5	39.1
target verb	27.5	36.9	0	16.7	21.1
substitut. for 1-place V	40.0	24.6	76.0	29.1	42.1
substitut. for 2-place V	32.5	38.5	24.0	54.1	36.8

The data show that our subjects had a lexical selection problem in accessing target predicates; they selected a high number of paraphasia verbs. Proportions of target verbs were lower than substituted verbs in every verb group. This does not mean that the aphasic patients cannot obtain any information from the feature structure of the verbs. The unsuccessful retrieval of the phonological form of the target verb does not explain agrammatic verbal performance in itself. The argument 'enumerations' indicate that certain information concerning the argument-structure, thematic grid and subcategorization list is available.

In **Type A** answers only nouns or noun phrases were produced, the verb was deleted. In **Type B** answers the activation of nominal elements of the subcategorization list preceded lexical access of the verb. (During the selection of argument nouns hesitation, pauses, semantic paraphasias, word initiation difficulties, self corrections occurred.) The subjects usually attempted to build the previously activated argument Ns or DPs into a syntactic scheme. When the phonetic form of the target verb was inaccessible, another predicate was selected (both one- or two-place verbs which were always adequate in the situational context).

Type C (and clausal part of **Type B**) answers were either fragments/agrammatic or well-formed sentences.

The "listed" Ns or DPs (in 'isolated argument' answer types) were always complements, never randomly named nouns. (Instrument and locative adjunct NPs sometimes occurred.) The patients never assigned "extra" arguments, only those which were required by the verb.

The data show that the subjects were able to get some specific information represented in the lexical entry of the predicate: argument-structure and thematic information were accessible; argument assignment was not accidental, the ratio of activated arguments with different thematic roles was related to the thematic hierarchy.

3.3. Argument assignment and thematic hierarchy

According to the Projection Principle of GB Theory, lexical information is syntactically represented. Argument structure is projected from the lexical semantic structure of the verb and the base structure of the sentence is projected from the argument structure according to the parametric characteristics of phrase structure of a given language (Grimshaw 1990).

According to the 'thematic hierarchy' hypothesis the argument structure of the verb is not only a set of arguments. It has its own internal structure which represents prominent relations that are determined by the thematic information of the predicate (Grimshaw 1990). Grimshaw suggested a protoargument-structure which is a structured representation of arguments based on the thematic hierarchy:

(Agent (Experiencer (Goal/Source/Location (Theme))))

The hierarchy expresses which argument has more chance of getting into the subject position. If the predicate assigns an Agent thematic role, this argument must be mapped into the syntactic function of subject. If there is no Agent or Experiencer argument in the thematic grid of the verb, the less prominent Goal/Source or Theme argument can get into the subject position.

As we described above, our agrammatic patients often gave answers in which they listed argument Ns or DPs (Type A and the argument enumeration part of Type B answers).

During the analysis of these kinds of answers, we found that argument assignment was not random. The selection of arguments was connected with their **position in the thematic hierarchy and the 'animacy' semantic feature**, consequently the argument activation depended on the type of target verb.

Table 5 shows the distribution of arguments produced first in the different verb subgroups. (The numbers in parentheses show the number of total occurrences of a given argument: number of occurrences of an argument produced first linearly in the list plus the number of the same argument appearing as second or third element in another argument list.)

Table 5
Distribution of arguments activated first
(the total number of activated arguments including first activated is indicated in parentheses)

type of verb	Agent	Goal/ Benefactive	Goal/ Source	Theme
2-place [+animate]	12 (13)	– –	– –	6 (12)
2-place [–animate]	10 (18)	–	–	52 (60)
2-place [locative]	7 (8)	– –	11 (13)	– –
3-place [locative]	10 (11)	– –	5 (10)	16 (26)
3-place [dative]	0 (5)	4 (6)	– –	10 (13)

Based on the distribution of arguments the following thematic role preference was found in the different predicate types:

Transitive verbs ([+animate] object constituent)	Agent > Theme
Transitive verbs ([–animate] object constituent)	Theme > Agent
2-place verbs (locative constituent)	Goal > Agent
3-place verbs (object+locative constituent)	Theme > Agent > Goal
3-place verbs (object+dative constituent)	Theme > Goal/Benefactive > Agent

The subjects were able to produce every type of argument (Agent, Theme, Goal, Benefactive) but a difference was found in the distribution of arguments activated first.

Activation of the arguments lower in the thematic hierarchy was more frequent than more prominent arguments of a given predicate (e.g. Theme > Benefactive > Agent; Theme > Agent; Goal > Agent). Two exceptions were found: the Agent >

Goal order in the 'three-place locative' group and the Agent > Theme order in the 'transitive [+animate]' group.

Comparing the proportions of arguments, an **outstanding contrast** was found between the activation of **Agent and Theme** arguments in the 'transitive [-animate]' and '3-place dative' verb groups. In the case of the '3-place locative' group the Agent><Theme contrast was not so sharp, rather, the Goal/Source><Theme and the Agent ><Goal/Source contrasts were considerable. The contrast was also less sharp between the Agent and Goal arguments in the 'two-place locative' type of verbs.

The data show that the **less prominent Theme argument was activated faster** than the other arguments if the predicate assigned the thematic role of Theme mapped to an object NP specified as [-animate]. Activation of the Theme argument fell behind the Agent only if the verb was reversible (if the Theme thematic role was mapped into an object specified as [+animate, +human]). Considering the total numbers of activated arguments, only the '**Theme [-animate]>< other arguments**' contrast remained, the contrasts among the other arguments had been equalized. The Agent><Theme [+animate] contrast also 'disappeared' when considering the total number of arguments.

The **Theme [-animate] argument** seems to be a preferred argument. Among the elements of the subcategorization list, mostly the Theme thematic role was assigned first. The verb–Theme argument relationship seems to be closer than the verb–other argument connection.

3.4. Case assignment in isolated arguments

The argument Ns and DPs were mostly produced without a case marker but case marked forms also occurred. Proportions of case marked forms in 'isolated argument assignment' answers were slight compared to the caseless forms. [Theme argument N with accusative: (4.5); Goal argument N with locative case marker: (13.0); Benefactive argument with dative case marker: (16.6). Case marker substitutions: Theme argument: (4.5); Agent argument: (3.6); Goal arguments: (8.6); Benefactive argument: (0)].

According to GB Case Theory case can be assigned under government. The verb governs its complements and assigns them abstract cases. Hungarian has a morphologically rich case system, cases are realized morphologically and marked by overt case markers (only the nominative case is marked by a 'zero' morpheme). The verb idiosyncratically assigns case endings of its arguments, this information is indicated in the subcategorization frame.

Case assignment can be realised in two ways:

– If we assume that root-form argument Ns are inserted into the base structure, further morphological operations are needed to produce the appropriate case

marked forms according to the information specified in the subcategorization list. This process assumes intact lexical selection of the given case maker from the 'grammatical marker lexicon' and intact morphological procedures that assign the overt case markers to the argument nouns.

– We can also assume that the lexical entry of the noun involves the root form and all inflected variants of the noun. In this case, complete case marked forms can be retrieved from the lexicon and inserted into given syntactic slots. The verb assigns the case by checking the case markers of the NPs in the argument positions.

Both procedures seem to be possible on the cognitive level and are supported by processing data. The latter solution would correspond to a non-compositional holistic access regarding morphology combined with a decompositional secondary checking.

The subjects' performance shows that the access code is mostly the root form in the lexical selection process in agrammatic aphasics. The root forms are generally accessible, their activation is faster. The aphasics rarely used direct holistic access, the substitution and omission of case markers indicate a dysfunction of morphological procedures.

3.5. The clausal answers (Types B and C)

After the activation of the available information from the lexical entry of the verb (argument-structure and thematic information), the agrammatic patients tried to insert the activated arguments into syntactic structure. The syntactic structure building mechanisms however, were also disturbed, they generated both **well-formed** and **agrammatic** sentences. (These sentences involved target or paraphasia predicates.)

Table 6
Proportion of agrammatic and well-formed sentences

	II/A 2-place [+anim]	II/B 2-place [-anim]	II/C 2-place (loc.)	III/A 3-place (loc.)	III/B 3-place (dat.)
agrammatic S	47.5	58.4	44.0	58.3	42.1
well-formed S	52.5	41.5	56.0	41.6	57.8
total	40	65	25	24	19

Some agrammatical sentences were **(a) incomplete clauses**, e.g. VO*, SVO*, SLVO* etc.,³ since the complement NPs were deleted or the previously activated arguments were lost again when the subjects wanted to frame them into the slots of the phrase structure (into the complement or subject/Topic positions). Other agrammatical sentences were due to **(b) deletion of formatives**. The complete phrase structure was not built because of the slow activation speed or lack of formatives (closed class items): case markers, verb inflections (agreement of the verb inflectional ending with the definiteness or indefiniteness of the object) and determiners/articles under the DP nonterminal nodes were deleted. (See Appendix II. and III. for examples.)

3.6. Word order in the clausal answers

Our subjects produced different permutations of surface word orders. The word order variations in the different verb groups were the following (verbs in sentences were target or paraphasia verbs):⁴

- (a) 'Transitive [+animate]'/reversible
V > SV > VO* > SVO*, VC, SOV > (OV, SVC, CVS, VS, VS', SVO, SCV)
- (b) 'Transitive [-animate]'/irreversible
VO* > **V > VO** > VS, VC, SVO* > (SV, SVO, VOC*, OV, SOV, OSV, SVC, CVS)
- (c) '2-place verbs with locative complement'
V > SV > (VS, VO, LV, VL, SVL, VL*)
- (d) '3-place with locative complement'
V > VO > VO* > (LVO, VOL*, VO*L*, SV, VDO*, LV, VSO*, CVS)
- (e) '3-place verbs with dative complement'
V > VO*, SDOV > (DVO*, SOVD, VDO, DSVO*, VO, VC, VSO)

V, SV, VO (VO*) word orders were always higher than other word order variations, across all permutations produced by the patients.

When the predicate did not assign the Theme argument ('2-place locative') or there was no animacy contrast between the Theme and Agent arguments, the number of V and SV structures was higher.

³ * marks the deletion of the given constituent, D: dative complement, L: locative complement, C: other complement, S': sentential complement)

⁴ Word orders with highest occurrence are indicated by bold letters; word orders that occurred only once or twice are indicated in parentheses.

In the case of those predicates that required Theme arguments and in which an animacy contrast was found between the Agent and Theme arguments, the V, VO, VO* answers occurred in the highest proportion.

Generating the (a)–(c) types of sentences, the aphasics used three main principles:

1. *'Insert the [+animate] [+human] argument into the subject or Topic position'*. In the transitive/reversible verb group the Theme argument was also specified as [+animate] [+human], giving the possibility of 'perspective reversing': the 'original' Theme argument was mapped into the subject position of a one-place verb as Agent. (Some SV answers belonged to this kind of sentence type in this verb group.)

2. *'Keep the predicate and the Theme argument together'*.

3. If other information is not available/accessible, *'try to build the simplest structure selecting a one-place predicate'*.

These 'tendencies' are parallel to the strategies used by the subjects on the semantic mapping level:

– the **Agent** argument was activated first in higher proportion in the case of the 'transitive/reversible' verb group.

– in the case of the other predicates the **Theme** arguments were activated first which can be connected to the strategy: among the elements of the subcategorization list, 'map first the less prominent argument into the syntactic frame. Construct the [V+O complement] structure first'.

4. Summary

We investigated the ability of Broca's aphasic patients to produce simple active sentences which involved verbs of different argument structures with varying morphological complexity.

'Task specificity', which is a characteristic feature of aphasic performance, appeared in our investigation as well. Although our Broca patients omitted main verbs from their spontaneous speech, omission of verbs was not characteristic of their performance in an 'action naming task'; rather, substitution of verbs occurred. Our subjects could retrieve one or two-place verbs (target and paraphasia predicates) in a relatively high number (mean score of total verb answers in different verb groups: 54.8/'1-place'; 71.0/'2-place'; 66.6/'3-place'). The proportion of the target verbs was lower than the ratio of the substituted predicates in the 2-, or 3-place verb types, which showed a lexical selection disorder in verb retrieval.

We found that the representational complexity of the verbs had a direct effect on the accessibility of the predicates. The 'morphologically simple one-place pred-

icates' were produced in the highest number. Much lower proportions were found in the 'morphologically complex one-place' predicates and in the transitive verbs, and only some verbs were activated in the 3-place verb groups. Production of the directional motion verbs proved to be the most difficult for the patients. This data showed that the argument structure complexity of the verb is important but not the only factor in the lexical selection of predicates. The semantic representational and morphological complexity of the predicate is also relevant in the lexical-semantic selection of the verbs.

Although the phonological form of the target verb was often not accessible for the aphasics, they could retrieve other specific information represented in the lexical entry of the verb. Argument structure and thematic information were partly accessible. Activation of the arguments was not random but related to the thematic hierarchy. The less prominent arguments were produced faster. The Theme argument specified as [-animate] was always the most preferred argument in the semantic and syntactic mapping procedures.

When there was no animacy contrast between the Agent and Theme argument, more Agent arguments were produced first than Theme arguments. The data show that the subjects used three principles in the semantic and syntactic mapping processes: (1) Map the [+animate], [+human] argument into the subject or Topic position, treating it as an Agent. (2) Construct first the verb-object complement structure, map the less prominent Theme argument specified as [-animate] first into the object position of the syntactic frame. (3) Construct the most simple (S)V structure if more information is not available from the semantic representation of the verb, selecting a one-place predicate.

Dysfunction of the syntactic structure building mechanisms had a connection with the delayed activation of the formatives and nominal elements of the phrase structure. The reduced capacity to preserve the previously activated argument Ns or NPs had a role in the unsuccessful structure building operations. The previously activated argument nouns were often not preserved—they were not inserted into the given positions of the constituent structure—during the selection of the phonetic form of the verb. This resulted in incomplete clauses or fragments. The formatives were also not obtainable because their lexical selection was slower or impossible. They were not assigned to the appropriate slots of the case frame. This also resulted in agrammatical sentences. The semantic and syntactic mapping mechanisms rarely operated in a parallel way or in coordination. The number of well-formed or complete clauses was very low in the case of predicates which assigned more complex argument structure.

Based on the data, agrammatical performance can be interpreted by those asynchronous mechanisms that cannot function simultaneously on/between the level of

semantic mapping (activation of argument-structure and thematic information) and syntactic mapping (procedures that construct the syntactic phrase structure and map the arguments/thematic roles into the syntactic frame).

Appendix

I. Examples of typical answers in Types A–C

A. Isolated argument/s

1. target: A férfi virágot ad a nőnek. – The man gives flowers to the woman.
Anyuka.... virág.... A virág.... Férje.....
[mother-nom..... flower-nom.... the flower-nom.... husband-gen-3sg]
2. target: A nő kiveszi a levelet a levélszekrényből. – The woman takes the letter out of the letter-box.
Levél.... Levélszekrény... Szekrénybe...
[letter-nom.... letter-box-nom..... wardrobe-into]
3. target: A fiú meghámozza a banánt. – The boy peels the banana.
Banánt..... A fiú.. banánt.....
[banana-acc..... the boy-nom.. banana-acc.....]

B. Argument assignment > verb selection/clausal answer

1. target: A fiú felszál a buszra. – The boy gets on the bus.
Busz... Fiú majd jön.
[bus-nom.... boy later come-3sg]
2. target: A férfi beleteszi a paradicsomot a zacskóba. – The man puts the tomato into the small bag.
Mi ez?... Ja, paradicsom... Paradicsom.... Egy sok paradicsom.... Szatyor és zacskó és paradicsom.... Kéri...
[What is it?.... Ah, tomato-nom.... Tomato-nom.... One many tomato.... Bag-nom and small bag-nom and tomato-nom.... ask-3sg-def. for....]
3. target: A fiú kiönti a narancslevet a pohárba. – The boy pours out the orange juice into the glass.
A fiú..... A fiúnak... Nem... Dzsúsz.... Önti.... Kiönti a dzsúszt.... A pohárba kiönti a dzsúszt.
[The boy-nom.... The boy-dat.... No... Juice-nom.... Pour-3sg-def.... Prefix:out-pour-3sg-def the juice-acc.... The glass-into prefix:out-pour-3sg-def the juice-acc]

C. Clausal answer

1. target: A fiú átmegy a zebrán. – The boy is crossing the street at a zebra crossing.
Kimegy a zebrán.
[prefix: out-go-3sg the zebra-on]
2. target: A fiú kiönti a narancslevet a pohárba. – The boy pours out the juice into the glass.
Önteni. Önteni a limonádét.
[pour-inf pour-inf the lemonade-acc]
3. target: A lány felébreszti a fiút. – The girl wakes up the boy.
Alszik.... Letakarja.
[sleep-3sg.... prefix-cover-3sg-def]

II. Examples of agrammatic – incomplete sentences

1. target: A fiú feltörli a tejet. – The boy wipes the milk.
A tej... tej... és nem jó. Tej és... letörölni.
[The milk-nom...milk-nom... and it is not good. Milk-nom and... wipe-inf]
2. target: A fiú lekapcsolja a villanyt. – The boy switches the light off.
Villany és és rá... És fiú lekapcsolja.
[Light-nom and and onto... And boy-nom switch-3sg.def off]

III. Examples of deletion of formatives in agrammatic sentences

1. target: A férfi fölszeleteli az uborkát. – The man slices the cucumber.
Uborka... Szeletelni. Férfi föl.. szeleteli uborkát.
[Cucumber-nom... Slice-inf Man-nom prefix... slice-3sg.def cucumber-acc]
2. target: A lány elülteti a virágot. – The girl plants the flower.
Virág... Elültetni virágot.
[Flower-nom... Plant-inf flower-acc]
3. target: A fiú beleteszi a kenyeret a pirítóba. – The boy puts the (slice of) bread into the toaster.
Kenyér... Szeletelni... Odaadni kenyér.
[Bread-nom... Slice-inf... Prefix-give-inf bread-nom]

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AGREEMENT PROCESSING IN HUNGARIAN APHASICS*

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Abstract

Crosslinguistic studies of sentence processing in aphasia in the Competition Model framework emphasize the extent to which strong cues are preserved in aphasia, while weak cues are lost. In addition, these studies have indicated that cues expressed by morphological markings, such as case and agreement cues, are particularly vulnerable to damage. The processing of agreement cues in Hungarian is an interesting further test of this “selective vulnerability” of morphological marking, since Hungarian has a rich and complex system of agreement-marking coupled with a remarkably simple system for case-marking. In addition, aphasics may rely on cues such as animacy and word order when they are not able to process the more grammaticalized case and agreement cues. This study examines the relative cue strength of each of these four cues for aphasics in a simple sentence interpretation task. The results provide further support for the importance of cue strength in aphasic processing, as well as pointing to the selective vulnerability of morphological cues, particularly in Wernicke’s aphasia.

1. Introduction

The expression of grammatical role is one of the most central functions conveyed by language. In every clause, we need to be able to identify the subject or actor. If the verb is intransitive, this is an easy matter. But when the verb is transitive, we may often find two or even three nominals that are potential candidates for the role of subject. In order to select among these possibilities, we use a series of cues, including word order, case-marking, animacy, and verb agreement-marking. Of these various cue types, the ones that involve the most elaborate type of processing are the agreement cues, since they require us to process morphological markers on the verb and the various nouns and then to compare these two sets of markings in terms of a possibly complex conjugational paradigm. In English, the conjugational paradigm is not very complex. Consider the English sentence *It was the dogs that*

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were chased by the cat. Here we must process the number marking on the verb *were*, interpret the number on the nominals, *the dogs* and *the cat*, and link these two sets of results in terms of the agreement rules of English. Despite the formal simplicity of the English system, the processing of agreement in English is still a difficult matter (Bock–Miller 1991).

In Hungarian, the situation is even more complicated. Like English, Hungarian has agreement between the subject and the verb. However, unlike English, the markers in Hungarian fully distinguish all persons and all numbers in all tenses. In a sense, this might make Hungarian agreement-marking a more powerful and reliable cue, since it not only tells us the grammatical number of the subject, but also its grammatical person. What makes the situation particularly complicated in Hungarian is the fact that these markers not only indicate the person and number of the subject, but also the definiteness of the object. In other words, a single suffix on a Hungarian verb is used to mark both subject–verb agreement and object–verb agreement.

Crosslinguistic studies of sentence processing in the Competition Model framework (Bates–Wulfeck 1989; MacWhinney–Osman-Sági–Slobin 1991; Smith–Bates 1987; Smith–Mimica 1984) have emphasized the extent to which strong cues are preserved in aphasia, while weak cues are lost. In addition, these studies have indicated that agreement cues are particularly vulnerable to damage. The processing of agreement cues in Hungarian is an interesting further test of this “selective vulnerability” of agreement marking, since Hungarian has a particularly complex, but reliable, system of agreement-marking coupled with a remarkably simple system for case-marking. In addition, we know that aphasics may rely on cues such as animacy and word order when they are not able to process the more grammaticalized case and agreement cues. MacWhinney–Osman-Sági–Slobin (1991) showed that, when the Hungarian case-marking cue is clearly detectable, aphasics rely on it with fair consistency. However, that study did not examine the use of the agreement-marking cue. Therefore, we do not know whether Hungarian aphasics are able to make full and integrative use these two reliable grammatical cues. This study examines the relative cue strength of each of the four cues for aphasics in a simple sentence interpretation task.

2. Cues to grammatical role identification in Hungarian

Before presenting our experiment, it will be helpful to review the ways in which grammatical roles are marked in Hungarian. Hungarian has five major cues that help the listener identify the subject of a transitive: (1) case marking, (2) subject–verb number agreement, (3) word order, (4) animacy, and (5) object–verb def-

initeness agreement. In this report, we will only focus on the use of the first four cues, since research with normal subjects (MacWhinney–Pléh 1997) has shown that object–verb agreement plays a minimal role in sentence interpretation.

In order to see how these cues interact, consider a Hungarian sentence such as (1):

- (1) Egy fiú szeret-i az almá-k-at.
 a boy like-3.sg.def the apple-pl-acc
 ‘A boy likes the apples’

The listener’s decision to treat *fiú* ‘boy’ as the subject and *almákat* ‘apples’ as the object is influenced by each of these five cues. In this particular case, all five cues point in the same direction.

1. **Case-marking.** *Fiú* has zero case marking which makes it a good candidate for the actor/subject. *Almákat* has accusative case marking which blocks it as a possible candidate for subject.

2. **Agreement-marking.** *Fiú* is singular and therefore agrees with the third person singular marking on the verb, whereas *almákat* is plural and does not agree properly with the number of the verb. Therefore, *fiú* is a better candidate for actor.

3. **Object–verb agreement.** The same suffix on the verb that indicates a third person singular subject also indicates that the object of the verb is definite. Since *fiú* is marked by an indefinite article, it cannot be the object of the verb and must be the subject.

4. **Animacy.** Furthermore, *fiú* is animate and *almákat* is not, and this further supports the choice of *fiú* as the subject.

5. **Word order.** Finally, *fiú* precedes the verb and *almákat* does not. This positional placement of *fiú* provides further evidence that *fiú* is the subject. Thus, the five cues of case, number agreement, definiteness agreement, animacy, and word order all point toward the selection of *fiú* as the subject and agent.

Not all sentences work out so nicely. In some sentences, several cues may be ambiguous. It can even turn out that cues point in opposite directions. For example, the free word order of major elements in a Hungarian sentence (see below) makes it so that the word order cue often conflicts with the case cue. A model that has been formulated to deal with cue competitions of this type is the Competition Model (MacWhinney–Bates 1989; MacWhinney–Pléh–Bates 1985). This model holds that the cues which have the strongest effect on sentence processing are those with the highest cue reliability. In order to understand the predictions that arise from the Competition Model for Hungarian in general and for aphasia in particular, we need to examine the relative reliabilities of the five major cues to subject identification.

2.1. Reliability of the case-marking cue

The direct object of the Hungarian verb is marked by a final *-t* accusative suffix. In Competition Model terms, this marker is considered to be an extremely **reliable** cue to role identification. There are no cases with transitive verbs and two NPs in which the presence of the accusative is misleading. However, there are a few cases in which the cue is not **available** because the accusative case marker is optional. These optional deletions occur when a noun has a first person singular or second person singular possessive suffix. For example, one can say either (2) or (3).

- (2) Lát-om a kutyá-d.
 see-1.sg the dog-2.sg.poss
 'I see your dog'.
- (3) Lát-om a kutyá-d-at.
 see-1.sg the dog-2.sg.poss-acc
 'I see your dog'.

Both sentences mean "I see your dog". In (2) the accusative suffix on *kutyádat* is optional. When the first person singular or second person singular possessive is not present, every object of a transitive verb must have the accusative suffix. Thus, although the accusative is fully reliable, it is not always available.

There is a complex set of morphophonological patterns that alters the actual shape of the linking vowel and the stem itself. However, none of these morphophonological processes alters the shape of the final *-t*. Because of this, adult speakers can easily recognize both regularly and irregularly inflected accusatives. For children, this task is not so easy (MacWhinney 1985; MacWhinney *et al.* 1985), because they have not yet learned to control the various morphophonological irregularities involved. Moreover, auditory detection of the accusative suffix can be difficult for children in forms where the *-t* directly follows a dental obstruent (MacWhinney *et al.* 1985). Aphasics have particular trouble detecting the accusative marker (MacWhinney *et al.* 1991) and this problem appears to be more severe for Wernicke's aphasics than for Broca's aphasics. The other major case marking cue in Hungarian is the 'zero' marking cue on nouns. A noun that appears without any case suffixes or postpositions is, by default, placed into the nominative case. The absence of any form of case marking or postpositional marking is an extremely reliable cue for the subject of the verb. Since there is no true passive in Hungarian, the subject is also easily identified as the actor or agent with a transitive verb.

2.2. Reliability of the subject–verb agreement cue

Hungarian verbs agree with their subjects in person and number. As in languages like Spanish and German, the Hungarian verb is conjugated for three persons and two numbers. The paradigm for subject–verb agreement marking has very little neutralization and is relatively clear and unambiguous. For example, the verb *fut* ‘run’ has these forms.

		<i>Present Ind.</i>	<i>Past</i>	<i>Conditional</i>	<i>Imperative</i>
<i>Singular</i>	1st	futok	futottam	futnék	fussak
	2nd	futsz	futottál	futnál	fuss
	3rd	fut	futott	futna	fusson
<i>Plural</i>	1st	futunk	futottunk	futnánk	fussunk
	2nd	futtok	futottatok	futnátok	fussatok
	3rd	futnak	futottak	futnának	fussanak

Note that each of these forms is distinct and there is virtually no neutralization anywhere in the conjugational paradigm. This is generally true for Hungarian verbs.

In the terms of the Competition Model, this means that the agreement cue on the verb is completely **reliable**, despite its high level of **formal complexity**. Although this cue is extremely reliable, it is not as generally **available** as the case marking cues. When there are two or more third person singular nouns in a clause, agreement marking alone cannot tell us which is the subject and which is the object. Of course, in those cases where the subject–verb agreement cue is not available, the accusative case cue is usually available. There are no cases in which the case cue and the agreement cue point in opposite directions. In Competition Model terms, this means that the **conflict validities** of both the case cue and the subject–verb agreement cue are very high.

There are two ways in which the number agreement cue in Hungarian differs from number agreement in languages like English, German, or Spanish. One difference involves the way in which agreement interacts with ‘plural’ quantifiers. In Hungarian, one says *öt férfi* ‘five man’ instead of *öt férfiak* ‘five men’. Whenever the quantifier expresses inherent plurality, the marking of plurality on the noun is considered redundant and is suppressed. Furthermore, for the purposes of agreement with the verb, a quantified “plural” subject noun phrase is treated as singular. In this sense, a referent that is conceptually plural (Pollard–Sag 1988) is treated as grammatically singular. If sentence processing relies more on underlying form than on superficial syntactic form, these two mismatches between conceptual number (Pollard–Sag 1988) and grammatical number could serve to weaken the subject–verb agreement cue. Alternatively, as Bock–Miller (1991) and Bock–Loebell–Morey (1992) have suggested, syntactic processing may rely initially more

on surface syntactic structure than on underlying conceptual structure. In that case, the strength of agreement marking should be influenced only by reliability and other processing factors.

2.3. Reliability of the word order cue

When the verb is in the definite conjugation, the usual word order is SVO. Hungarian permits all six word orders in transitive clauses (SVO, SOV, VSO, VOS, OSV, OVS). However, the SOV and SVO orders are the unmarked (Dezső 1972; 1982). When there is a definite noun in postverbal position in an NVN clause, then it is fairly likely that the preverbal noun is the subject. This cue is fairly high in availability, but rather low in reliability. In sentences with OVS order, the case marking and agreement cues inevitably dominate over the word order cue. Similarly, in NNV clauses with an articleless preverbal noun, it is fairly likely that the first noun is the subject. In both word order types the basic cue is that the first noun is probably the subject (MacWhinney *et al.* 1985).

2.4. Reliability of the animacy cue

As in other languages that have been investigated within the Competition Model framework (MacWhinney–Bates 1989), Hungarian makes use of animacy contrasts to determine the subject of the sentence. The real effect of the animacy cue is only evident when case marking and agreement cues are removed. For example, in (4) listeners tend to take *fiú* ‘boy’ as the subject that is also supported by the conceptual representation of verb semantics.

- (4) *A labda fog-ja a fiú.
 The ball grab-3.sg.def the boy
 ‘?The boy grabs the ball’

2.5. Cue reliability: Summary

According to the Competition Model (MacWhinney–Bates 1989), the strength of the four cues should be determined first by their relative **conflict reliability**. In sentences where two cues point in opposite directions, the one that wins should have the greatest individual strength. Reliability considerations make it so that the animacy cue and the word order cue should be the weakest in this set of four cues. For the other two cues, the major determinant of their relative strength should be **availability**. In this regard, the accusative suffix is more highly available than the agreement cues, since agreement is sometimes neutralized. Therefore, case-marking should be the strongest of the four cues, although the difference in strength between case-marking and agreement-marking should not be large.

There are two additional factors which could further limit the strength of the agreement cues. First, agreement cues place a greater strain on the language processor and could therefore be somewhat weaker than local cues such as case marking cues. Second, although agreement marking is reliable, the paradigm is formally quite complex. However, in a comparison of Russian and German, Kempe–MacWhinney (in preparation) have shown that formal complexity is not a major determinant of sentence interpretation. Therefore, we would be inclined to attribute any additional problems found in processing agreement cues not to formal complexity, but to processing costs.

3. Methods

3.1. Subjects

Our subjects included 10 Broca's aphasics, 11 Wernicke's aphasics, 9 anomics, 4 conduction aphasics, and 15 normal control subjects. The aphasics were tested by the second author at the Rehabilitation Institute in Budapest where they were recovering. The control subjects were matched to the aphasic subjects in terms of age and educational level.

3.2. Materials

The stimulus sentences in this experiment were all composed of two simple nouns and one verb. The verbs used were 'push away', 'hit', 'beat', 'jump over', and 'step over'. The nouns were all common animal names such as 'lizard' or 'pig'. The order of the nouns and the verb was always NVN.

The shape of the two noun phrases was specified by the systematic variation of three factors: case marking, number, and animacy. For each of these three cues, there were three levels in a fully crossed $3 \times 3 \times 3$ design. On the first level, the cue favored the choice of the first noun. On the second level, it favored the choice of the second noun. On the third level, the cue was the same for both of the two nouns. For example, the three levels of the case cue were (1) the cue favors first noun, (2) the cue favors second noun, and (3) the cue is neutralized. In addition to the three noun cue factors, there was a fourth factor that varied the number of the verb. This factor was added to see if the effects for singular verbs were the same as the effects for plural verbs. Thus, the complete design of the experiment was:

case marking	(3)
noun number	(3)
animacy	(3)
verb number	(2)

This leads to a total of 54 possible cells. One sentence was constructed for each of the possible cells. In order to further control for possible order effects, three different versions of the test were constructed in which combinations of nouns and verbs and the order of stimuli were further counterbalanced.

Since the verbs were all formed with a verbal prefix, and since both nouns had articles, the actual order of elements was: (article + noun) + (prefix + verb) + (article + noun). For example, one of the stimulus sentences was (5):

- (5) *Egy kutya el-kerget-i egy csacsi-t.
 a dog away-chase-3sg.def a donkey-acc.
 'A dog chases away a donkey'

The verb was always a third person singular definite verb with an unseparated verbal prefix of the type given in (5). The use of prefixed verbs had two advantages. First, prefixed verbs usually denote a specific rather than habitual action. Therefore the reading of the definite article as denoting the generic could be avoided. Second, sentences with unseparated verbal prefixes have a straightforward topic-comment structure, since it is the prefix itself which takes the focus slot, thereby allowing the listener to treat the preverbal noun as given information (É Kiss 1981).

3.2.1. Case-marking variation

The following three sentences illustrate the three basic patterns for case marking, when both nouns are animate, definite, and singular.

- (6) *First noun nominative* (cue favors first noun choice; Nom-Acc)
 A csacsi meg-üt-i a krokodil-t.
 the donkey pref-hit-3.sg.def the crocodile-acc
- (7) *Second noun nominative* (cue favors second noun choice; Acc-Nom)
 A csacsi-t meg-üt-i a krokodil.
 the donkey-acc pref-hit-3.sg.def the crocodile
- (8) *Both nouns nominative* (cue favors neither noun; Nom-Nom)
 *A csacsi meg-üt-i a krokodil.
 the donkey pref-hit-3.sg.def the crocodile

We will refer to these three sentence types as Nom-Acc (Nominative-Accusative), Acc-Nom (Accusative-Nominative), and Nom-Nom (Nominative-Nominative), respectively. For the first two types of sentences we would expect the unmarked

nominative noun to be chosen as the agent. When both nouns are nominative, interpretation would rely on the use of other cues. Note that, whereas (6) and (7) are grammatical sentences in Hungarian, (8) is not. However, as demonstrated in MacWhinney–Pléh–Bates (1985), the interpretation of sentences like (8) follows the same principles as those followed in the interpretation of fully grammatical sentences like (6) and (7).

3.2.2. Number-marking variation

The next three sentences provide examples for the three levels of the factors of number. For clarity of illustration, the cues of definiteness and case marking are balanced in these sentences.

- (9) *Both nouns singular* (cue favors neither noun)
 *A csacsi meg-üt-i a krokodil.
 the donkey pref-hit-3.sg.def the crocodile
- (10) *First noun singular* (cue favors first noun choice)
 *A csacsi meg-üt-i a krokodilok.
 the donkey pref-hit-3.sg.def the crocodile-pl
- (11) *Second noun singular* (cue favors second noun choice)
 *A csacsik meg-üt-i a krokodil.
 the donkey-pl pref-hit-3.sg.def the crocodile

We will refer to these three noun number patterns as Sg-Sg (Singular-Singular), Sg-Pl (Singular-Plural), and Pl-Sg (Plural-Singular), respectively.

3.2.3. Animacy variations

The next three sentences illustrate the three levels of animacy, which we will call Anim-Inan (Animate-Inanimate), Inan-Anim (Inanimate-Animate), and Anim-Anim (Animate-Animate).

- (12) *First noun animate* (cue favors first noun choice; Anim-Inan)
 *A csacsi meg-üt-i a kocka.
 the donkey pref-hit-3.sg.def the block
- (13) *Second noun animate* (cue favors second noun choice; Inan-Anim)
 *A kocka meg-üt-i a krokodil.
 the block pref-hit-3.sg.def the crocodile

(14) *Both nouns animate* (cue favors neither noun; Anim-Anim)

*A csacsi meg-üt-i a krokodil.
 the donkey pref-hit-3.sg.def the crocodile

3.3. Procedure

Pairs of objects were placed in front of the subject. Then a sentence was read aloud and the subject's task was to enact the activity described by the sentence. For example, given a sentence such as 'the cows are hitting the dog', the subject could either pick up the dog and use it to hit the cows or else pick up the pair of cows and use it to hit the dog. Pairs of objects, such as a pair of cows, were mounted together on a small board to facilitate handling. The second author, a native speaker of Hungarian, read the test sentences in a clear normal voice. The full set of 54 test sentences were administered one after another—usually in a single experimental session.

4. Results

4.1. Word order

As in earlier experiments with normals (MacWhinney–Pléh 1997; MacWhinney *et al.* 1985), there was a general tendency to take the first noun as agent. Normals chose the first noun 55% of the time in this experiment, closely matching the 54.3% level of choice for normals found in a parallel study with similar materials by MacWhinney–Pléh (1996). The patient groups all showed higher levels of first noun choice, $F(4,44) = 2.94$, $p < .03$. The levels were 56% for anomics, 57% for Broca's, 60% for Wernicke's, and 75% for Conduction. This marked elevation in the use of the first-noun-as-agent strategy for Wernicke's was also observed in MacWhinney–Osman-Sági–Slobin (1991).

4.2. Case

As in earlier experiments with normals (MacWhinney–Pléh 1997; MacWhinney *et al.* 1985), the main effect of case was highly significant across all five groups, $F(2,88) = 83.77$, $p < .00001$. However, the magnitude of this effect varied greatly across the five groups, $F(8,88) = 14.51$, $p < .00001$. The sharpest use of the cue was in the normal group. Following the normals, come the anomics, the Broca's patients, and finally the Wernicke's and Conduction patients. Figure 1 displays the shape of this interaction. This pattern of sharply diminished use of the case-marking cue in Wernicke's aphasics tightly replicates the similar pattern reported in MacWhinney–Osman-Sági–Slobin (1991).

4.3. Animacy

There was a significant main effect for animacy, $F(2,88) = 6.82, p < .005$. In Anim-Inan (animate first, inanimate second) orders, the percentage choice of the first noun as agent reached 65%. In the Anim-Anim and Inan-Anim orders, choice was at 62% and 55%, respectively. There were no significant differences between the groups in the use of the animacy cue, although the use in the Broca's group had the weakest level of use of the cue.

4.4. Subject-verb agreement

As in earlier experiments with normals (MacWhinney-Pléh 1997; MacWhinney *et al.* 1985), the main effect of agreement between the noun and the verb was highly significant, $F(2,88) = 22.73, p < .00001$. When the agreement cue favored the first noun, choice of the first noun was at 67%. When it favored the second noun, choice of the first noun was reduced to 54%. This overall effect of agreement was modified by three significant interactions. First, there was a significant interaction of subject group with the agreement cue, $F(8,88) = 2.28, p < .03$. The essence of this interaction was that the agreement cue was used more by the normal and Broca's groups than by the other three groups, as is indicated in Fig. 2. As with the processing of the case cue in Fig. 1, the Wernicke's patients show the most severe loss of this grammatical cue.

There was also a significant interaction of case with agreement, $F(4,88) = 6.92, p < .0001$ which is parallel to the one found in MacWhinney-Pléh (1997) with normals. When the case marking cue was absent in the Nom-Nom sentences, the effect of agreement was much stronger. However, this was not true across all of the subject

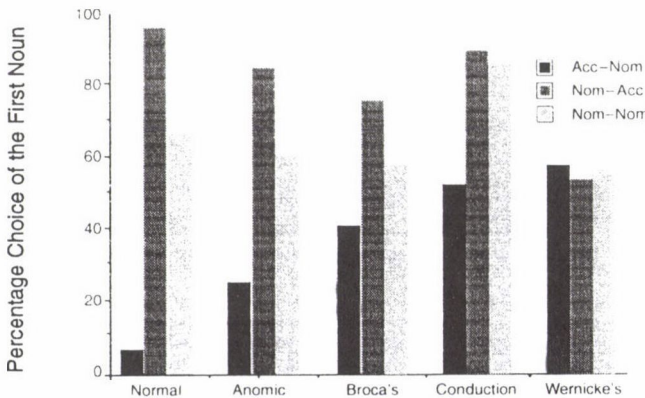


Fig. 1
Differences between subject groups in the use of case marking

groups. Even when there was no case cue, the Wernicke's group differed significantly from the other groups in failing to pick up on this cue, $F(16,176) = 2.28, p < .005$.

4.5. Cue convergence

Smith and Bates (1987) found that their Serbo-Croatian aphasic subjects tended to rely on morphological cues primarily when several cues pointed in the same direction. The Broca's subjects in this experiment showed a similar effect. When the animacy and agreement cues were neutral, the presence of an accusative case marker on the first noun led to a 55% level of choice of the first noun as actor.

When the agreement and animacy cues both pointed toward the second noun as actor, this level of choice dropped to 15%. However, a similar pattern did not appear when the case marker was on the second noun. In such sentences, choice of the first noun as actor by Broca's aphasics remained around 75%, even when animacy and agreement cues were added to the case cue. For Wernicke's aphasics, the addition of more cues made no difference, since choice was generally at chance in all conditions.

5. Summary

This study provides further support for the finding from previous research (Bates–Wulfeck–MacWhinney 1991; MacWhinney *et al.* 1991) that morphological

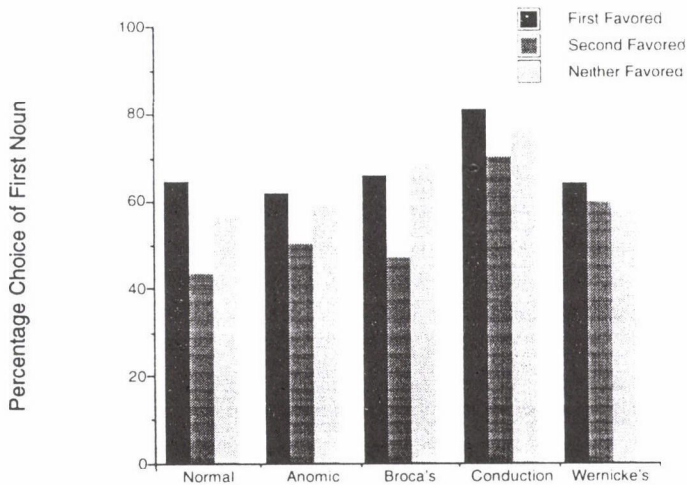


Fig. 2
Use of the agreement cue across groups

cues are particularly vulnerable to loss in aphasia. Overall, the patterns of preservation and loss support the Competition Model notion that strong cues are preserved over weak cues. For the normals and the anomics, the case cue was stronger than the number agreement cue. For the Broca's group, both cues were weakened, but still somewhat operative. Finally, the Wernicke's patients appear to have almost totally lost their ability to use either the case marking cue or the agreement cue. As subjects lose control of these morphological markings, they rely increasingly on animacy and word order strategies.

These data suggest that Wernicke's aphasics may be suffering from a general inability to process morphological markings. However, there is little evidence in this particular study that aphasia damages the agreement cue more than the case marking cue. The greater complexity of the agreement-marking paradigm and the higher level of processing complexity for agreement might have led us to expect to find a higher level of damage of the agreement cue than the case-marking cue. But no such differences were reported. Instead, the most dramatic result of the study is the nearly total loss of both of the grammatical morphological cues in Wernicke's aphasics. It is possible that this extreme loss of ability in the Wernicke's group reflects the loss of some basic ability to process grammatical markers as phonological appendages of stems. Thus, the vulnerability of morphological markings in these patients appears to focus on the basic detection and use of the suffix, rather than on higher-level syntactic processing.

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PERFORMANCE ON SENTENCE REPETITION IN A BROCA'S APHASIC PATIENT

ÉVA MÉSZÁROS

Abstract

Besides spontaneous speech performance a sentence repetition task has got a diagnostical value in the classification of aphasic patients. Verbatim sentence repetition was tested in a Broca's aphasic in this study.

Sixty simple active sentences were used in the first part of the repetition task. The main constituents of the target sentences (Subject, Verb, Object) appeared in all permutations. These sentences contained two-argument transitive verbs and their complements.

The omission of complements was not observed; the characteristic feature was the reversing of the elements of the sentences. A significant tendency could be spotted to keep the Verb and its Object together in repetition of OSV and VSO sentences by moving the Subject from between the Verb and the Object and placing it to the end or the beginning of the sentence.

In the second part of the study 40 sentences with SVO word order were used which also contained a locative adjunct in various positions. The adjunct was frequently omitted regardless of its position in the surface string.

Another general error was the replacement of a definite NP by a bare noun.

The difference between the preservation of the adjunct and the complement during repetition could be in close connection with the semantic representation of the Verb. Information about the complements is represented in the lexical entry of the verb and it is available by accessing the verb from the mental lexicon. On the other hand, adjuncts are not subcategorized for by any element of the sentence.

These results show that the syntactic role of the constituents is more important than the linear order of the elements of a given sentence. The patient's performance in sentence repetition seems to depend not only on the capacity of short term memory but on the operation of lexical, semantic and syntactic processes.

1. Introduction

It is well known that the performance in word-list and sentence repetition tasks has a diagnostic value in the classification of aphasia types. While the preservation of repetition ability is the most characteristic feature of certain aphasia types (such as transcortical aphasias) we find that it is impaired to various degrees and in various forms in other types (Wernicke's, Conduction, Broca's aphasias).

In the literature opinions diverge as to whether repetition is based on the passive span-capacity of short-term memory or on the active processes of various linguistic levels or both of them.

Strub and Gardner's model (1974) interprets repetition disturbances as a result of the impaired function of various linguistic levels. In compliance with it, Broca's and Conduction aphasic patients can perceive acoustic signals. They can classify them as segments of a particular language by analyzing them phonologically but conversion into articulatory patterns is damaged in conduction aphasia and the actual execution of these articulatory patterns is impaired in Broca's aphasic patients. In this latter case spontaneous speech is severely damaged, too. One of the advantages of the model is that it can accommodate any kind of repetition errors but it is unable to explain the subtle differences between them.

McCarthy and Warrington (1984) postulated two separate processing routes for speech production by making a comparison between the repetition and the spontaneous speech performances of three aphasic patients. One of the two separate processing routes requires active semantic analysis of the input and the transcoding of this information to the articulatory output via semantic phonological transcoding. The other one is an auditory phonological transcoding process between a verbal input and an articulatory output. The auditory-phonological transcoding process is damaged in Conduction aphasia but not in the transcortical type giving rise to poor repetition in the former but not in the latter case. Semantic-phonological transcoding is damaged in Transcortical motor aphasia (but not in the Conduction type) causing non-fluent, erroneous spontaneous speech.

This model can explain various repetition and spontaneous speech impairments in the linguistic frame but it cannot explain the observed disparity between the performance on word-lists and sentence repetition in the same aphasic patient.

It is known that the memory span for words is 7 ± 2 in the verbatim repetition while it can extend up to 20 words in sentences (Miller 1956 invokes the notion of "chunk" to explain that inequality in capacity). McCarthy and Warrington (1987) emphasize the fact that there are multiple short-term memory systems and representations that cause double dissociation of the word list and the sentence repetition performance. They argue that sentence repetition is based on a dynamic integrative memory, while word-list repetition relies on a relatively passive phonological store (see Baddeley 1966).

According to this, sentence repetition might be based on the processing of semantic and syntactic information. Davis-Foldi-Gardner-Zurif (1978) examined the influence of semantic and syntactic factors by having transcortical aphasic patients repeat syntactically or semantically anomalous sentences. They concluded that transcortical motoric patients (having a relatively preserved comprehension

ability) were able to utilize semantic information of the components of the anomalous target sentence to produce a syntactically and semantically well-formed sentence. On the contrary, the impaired comprehension of transcortical sensory patients was not helped by the semantic information of the constituents of the target sentence. Despite of this, they were able to produce syntactically correct sentences based on the intact syntactic operations. The authors pointed out that syntactic and semantic information are represented and processed separately, and they might be impaired independently from one another.

Comprehension, production and memory abilities take a prominent part in sentence repetition and in the picture description task as well. Ostrin and Schwartz (1986) investigated the effect of the alternation of semantic and syntactic facts on the sentence repetition performance of the agrammatic patients. They observed that the patients preserved the main grammatical functions of the target sentence occasionally by a degraded "skeleton" trace. The patients made an effort to produce a semantically acceptable sentence on the basis of this "skeleton" subject-verb-object frame.

Emphasizing the constructive and the regenerative nature of immediate sentence repetition, Potter and Lombardi (1990) claim that sentence repetition relies on the conceptual representation of the sentence in the short-term memory and on an activated unordered set of lexical items in the mental lexicon. They found that it was a general sentence production system that operated on the activated lexical items during sentence repetition. The dissociation in performance with the word-lists and the sentence repetition task is due to their different representations.

The Conceptual Regeneration Hypothesis worked out by Potter and Lombardi raises several questions in connection with aphasic patients showing impairment in sentence processing and production. Namely, what kinds of connection exist between comprehension and repetition, how does sentence repetition reflect the impairment of various linguistic levels?

The single-case study method by observation of the performance of an individual patient may contribute to reveal the structure of normal cognitive systems as was mentioned by Caramazza (1986). The present study explores the characteristic features of sentence repetition produced by a non-agrammatic Broca's aphasic patient. The main questions of the study were as follows:

- How does the word order of target sentences influence the recall of the sentences?
- What are the characteristic features of the patient's sentence repetition?
- How may these features be connected to the operation on various linguistic levels?

2. Linguistic background

In Hungarian, according to the hypothesis of non-configurational languages, the arguments of a verb are generated within the VP as sisters of the verb in an unrestricted order in underlying structure. The complements might be affected by some syntactic operations forming the surface structure of the sentence (Fig. 1).

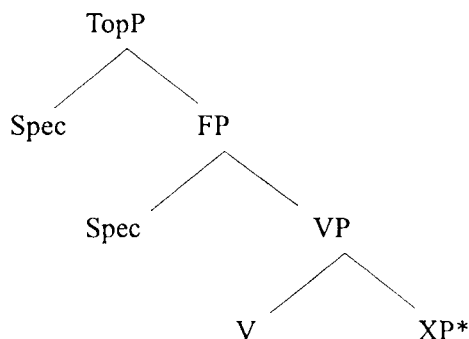


Fig. 1

The basic Hungarian sentence structure as described by É. Kiss (1995)

From a semantic/communicative point of view the [Spec TopP] and [Spec FP] operator positions are the most important structurally defined positions in Hungarian sentences (though these positions may remain empty). The semantic content of the focus operator in [Spec FP] is identification. The focus operator at the beginning of the predicative part of a sentence represents the main assertion in the sentence. Any maximal major category moved into this position may be interpreted as the focus of the sentence. (The focus feature can be assigned by a verb to an adjacent constituent governed by it (Kálmán 1985b; É. Kiss 1994; Bródy 1990). A corrective sentence containing a focused constituent has got a particular intonation pattern, the focus receiving the main stress of the sentence in the phonological component. That is, the primary stress on a focused element eradicates the stress of all subsequent constituents (Kálmán 1985a). (A prefix in the focus position has no identifying role: it is interpreted as an aspectual operator. In this case the prefix makes the sentence perfective.)

A sentence with constituents of equal stress is called a level prosody sentence. According to Kálmán (1985a), there is a stressed position immediately preceding the finite verb reserved to particular constituents in such sentences. This position, called Hocus, may be occupied by special adverbs and by several kinds of verbal

modifiers among others. A verb and a modifier, appearing in this position form a complex predicate. In the case of a bare noun modifier, the argument of the verb (expressed by the bare noun) is incorporated into the verb.

One or more constituents may be preposed from the base generated position to Topic position(s) (to [Spec TopP]), serving as the logical subject of the sentence. These sentences make a statement about the topicalized constituent. Nevertheless, there are several restrictions on what kinds of constituent may function as a topic. Only referring expressions are allowed to appear in this position. Specificity, animacy and the thematic role of the constituent also have an influence on the selection of the topic. It is most likely that a constituent having the features [+animate], [+human] and the Agent thematic role to be topicalized contrasts with another complement of the sentence possessing the features [-animate], [-human] and the Patient thematic role (as was mentioned by Kálmán 1985b; É. Kiss 1987).

- (1) A papa felvágta a fát. SVO
 the father–nom up[pref]+cut–past.3sg the tree–acc
 ‘The father cut up the tree’
- (2) A fát felvágta a papa. OVS
 the tree–acc up[pref]+cut–past.3sg the father–nom
 ‘The tree was cut up by the father’

The SVO sentence (1) seems to be more neutral (unmarked) than the OVS sentence (2) because the topicalized subject possesses the features [+animate], [+human], and [+specific], and its thematic role is Agent.

In the case of sentences containing more than one topic, all permutations of the topicalized constituents are permitted and their reordering does not change the meaning of the sentence.

- (3) A fát a papa felvágta.
 the tree–acc the father–nom up[pref]cut–past.3sg
 ‘The tree was cut up by the father’
- (4) A papa a fát felvágta.
 the father–nom the tree–acc up[pref]+cut–past.3sg

However, sentences (3) and (4) are both marked in the general perceptual-strategies sense mentioned by Bever (1970). That is, we are susceptible to interpret a surface NP–V–NP sequence as an actor–action–object sequence without any deeper syn-

tactic analysis as was mentioned by Pléh (1989). In compliance with this, the comprehension of an SVO sentence is easier than that of an SOV, OSV, OVS, or any other sentence.

A sentence with the word order VOS or VSO without a pre-verbal part is considered to be a complex predicate. These verbal sentences are marked as not expressing a statement about anybody or anything, but they refer to an event in contrast to OSV/SOV/SVO/OVS having a topic–predicate structure as described by Kálmán (1985a).

Komlósy (1994) analyzed complex predicates containing a bare noun and a verb (e.g. *újságot olvas* ‘he is reading a newspaper’). He reports that the verb is affected by a lexical operation resulting in binding the object argument slot by an existential quantifier. The lexical semantic structure of a verb like this does not contain a syntactic object argument slot, it is not allowed to take a specific NP as an object. In the case of a pure transitive prefixed verb it is the prefix that takes certain verbs containing an unbound (object) argument slot as arguments forming a complex predicate. The prefix+verb together as a new complex predicate make restrictions on the form of its arguments.

Several verbs including prefixed ones trigger the Specificity Effect. These predicates require that their Object/Subject complements be specific. In this case the prefix functions as a perfective operator so these sentences assert the perfectivity of an action. Consequently, the existence of the participants are presupposed and only specific NPs are tolerated by these verbs as stated by É. Kiss (1995) and shown in the contrast between (5) and (6).

- (5) A zoknit a kisfiú kimosta.
 the socks–acc the boy–nom out[pref]+wash–past.3sg
 ‘The boy has washed out the socks’
- (6) *Zoknit kisfiú kimosott.
 socks–acc boy–nom out[pref]+wash–past.3sg
 ‘The boy washed out socks’

The bare noun has a non-specific reading in examples like (6) thus its co-occurrence with a prefixed verb (the prefix occupying the focus position) results in an agrammatical sentence.

The lexical entry of a verb contains information about its syntactic category, phonological form, subcategorization frame, thematic information and argument structure. The argument frame representation plays an important role in sentence processing and production by interfacing the lexical–semantic representation with the underlying structure of the sentence in which the verb occurs. The argument

structure as supposed by Grimshaw (1992) is a structured representation which originates from different prominence relations between the arguments. The judgement of prominence is based on a thematic and aspectual role hierarchy. The most prominent argument in both respects will be the subject in the surface structure of the sentence. There are languages in which this hierarchy is reflected by configurationality and a position in the argument structure corresponds to a particular structural position in the surface structure (in the tree). But this is not the case in Hungarian in which the argument-structure position is marked by suffixes and it has no effect on word order.

The verbs may differ in their thematic complexity which depends on how many thematic frames a verb has. A verb with one thematic frame is considered less complex than a verb with two or more thematic frames (e.g. *drink* is simpler than *send*). The complement representing an argument may be obligatory or optional. The occurrence of an adjunct is always optional for it does not match the thematic frame of a predicate. It provides information on the manner, time or place of the event expressed by the sentence. Information regarding the arguments becomes available by accessing and recalling the lexical item corresponding to the verb from the mental lexicon. The lexical item does not contain any information regarding adjuncts because verbs do not select adjuncts.

The argument/adjunct distinction is important in processing and producing a sentence. In neurological patients Shapiro–McNamara–Zurif–Lanzoni–Cermak (1992) found that sentences containing a PP adjunct were more difficult to repeat for amnesic patients than sentences in which the PP was an argument.

Lexical representations and syntactic operations seem to have an influence on sentence reconstruction. The present study makes an attempt to investigate the importance of constituent order and the various syntactic roles of constituents on sentence repetition in an aphasic patient.

3. Method

3.1. Subject

Our subject was a right-handed left-side damaged 17-year-old grammar school boy. The CT scan showed a tumor in the fronto-temporo-parietal part of the left hemisphere. The patient was investigated for this study one year after the tumor had been removed. He was categorized as Broca's aphasic using the Western Aphasia Battery (adapted to Hungarian by Judit Osman-Sági). He produced simplified syntactic structures in his non-fluent spontaneous speech but omission of grammatical morphemes were not characteristic of his speech. Besides intact comprehension he

had a severely restricted immediate memory span of two items in the repetition of word-lists containing five words each.

3.2. Material

Simple active sentences involving past tense prefixed transitive verbs and their obligatory complements were used for repetition. The only role of the prefixes was to make the verbs perfective. The investigation comprised two subtests. In the first subtest the main constituents (subject, verb, object) of 60 target sentences appeared in all permutations to control for the possible effects of the position of the elements that was observed in the case of the word list repetition by the same patient. In compliance with this, target sentences were as follows:

I	SVO
II	SOV
III	VOS
IV	VSO
V	OVS
VI	OSV

Besides the SVO order of the constituents a locative adjunct was inserted into 40 target sentences to increase sentence length in the second subtest. (SVO sentences were used only because this type was the most successfully repeated in subtest 1.) The adjunct was placed in every possible linear position of the sentence. The constituent order in the sentences was as follows:

I	AdjSVO
II	S AdjVO
III	SV AdjO
IV	SVO Adj

Sentences with neutral intonation were read once by the experimenter and the patient was asked to repeat them verbatim. The most complete answers were accepted from the patient's several attempts to repeat exactly the target sentences. Testing was done on five consecutive sessions. That reduces the chance of his familiarity with the task and ad hoc strategies.

4. Results

4.1. Word order alteration when there is no adjunct in the structure

The alteration of the main constituent order was the most characteristic feature of the patient's answers. Among the answers those that contained the constituents in the right order were considered accurate answers. Sentences in which the reproduced word order did not correspond to the target sentence order were accepted as altered sentences. Sentences involving only two constituents were regarded as unacceptable sentences because the missing subject or the object of the sentence could not be reconstructed from the context.

Table 1
Number of correct items out of 10

target sentences	accurate sentences	altered sentences	unacceptable sentences
I SVO	7	3	0
II SOV	5	5	0
III VOS	5	4	1
IV VSO	0	8	2
V OVS	5	5	0
VI OSV	1	9	0
All	23	34	3
n%	38.33%	56.66%	5.00%

Table 1 shows that word order alteration could be found in all types, even in SVO sentences which proved to be the easiest ones. On the other hand, OSV and VSO sentences turned out to be the most difficult ones for the patient. Investigating more closely the altered sentences the production of SVO order was dominant (Table 2).

Table 2
Proportion of word order types in altered answers

Target sentence		SVO	SOV	VOS	VSO	OVS	OSV
I	SVO		2		1		
II	SOV	5					
III	VOS	2	1		1		1
IV	VSO	2	1	2		2	1
V	OVS	4		1			
VI	OSV	1		1	1	5	
	All	14	4	4	3	7	2
	n%	41.17%	11.76%	11.76%	8.82%	20.58%	5.88%

Comparing the correct (accurate) and incorrect (altered and unacceptable) answers the following scale can be formed.

Correct answer types (23) **SVO > OVS = SOV = VOS > OSV > VSO**

Inaccurate answer types (37) **SVO > OVS > SOV = VOS > VSO > OSV = VO > VS**

4.2. Omission of adjuncts

The repetition of sentences containing an adjunct proved to be the most problematic for this aphasic patient. Generally, the number of correct repetitions was low. The answers involving the adjunct in the same position as in the target sentences were regarded correct (5.0%). Acceptable answers (17.5%) were the ones which contained the adjunct but not in the original target sentence position. In the unacceptable answers (77.5%) the adjunct or one or more constituents were omitted (Table 3).

Table 3.
Distribution of correct, acceptable and unacceptable answers

Target sentences		correct answers	acceptable answers	unacceptable answers
I	Adj S V O	0	1	9
II	S Adj V O	0	0	10
III	S V Adj O	1	2	7
IV	S V O Adj	1	4	5
	All	2	7	31
	n%	5.0%	17.5%	77.5%

The reproduction of the adjunct was not equally difficult in each position. Sentences where the adjunct followed the SVO sequence were more successfully reproduced than those containing the locative adjunct between the main constituents. Unacceptable answers were mainly omissions of adjuncts but complement omissions also occurred (see Table 4).

Table 4
Distribution of various constituent omissions in unacceptable answers

Target sentences		adjunct omission	adjunct and complement omission	subject or object omission	semantic decomposition
I	Adj S V O	5		3	1
II	S Adj V O	7	1	2	
III	S V Adj O	7			
IV	S V O Adj	3		1	1
	All	22	1	6	2
	n%	55.0%	2.5%	15.0%	5.0%

4.3. Substitution by indefinite NP

In comparing subject topicalization with object topicalization in altered sentences (in subtest one) we found that subjects were more frequently topicalized than objects (Table 5).

Table 5
Proportion of topicalized and non-topicalized complements in the target and the answer sentences

	TARGET sentences	ANSWER sentences
number of the topicalized subjects	30 (55.9%)	33
number of the topicalized objects	30 (38.9%)	23
number of the subjects in VP	30 (43.4%)	25
number of the objects in VP	30 (61.0%)	36

The definite subject and object NPs were frequently replaced by indefinite NPs expressed by bare nouns in answers. Comparing the structural positions of the definite (specific) and the indefinite (non-specific) NPs we found that the Topic position is more frequently occupied by an indefinite NP than by a definite one. Furthermore the definite NPs often occupied a position in the VP. Similar phenomena were found in repetition of sentences containing a verb and its complements and a locative adjunct (see Table 6).

Table 6

Proportion of definite (specific) and indefinite (non-specific) NPs in various syntactic positions

Sentences containing main constituents only				
	definite NP in Topic	definite NP in VP	indefinite NP in Topic	indefinite NP in VP
target				
sentences	60	60		
answers	17	34	39	27
Sentences containing main constituents and an adjunct				
	definite NP in Topic	definite NP in VP	indefinite NP in Topic	indefinite NP in VP
target				
sentences	60	60		
answers	22	30	19	12

We found definite/specific and indefinite/non-specific NPs in topic position and in the VP as well but the specific ones often remained in a VP position.

5. Discussion

This study presented the performance on the sentence repetition task of a non-agrammatic Broca's aphasic patient. The characteristic features of the repetition were as follows:

- The patient made an effort to keep the verb and the object together in a surface string.
- Argument and verb omission was rarely found but the adjuncts were frequently omitted or substituted by a semantically related word.
- The patient showed a tendency to replace the definite specific NP complement by an indefinite non-specific bare noun in his answers.

The conceptual regeneration hypothesis advanced by Potter and Lombardi (1990) was the starting point of the present study. According to this concept, the immedi-

ate recall of a word-list and a sentence relies on different representations in the Short-Term Store. The former relies on an auditory representation where the order of elements is preserved. On the other hand, sentence repetition is based on a conceptual representation. According to this schema the process of sentence repetition would be as follows: first of all the conceptual representation of the intended answer-sentence is taking on the basis of the meaning of the previously heard target sentence in the Short-Term Store. Accordingly, the appropriate lexical items (and only those) will be recently activated in the mental lexicon. The cardinal assumption is that these lexical items constitute an unordered set and the general sentence production system, involving syntactic, morphological, and phonological modules, operates on them to produce the answer-sentence.

Accepting this assumption, the different characteristic features found in the sentence repetition of this patient might be attributed to several reasons. They might arise from the impairment of sentence comprehension on the one hand or from the damage of the sentence production system on the other. In the latter case, accessing or recalling the required lexical items or the operation of various linguistic modules might be difficult. So the impairment of various linguistic processes must be reflected in sentence repetition.

Considering the above-mentioned factors, several possible reasons can be used for explaining the characteristic features found in sentence repetition.

The main assumption of the above-mentioned hypothesis is that the basis of sentence repetition is the conceptual representation of the answer sentence and the activated set of required lexical items in the mental lexicon. The latter ensures the verbatim nature of immediate recall from the Short-Term Store. But if this was true, how could some answer-sentences involve a word which was not present in the target sentence?

(7) T: A titkárnő *legépelte* a levelet.
 the secretary-nom pref-typed-3sg the letter-acc
 'The secretary has *typed* the letter'

A: A titkárnő *leírta* a levelet.
 the secretary-nom pref-wrote-3sg the letter-acc
 'The secretary has *written* the letter'

(8) T: A szerelő *megjavította* a fürdőszobában a csapot.
 the plumber-nom pref-repaired-3sg the bathroom-in the tap-acc
 'The plumber has *repaired* the tap in the bathroom'

A: *Megcsinálta* a csapat a szerelő.
 pref+made-3sg the tap-acc the plumber-nom
 'The plumber has *made* the tap'

The patient replaced the target verb containing a specific lexical meaning component in its semantic representation by a verb with a less specific semantic content. The semantic content of the verb *legépel* 'type' in example (7) is more specific than the meaning of the verb *ír* 'write'. In a sense the meaning of the former involves the instrument of the activity besides the general meaning "to write". In example (8) the target verb *megjavít* 'repair' presupposes that the object of the activity is in a "bad state" or "out of order". The lexical semantic content of the substituted verb *megcsinál* 'make' has a wider meaning including the component of "creating sg new".

(9) T: A fát *kivágták* a favágók.
 the tree-acc out+cut-3pl the woodmen-nom
 'The woodmen have cut the tree'

A: Favágók *kiverték* a fát.
 woodmen-nom out+beat-3pl the tree-acc
 'Woodmen have beaten out the tree'

(10) T: A virágokat *megöntözte* az eső.
 the flowers-acc pref+watered-3sg the rain-nom
 'The rain has *watered* the flowers'

A: A virágokat *belepte* eső.
 the flowers-acc pref+covered-3sg rain-nom
 'Rain has *covered* the flowers'

Examples (9) and (10) show that the patient decomposed the integrated internal lexical structure of the target verb. He extracted a motion component from it and this component is expressed by the new verb in the answer sentence. In (9) the meaning component *üt* 'hit, strike' is picked out of the lexical meaning of the original verb *vág* 'cut' and that is emphasized by using the verb *ver* 'beat'.

(11) T: A szobrot a szobrász elkészítette.
 the sculpture-acc the sculptor-nom has pref+made-3sg
 'The *sculptor* has made the sculpture'

A: A szobrot elkészítette a festő.
 the sculpture-acc pref+made-3sg the painter-nom
 'The painter has made the sculpture'

(12) T: A zöldséget megvették a vevők.
 the vegetable-acc pref+bought-3pl the customers-nom
 'The customers bought the vegetable'

A: Az árut megvették a vevők.
 the goods-acc pref+bought-3pl the customers-nom
 'The customers bought the goods'

In some answer sentences the object or subject NP is altered. In one case (11) the substituted and the target noun fall in a common superordinate category (i.e. *szobrász* 'sculptor' and *festő* 'painter'). In another case, in example (12), the meaning of the substituting noun is more general than that of the target. The target word *zöldség* 'vegetables' is a member of the superordinate category expressed by the substituting noun *áru* 'goods'.

To summarize the above-mentioned main suggestion: the replacement of the target noun or verb never alters the whole meaning of the target sentence and the new verb always agrees with the original target verb in argument structure. How can we account for this semantic paraphasia?

One possibility is that the conceptual representation of an intended answer sentence does not correspond to the target sentence meaning because of the impaired comprehension of the patient. Nevertheless, in our case the patient had an adequate sentence comprehension.

The second possibility is that the patient can construct a suitable conceptual representation and the right lexical items will be activated. But this activated state is preserved for a very short time due to his restricted memory span. This short period is not sufficient for reconstructing the target sentence verbatim. Thus, the patient must rely solely on the conceptual representation of the whole sentence so he can activate any lexical item which corresponds to this representation. Accordingly, if the patient has a word selection disturbance or impairment in accessing of lexical items these will be reflected in sentence repetition, too. Presumably our patient was not able to preserve the activated lexical item and this caused the substitution in answer sentences.

One of the answer sentences, namely (13), contained another feature: the decomposition and extension of the meaning of the whole target sentence.

(13) T: A könyvtárban a lány meglátogatta a barátját.
 the library-in the girl-nom visited 3sg the her-girlfriend-acc
 'The girl visited her girlfriend in the library'

A: Könyvtárban dolgozott.... lány könyvtárban van..... megbeszélte ötre
 library-in worked-3sg girl library-in is discussed-3sg five-onto
 '(She) worked in library... Girl is in library... (She) made an appointment for
 five...'

Presumably the patient was able to perceive and process the target sentence and was able to construct the conceptual representation of the answer sentence but the reconstruction was modulated by an additional element such as 'knowledge about the world' which contains experience related to a possible situation.

While the previously mentioned characteristic features could be in close connection with sentence representation, the phenomena of subject replacement and adjunct omission might be connected to the operation of the general sentence production system in an activated set of lexical items. As it is well known, the verb has the most important role from the point of view of sentence production (see section 2). The verb theta-marks its arguments and the argument structure is respected in the course of theta-marking. In the case of a pure transitive verb having two argument slots—one of them for Agent and the other for Patient—the Patient, which is the closest argument, will be filled and theta-marked first because the Patient thematic role is lower in the argument hierarchy than the Agent. The argument structure has an effect on the syntactic role of the arguments too, since the most prominent Agent will be realized as the Subject and the Patient as the Object of the sentence in the surface structure. (In English the most prominent argument will be the external argument and the other ones will be the internal arguments of the verb. The external vs. internal distinction is mapped onto the surface linear order of the constituents.)

In Hungarian the syntactic roles are realized by morphological devices in surface structure. The subject gets a nominative case marker and the object gets the accusative. A close semantic and thematic relation of the verb and its object complement might be reflected in the strong tendency found in the patient's performance. In the repetition of VSO and OSV target sentences he made an effort to keep the verb and its object together in the surface structure by preposing or postposing the subject (in examples (14)–(19)).

(14) T: A kerítést a férfi befestette.
 the fence-acc the man-nom pref+painting-3sg
 'The man has painted the fence'

A: Kerítést befestette a férfi.
 fence-acc pref+Painted-3sg the man-nom
 'The man has painted fence'

(15) T: A ruhát a varrónő átalakította.
 the dress-acc the dressmaker-nom pref+made-3sg
 'The dressmaker has remade the dress'

A: Ruhát átalakította a varrónő.
 dress-acc pref+made-3sg the dressmaker-nom
 'The dressmaker has remade dress'

(16) T: A kenyeret a gyerekek megették.
 the bread-acc the children-nom pref+ate-3pl
 'The children have eaten the bread'

A: Gyerekek megették a kenyeret.
 children-nom pref+ate-3pl the bread-acc
 'Children have eaten the bread'

(17) T: Levágta a lány a haját.
 pref+cut-3sg the girl-nom the her hair-acc
 'The girl has cut her hair'

A: Levágta haját a lány.
 pref+cut-3sg her hair-acc the girl-nom
 'The girl has cut her hair'

(18) T: Megnézte a néni a filmet.
 pref+saw-3sg the woman-nom the film-acc
 'The woman has seen the film'

A: Megnézte filmet.....
 pref+saw-3sg film-acc
 'Has seen the film'

(19) T: Kimosta a fiú a ruhát.
 out+washed-3sg the boy-nom the dress-acc
 'The boy washed the dress'

A: Kimosta a ruhát.....
 out+washed-3sg the dress-acc
 'Washed the dress'

While obligatory complements were rarely omitted, the most frequent phenomenon was the omission of adjunct elements in sentences containing main constituents and a locative adjunct as in (20)–(23).

(20) T: Az utcán a kutya megugatta a járókelőket.
 the street-on the dog-nom pref-barked-3sg the passers-by-acc
 'The dog barked at the passers-by in the street'

A: Járókelőket megugatta a kutya.
 passers-by-acc pref-barked-3sg the dog-nom
 'The dog barked at passers-by'

(21) T: A mosókonyhában a nő kimosta a ruhákat.
 the wash-house-in the woman-nom out-washed-3sg the clothes-acc
 'The woman washed the clothes in the wash-house'

A: Kimosta ruhákat mosónő.
 out-washed-3sg clothes-acc washer-woman-nom
 'Washer-woman washed clothes'

(22) T: A róka az erdőben megfogta a nyulat.
 the fox-nom the forest-in pref-caught-3sg the rabbit-acc
 'The fox caught the rabbit in the forest'

A: Róka megfogta a nyulat.
 fox-nom pref-caught-3sg the rabbit-acc
 'Fox has caught the rabbit'

(23) T: A gólya megette a békát a parton.
 the stork-nom pref-ate-3sg the frog-acc the bank-on
 'The stork has eaten the frog on the bank'

A: A gólya megette a békát.
 the stork-nom pref-ate-3sg the frog-acc
 'The stork has eaten the frog'

This strong tendency might be due to several facts. One of them is that there are differences in the representation of propositional and contextual information in a sentence. The former has the most important role in comprehension and production by containing the verb and its obligatory arguments. The contextual part gives information about the circumstances of the event expressed by the strictly propositional part of the sentence. It seems that our patient made an effort to produce the propositional part of the sentence according to the propositional representation. In this process, the verb and information concerning the obligatory arguments have become accessible. During this time the contextual representation must have been preserved. The adjunct components are omitted when the context-representation and the activated state of the particular lexical item are no more available. It seems that this is the case with our patient in the repetition of S Adj V O and S V Adj O sentences because he did not even try to correct incomplete answer-sentences. Note that sentences involving the adjunct after the SVO sequence fared better.

The lexical entry of a verb not only selects for complements but certain properties of obligatory complements are also represented. Some verbs require that their object and/or subject be definite, others are compatible with only indefinite ones. The verb and its object must always agree in specificity (see section 2). The most common feature of the patient's answers is that the verb and the object do not agree in terms of the definiteness of the verb as a result of the unsatisfactory operation of the syntactic level.

(The appearance of an indefinite NP expressed by a bare noun in several answer sentences might be caused by complement movement. According to this hypothesis the bare noun is not the result of substitution but that of the "damage" done to the definite NP—by the omission of the article—in the course of moving the NP into the topic position. But this assumption is inconsistent with the fact that definite article omission was observed on non-moved constituents in VPs as well.)

There are some answer-sentences in which a complex predicate appears instead of a prefixed verb and its definite NP object (in (24)–(26)).

(24) T: A ruhát megvarrta a varrónő.
 the dress-acc pref+sewed-3sg the dressmaker-nom
 'The dressmaker has sewn the dress'

A: Ruhát varr.
 dress-acc sew-3sg
 '(She is) sewing a dress'

(25) T: Megette a csontot a kutya.
 pref+ate-3sg the bone-acc the dog-nom
 'The dog has eaten the bone'

A: Csontot evett.
 bone-acc ate-3sg
 '(It was) eating a bone'

(26) T: A képet kiszínezte a kislány.
 the picture-acc pref+coloured-3sg the girl-nom
 'The girl has coloured the picture'

V: Képet színez a lány.
 picture-acc colour-3sg the girl-nom
 'The girl is colouring a picture'

In the cases *ruhát varr* 'sew a dress', *csontot eszik* 'eat a bone', *képet színez* 'colour a picture' the singular bare noun is incorporated in the object argument slot of the base verb. The order of elements is fixed in these constructions: the verb is preceded by the bare noun. Probably this kind of complex predicate consists of an independent lexical entry in the mental lexicon and no syntactic operation is needed to produce them. Recalling a similar lexical entry might be easier for the patient than recalling the original lexical entry of the verb and its arguments.

6. Summary

The main results of this study are as follows:

Sentence repetition is modulated by the syntactic roles of the constituents rather than their surface linear position. It seems that it is the original verb and its argument structure that are preserved. That is why the omission of complements is rare in contradistinction to optional adjunct elements, which are not represented in the lexical entry of a verb in the mental lexicon.

The patient preferred the unmarked SVO word order to the marked ones.

The lack of the definite article may originate from the impairment of the agreement between the verb and its complements.

These findings may be explained if we suppose an interaction between the various types of representation (conceptual, lexical) in Short-Term Store. According to this, the recall of the sentences begins with the creation of the conceptual meaning representation of the answer sentence on the base of the target sentence. At the same time the corresponding lexical items will be activated in the mental lexicon. Paraphasia may arise when the originally activated lexical items are not available because of limited memory span. In cases like this the patient must activate lexical items on the basis of the conceptual representation of the intended sentence. These items may differ from the original items in semantic representation but they never cause considerable change in sentence meaning. The general sentence production system operates on these lexical items. Thus an impairment in syntactic or lexical operations may be reflected in disturbances of sentence repetition.

Supposing that the same or nearly the same general sentence production system operates on sentence repetition and spontaneous speech, it is reasonable to suppose that the impairment in production would be caused by the same or nearly the same phenomenon in both of them. It would be interesting to compare the tendencies found in sentence repetition with the errors in the spontaneous speech of the same patient.

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THE ROLE OF FOCUS-BASED INFERENCES IN ANTECEDENT MATCHING: TOPIC FOREGROUNDING AT THE CLAUSE-BOUNDARY

GYÖRGY GERGELY

Abstract

This paper examines the role of topic–focus (TF) structure in processing complex sentences. It is argued that relying on TF structure listeners compute focus-based elaborative inferences to directly integrate clausal propositions into a discourse structure representation. This hypothesis is tested using an on-line probe recognition task in Hungarian sentences which mark TF structure by explicit structural cues. It is shown that at the clause-boundary of initial subordinate clauses listeners compute focus-based predictive inferences which foreground the initial clause topic NP that is expected to serve as the discourse antecedent for the final clause. It is argued that such discourse inferential processes are jointly determined by (i) TF structure, (ii) inter-clausal semantic relations, and (iii) pragmatic knowledge. Based on the results the paper reexamines earlier models of clause-boundary bound processes in sentence comprehension, arguing that the processing concentrated at the end of the clause involves across-clause predictive inferences serving discourse interpretational functions.

1. Introduction

1.1. The discovery of clause-boundary effects and the clausal recoding hypothesis

During the classical phase of modern psycholinguistic research (see Fodor–Bever–Garrett 1974) the primary aim of studies on language processing was to test the psychological reality of structural analyses of sentences proposed within the framework of generative grammar (Chomsky 1957; 1965). One of the major empirical accomplishments of this line of research was the discovery of a set of behavioral phenomena which provided converging evidence suggesting that the **syntactic clause** has a special perceptual status in sentence processing. Briefly, this evidence consisted of the following three main aspects of clausal processing:

(a) **Perceptual closure around the clause.** Clicks that physically occur just before the end of the clause were shown to be systematically perceived and remembered as occurring in the clause-boundary (e.g., Fodor–Bever 1965; Bever–Lackner–Kirk 1969; Garrett–Bever–Fodor 1966; Fodor–Fodor–Garrett–Lackner 1974).

(b) **Increase in local processing load at the end of the clause.** Reaction times to clicks were found to be slower when they occurred right before the end of the clause than when heard after the clause-boundary (e.g., Abrams–Bever 1969). Similarly, the detectability of clicks was lower just before than shortly after the clause-boundary (e.g., Bever 1968; Bever–Hurtig, 1975).

(c) **Decreased accessibility of lexical material after the clause.** Verbatim recall was found to be better from a second clause than from a first one (Jarvella 1971; Jarvella–Hermann 1972). Recognition latencies were shown to be longer when the target word appeared in the first clause than when it occurred in the second one (in these studies the serial distance of the word probe from the point of testing was held constant) (Caplan 1972; Walker–Gough–Wall 1968).

These findings were given a comprehensive interpretation in terms of the “clausal recoding hypothesis” (see Fodor–Bever–Garrett 1974), which considered the clause-boundary effects as evidence for the psychological reality of syntactic structural representations. It was proposed that, as the listener proceeds within the clause, he employs surface grammatical cues to set up “candidate analyses” about the underlying constituent structure for the clausal sequence.

Thus, in this model the end of the clause became to be seen as the point at which the processor evaluates and decides (hence the local increase in processing load) between the candidate analyses developed during the clause, in the light of the complete set of grammatical cues available at the end of the clausal unit. The candidate analysis chosen is, then, retained and encoded into a more abstract representational format, while the alternative, aborted structural hypotheses together with the surface aspects of the clausal representation (such as phonological, or word order information) are erased from working memory (hence the decrease in relative accessibility of lexical material after the clause-boundary).

There are two basic assumptions of this early model of clausal processing that should be made explicit here: (a) The local increase in processing load at the end of the clause was seen as due entirely to **within-clause processes** of assigning underlying grammatical roles to clausal constituents, and (b) the output structure of this process was considered to be the **linguistically defined deep structure representation** of the clause.

In contrast, the present study will examine the role of clause-boundary bound processes from a discourse interpretational perspective. It will be demonstrated that, at least, a significant part of the processing concentrated at the end of the clause can be attributed to **across-clause predictive inferences** involved in antecedent matching during the direct construction of a discourse interpretational model for the sentence.

1.2. The role of discourse structure in sentence comprehension

When understanding sentences in discourse, the identification of single propositional units is only part of what the listener has to accomplish. The sequential propositional structures also have to be related to each other, and they have to be integrated into the larger discourse structure representation already established in the listener's memory.

We can differentiate between two major aspects of propositional integration, which are, nevertheless, intimately related in discourse processing. One concerns the way in which the new information in each propositional unit is identified and related to the appropriate part of the already established discourse representation. The second aspect of discourse integration concerns the encoding of the interpropositional semantic relations (e.g., temporal, causal, adversative) through which clausal propositions of complex sentences are related to each other in the discourse structure. Below I shall argue that, in achieving both of these discourse integrational tasks, the listener relies heavily on cues of discourse segmentation that allow him to identify the **topic-focus (TF) structure** of sentences.

Sentences provide cues that allow the listener to identify two distinct parts of the expressed proposition: (i) what is variably called 'topic', 'old', or 'given' information, that the sentence is 'about', and that has typically been already established (or is readily inferable) in the listener's memory; and (ii) what is called 'comment', or 'new' information, that the speaker asserts about the topic, and that he believes to be not yet represented in the listener's memory (see Halliday 1967; Chafe 1970; 1976; Chomsky 1971; Jackendoff 1972; Reinhart 1981). The most prominent constituent, both semantically and phonologically, of the latter part of the proposition is the sentence 'focus' which receives the primary stress of the sentence (e.g., Chomsky 1971; Sgall-Hajičová-Benešová 1973; Szabolcsi 1981).

The sentence **topic** is that part of the informational structure under construction to which the new information, encoded by the sentence **focus**, is to be related. Therefore, to successfully integrate a new propositional sequence into the discourse structure, the sentence has to provide sufficient cues for the listener to segment the proposition into its 'given' and 'new' parts. How does the listener identify the TF structure of sentences during comprehension, and how does he employ this information in on-line processing?

1.3. The role of topic-focus structure in discourse antecedent matching

In a series of experiments, Clark and Haviland (Clark-Haviland 1974; 1977; Haviland-Clark 1974) demonstrated that during comprehension the listener relies on TF structure to relate the new information in a propositional sequence to some previously established antecedent representation in the discourse. In particular,

they hypothesized that the identification of the sentence **topic** leads to a **backward search for a matching antecedent** in the discourse structure. If no direct match is found, the listener has to infer an antecedent on the basis of his pragmatic knowledge.

But Clark and Haviland's data consisted of post-sentence measures of overall comprehension times. Clearly, while such studies do imply that listeners rely on the discourse functions (topic vs. focus) of constituents for establishing discourse antecedent relations, they, nevertheless, fail to show how and when this process takes place during on-line processing. For example, is the backward search for a discourse antecedent initiated as soon as the topic of the sentence is identified? Or is the information provided by TF structure employed only after the syntactic and semantic processing of the sentence is complete?

To answer such finer-grained questions about the processing of discourse informational cues, one needs to employ on-line measures, as exemplified by the studies of Cutler (1976) and Cutler–Fodor (1979). These authors demonstrated that listeners actively search for the **focus** while they process a sentence, as shown by shorter phoneme-monitoring latencies when the target word is focussed than when it is not. Their results indicate that the focus is differentially processed already before the end of the sentence is reached (see also Crain–Steedman 1985). This finding, then, is consistent with the hypothesis that the on-line identification of TF structure directly initiates a backward search for a discourse antecedent.

In this paper I shall argue that TF structure, apart from triggering a backward search for antecedents, is also involved in generating **predictive inferential processes** that serve the discourse integration of complex sentences. In particular, it is hypothesized that during the processing of an initial subordinate clause the listener computes a **focus-based predictive inference as a result of which the initial clause constituent, that is likely to serve as discourse antecedent for the next clause, is foregrounded** (i.e., made more accessible by becoming selectively activated) **at the clause-boundary**. The hypothesized processing function of this inferential process is that of feeding the backward search for antecedents in the upcoming clause by making the likely candidates from the initial clause more accessible for efficient antecedent matching.

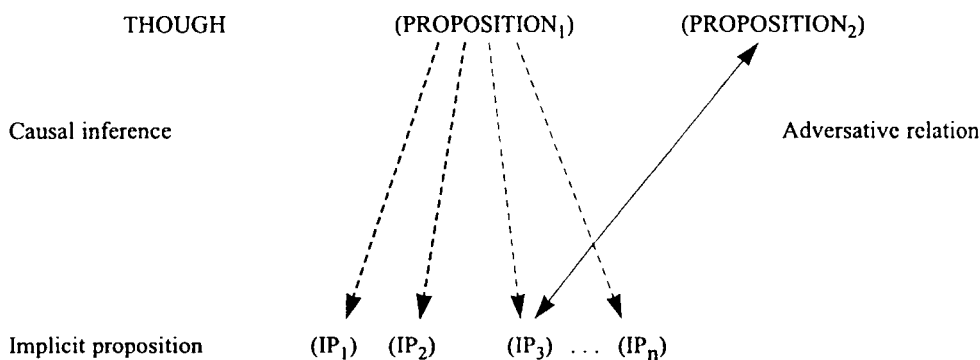
1.4. Focus-based inferences:

The interpretational structure of adversative subordinate constructions

Let us illustrate the above hypothesis by considering the structure of inferential relations that the listener has to establish when comprehending a two-clause adversative subordinate construction. Consider the initial *though*-clause in (1) and the two possible continuations (2a) and (2b):

- (1) Though yesterday John cleaned the bathroom,
- (2) (a) Mrs. Jones is still convinced that it is Mary who does all the cleaning in the house.
- (b) the tiles still looked a bit dirty.

The general interpretational schema for adversative constructions (see Fig. 1) can be summarized as follows (see also Dakin 1970; Townsend–Bever 1978; Bever–Townsend 1979; Gergely 1986; 1991; 1992a).



IP_{1...n}: The set of expectable consequences based on the initial *though*-clause proposition

Fig. 1

Schematic representation of the interpretational structure of adversative subordinate constructions

The initial *though* in (1) informs the listener that some expectable consequence of the first clause will be denied in the main clause. The particular consequence, however, is not explicitly specified: it has to be **inferred**. For example, the listener has to reconstruct different inferential paths leading from (1) to (2a) and (2b). For (2a) the implicit consequence of (1) is the expectation that because it was **John** who cleaned the bathroom, Mrs. Jones would **change** her belief about the unequal division of domestic labor between John and Mary. On the other hand, for (2b) the implicit effect is quite different: given that the bathroom has been **cleaned**, it is expected that the tiles would **not** look dirty.

How does the listener identify the inference that the speaker intends to deny, when there are always a number of typical consequences that follow from a given

proposition? From the initial *though*-clause, he can generate a set of candidate consequences based on his knowledge of typical cause-effect relations (see Fig. 1). However, the abstract propositional content of the clause does not indicate which of those is intended by the speaker. Does the listener have to wait until the main clause is processed, whose content allows him to identify the denied consequence **retrospectively**?

Townsend–Bever (1978) reported evidence supporting this possibility (see also Bever–Townsend 1979; Townsend 1983). They used on-line tests to assess the accessibility of (a) the meaning, and (b) the superficial aspects (such as the serial order of words) of the representation of incomplete clauses. The semantic content of an initial *though*-clause was found to be less available than that of a corresponding main or *if*-clause, while the superficial aspects of the clausal representation were more accessible in the initial *though*-clause. The authors hypothesized that the full semantic processing of an initial *though*-clause is postponed and the clause is kept in a relatively superficial representational format, precisely because the listener “...cannot determine which cause-effect relation the speaker is denying” before processing the second clause.

1.5. The role of topic-focus structure in directing the inferential processing of adversative subordinate clauses

In contrast, it can be argued (see Gergely 1986; 1991; 1992a) that the topic-focus structure of an initial *though*-clause does provide information that can be used by the listener on-line to restrict the set of expectable consequences of the proposition to the one that is most likely to be intended by the speaker. This is so because speakers, following a Gricean convention of language use, tend to mark the inferential basis of the denied consequence as the informational **focus** of the *though*-clause. Consider the sentence pairs (3) and (4) below:

(3) (a) Though Daddy *praised* his daughter for the excellent dinner, she was still not happy.

(b) ?Though Daddy praised his *daughter* for the excellent dinner, she was still not happy.

(4) (a) ?Though Daddy *praised* his daughter for the excellent dinner, it was, in fact, his son who prepared it.

(b) Though Daddy praised his *daughter* for the excellent dinner, it was, in fact, his son who prepared it.

The initial subordinate clauses are literally identical in all four sentences, however, they differ in where the contrastive stress falls (indicated by italics), marking the **focus** of the clause. In (3a) and (4a) the focused element is the verb *praised*, while in (3b) and (4b) the object noun *daughter* receives contrastive focus. In the case of (3a) and (3b) the final main clause contains the anaphoric pronoun *she* whose antecedent is in both cases the object NP *his daughter* from the initial clause. Notice, however, that this final clause is a perfectly natural continuation of the initial clause (3a), but sounds rather awkward following the first clause in (3b).

We can account for this difference in the following way. It can be hypothesized that when the listener identifies the **focus** of the initial *though*-clause, he will compute a **focus-based inference**, based on his pragmatic knowledge of typical cause-effect relations, about the implicit consequence that the speaker intends to deny. Furthermore, I shall assume that this focus-based consequence will be foregrounded at the clause-boundary, because it contains the expectable antecedent argument for the next clause.

Thus, in (3a) the speaker focuses the fact that the daughter was *praised*. Since the typical effect of being praised is to feel happy, by hypothesis, the listener will compute the implicit consequence proposition "the daughter is happy". This proposition contains the **topic NP** of the initial subordinate clause, which, in (3a), serves as the antecedent for the anaphoric pronoun *she* in the second clause. Therefore, assuming that the backward search for coreferent during the processing of the second clause will first access the foregrounded (and, therefore, most available) consequence proposition, the focus-based inference in (3a) will facilitate the smooth integrational processing of the second clause.

Not so in (3b), however, where the antecedent NP *his daughter* is **contrastively focused**. By contrastively focusing the object NP, the speaker makes implicit reference to a contrastive set of **entities other than the object**, that could have been praised, but were not (see Jackendoff 1972; Chafe 1976). Therefore, the inferred focus-based proposition will contain the entities of the contrastive set, but **not** the focused object *his daughter* which is, however, the antecedent for the pronoun *she* of the second clause in (3b). Thus, in (3b) the speaker **misleads** the listener when, violating the Gricean cooperative convention, he denies in the main clause a consequence that is **not based on the focus** of the initial subordinate clause. As a result, the backward search for antecedent for the main clause pronoun *she* will, at first, have to be aborted, as the foregrounded focus-based inference does **not** contain the right antecedent NP. For this reason, (3b) sounds awkward when compared to (3a).

In (4a) and (4b), however, the situation is reversed. Here the antecedent for the subject NP *his son* of the second clause of (4b) is contained in the contrastive set of the inferred focus-based proposition, and so the backward search for antecedent

is facilitated. In contrast, the foregrounded focus-based consequence in (4a) contains the topic NP *his daughter* of the subordinate clause. Therefore, the backward search for a matching antecedent for *his son* in the second clause will, at first, have to be aborted, since, by hypothesis, it will initially access the foregrounded consequence proposition. As a result, (4a) sounds awkward in contrast to (4b).

Therefore, if the above hypothesis is correct, we would expect a good deal of inferential processing to take place in an initial *though*-clause. This prediction, however, seems to contradict Townsend and Bever (1978) who found that the full semantic processing of an initial adversative clause is postponed until the second clause is reached.

To resolve this contradiction, in an earlier study I replicated Townsend–Bever (1978) using Hungarian sentences (see Gergely 1986; 1991). I argued that Townsend–Bever’s subjects processed initial *though*-clauses only superficially because they could not identify the focus of the clause fragments used in the experiment. In English, information about TF structure is typically provided by (a) contextual cues, and (b) intonational cues such as focal stress, which normally falls on the last word of a simple clause (see e.g., Jackendoff 1972). The clause fragments used by Townsend and Bever, however, appeared in isolation, and were recorded with “normal intonation” with the last word of the clause cut out. As a result, none of the constituents was clearly marked as the focus of the clause. It is possible, therefore, that at the point of testing, subjects have not yet assigned focus role to any of the clausal constituents. Consequently, they could not carry out the hypothesized focus-based inferential processing of the initial *though*-clause.

In Hungarian, however, there are clear **structural** cues (see below) that can help the listener identify the clausal focus **long before** the end of the clause. As a result, listeners should be able to assign discourse functions to constituents even when hearing isolated and incomplete clauses. In fact, the replication of Townsend–Bever (1978) in Hungarian showed no differences in either kind of on-line measure between initial *though*-clauses, on the one hand, and corresponding main or *if*-clauses, on the other (see Gergely, 1986, 1992a). This indicates that the Hungarian initial *though*-clauses were as fully processed as the other clause types.

In sum, these results are consistent with the hypothesis that when cues for TF structure are available in an initial *though*-clause, listeners will compute focus-based inferences to anticipate the content of the main clause (for additional evidence, see Gergely 1987/88; 1992a). The study to be discussed below examines this hypothesis in more detail. Since the experimental work was carried out in Hungarian, in the next section I shall briefly describe how the surface marking of the TF structure of Hungarian sentences differs from English.

1.6. Structural cues for the identification of discourse functions in Hungarian

In English TF structure is often marked only by intonational cues. The focussed element receives the primary or 'focal' stress, which in simple declarative sentences falls on the final word (see Halliday 1967; Chafe 1970; 1976; Akmajian 1973; Chomsky 1971; Jackendoff 1972). Other elements can also be marked as the focus, if they receive contrastive stress (e.g., Jackendoff 1972). Thus, though there are certain syntactic constructions, such as the cleft, which mark the discourse functions of constituents explicitly, in general, syntactic structural positions do not provide cues for the identification of TF structure during processing.

In contrast, Hungarian, a non-Indo-European, agglutinative language with a rich inflectional system and so-called 'free' word order, marks grammatical relations and discourse functions by clearly distinct **structural cues** (see e.g., É. Kiss 1981; 1987; Horvath 1981; Pléh 1982; Szabolcsi 1981). Grammatical relations, such as subject, object, indirect object, etc., are encoded by **local cues** in the form of case-marker suffixes attached to the nouns. This allows the surface order of the major constituents to be relatively free: practically any permutation of subject, verb, object, and adverbial yields a grammatical sequence.¹ The resulting versions of a sentence, however, are not interchangeable, they receive different discourse interpretations. In fact, in Hungarian, discourse functions are related to particular surface structure positions in a systematic manner. Therefore, the structural positions of the Hungarian sentence can function as **configurational cues** of high cue validity for the identification of the discourse roles (topic vs. focus) of constituents.

The basic structural positions of the Hungarian sentence can be schematically depicted as follows (see É. Kiss 1981; 1987):

$$[T_1, T_2, \dots] [F] V [X_1, X_2, \dots]^2$$

¹ However, word order **within** a major constituent (e.g., Det Adj N) is fixed, and some further restrictions, such as obligatory OV order for indefinite objects, apply. In fact, constituent order is really free only with respect to grammatical functions and cases; the position of question words, negated complements, or quantified phrases cannot be freely varied (see, e.g., É. Kiss 1987).

² The syntactic characterization of Hungarian sentence structure is controversial at present. Working within the framework of generative grammar, some linguists (e.g., Dezső 1965; Kiefer 1967; Horvath 1981) propose a fully configurational base structure for the Hungarian sentence of the form [_SNP[_{VP}V NP]]. The different permutations of the verb and its complements are derived by various reordering rules such as subject postposing and focus movement (see Horvath 1981). In contrast, É. Kiss (1981; 1987) developed within the GB framework (Chomsky 1981) a partially non-configurational approach in which the underlying structure of the Hungarian sentence has the V in initial position followed by its complements (including the subject) generated in an arbitrary order as sisters to the V. The different surface permutations are generated by movement rules (such as topicalization and

The sentence **focus** always appears in the immediately preverbal position (i.e., the 'focus slot': [F]) and carries the focal stress of the sentence (when there is one).³ This position can be occupied only by a single element. The element(s) (if any) in the position **preceding** the focus (i.e., the 'topic slot': [T₁, T₂,...]) is/are the topic(s) of the sentence. The verb can optionally be followed by further complements ([X₁, X₂,...]) which, when conveying new information, receive secondary stress, or, if they are known, remain unstressed.

The verb in its stem form can itself become the focus in which case it carries the primary stress of the sentence. However, the experiments to be reported below rely heavily on a special feature of Hungarian grammar: namely, that verbs often form complex predicates when combined with a class of aspect-marking adverbial particles, called verbal modifiers or converbs (e.g., *be* 'in', or *el* 'away') (see É. Kiss 1981; 1987; Ackerman-Komlósy 1983; Szabolcsi 1986) which indicate the **perfectivity** of the action.⁴ Complex verbs of this type can appear in two forms. On the one hand, the verbal modifier can occupy the F slot, in which case it is **prefixed** to the verb (e.g., *elmosta* in (5a) below). Alternatively, the focus slot may be filled by some other constituent. In that case, the modifier has to appear in a **postverbal** position as a separate element (e.g., *mosta el* in (5b) below).

focusing) which move the postverbal complements into the syntactic Topic and Focus positions in front of the verb. For a critical discussion of these positions, see Abraham-de Mey (1986), Sag-Szabolcsi (1992), Kálmán (1987), Prószéky (1985), and Varga (1985).

³ As pointed out by Kálmán (1985) (see also Prószéky 1985 and Varga 1985), there is a class of Hungarian sentences, the so-called 'level-prosody' sentences, in which none of the elements receive focal stress. Such neutral sentences have several main stresses one of which falls on the element appearing in the syntactic focus position. In such 'flat' sentences the syntactic focus slot is not interpreted as the communicative focus of the sentence. What is important for our present purposes, however, is that when the sentence **does** have a communicative focus (as in so-called 'corrective' sentences, see Kálmán 1985) it will always occupy the syntactic focus position. Therefore, this structural position acts as a configurational cue of high cue validity for the listener who attempts to identify the focus of the sentence. For further details on the treatment of the syntactic focus position in generative grammar, see Selkirk (1984); Schmerling (1980); Farkas (1986); Abraham-de Mey (1986); and Rochemont (forthcoming).

⁴ The verbal modifier is, in fact, only one kind of constituent which can be incorporated into the Hungarian verb to form a complex predicate. Other incorporated constituents include a bare N of object, subject, adverbial, or predicate function, or an Adj of predicate function. Incorporated constituents are not referring expressions, they add semantic features to the verb and together they form a single semantic unit. However, they are affected by syntactic operations: e.g., if another complement is moved into F position, they surface postverbally. Their correct grammatical (syntactic vs. lexical) treatment is presently subject of a controversy (see É. Kiss 1987; Horvath 1981; Ackerman-Komlósy 1983; Kenesei 1983; Szabolcsi 1986; Farkas 1986; Abraham-de Mey 1986; Sag-Szabolcsi 1992).

TOPIC FOCUS

(5) (a) Nagymama **el**mosta a tányérokát a tegnapi házibuli után,...

/[T: Grandmother (=nom)] [F: away (=V-mod)] + washed the plates +t (=acc) yesterday +i (=adj) party after,.../

'Grandmother has *washed* the plates after yesterday's party'

TOPIC FOCUS

(b) Nagymama a **tányérokát** mosta el a tegnapi házibuli után,...

/[T: Grandmother (=nom)] [F: the plates +t (=acc)] washed away (=V-mod) yesterday +i (=adj) party after,.../

'It was the *plates* that Grandmother has washed after yesterday's party'

These examples illustrate two important points about the difference between the encoding of TF structure in Hungarian and English. First, in Hungarian the placement of the verbal modifier around the verb provides a clear structural cue for the assignment of discourse functions to constituents, even when contextual and suprasegmental cues are not present. Secondly, this structural cue can appear long before the end of the sentence or clause is reached. With these points in mind let us return to the role of TF structure in sentence comprehension.

1.7. Topic foregrounding from initial subordinate clauses

Below I shall report an experimental study that examines the role of focus-based inferences during the processing of complex subordinate constructions in Hungarian. The study was designed to test the specific predictions developed above about how the topic-focus structure of initial subordinate clauses is involved in establishing across-clause antecedent relations in complex sentences.

It was hypothesized that during the processing of initial subordinate clauses the listener computes focus-based inferences which result in the foregrounding at the clause-boundary of an initial clause constituent that is expected to serve as the antecedent for the upcoming clause. In particular, as the analysis of the relative acceptability of (3)–(4) suggests, an object NP of an initial subordinate clause can be expected to resurface as an argument of the following main clause with higher likelihood when it is **topic** in the initial clause than when it is contrastively focused. Thus, it can be predicted that **an object NP, that is topic, will be foregrounded from an initial subordinate clause at the clause-boundary**, while a corresponding object NP, that receives contrastive focus, will not. To test this hypothesis the

present experiment will examine the on-line accessibility of initial clause object nouns as a function of their discourse role (topic vs. focus) in complex Hungarian sentences using an on-line word recognition task.

1.8. Recoding, foregrounding, and the functional interpretation of clause-boundary effects

The hypothesis that, as a result of foregrounding at the clause-boundary, the relative accessibility of certain initial clause constituents will increase after the end of the clause, seems to contradict earlier results on the relative availability of lexical material as a function of the clause-boundary. As reviewed earlier, the classical findings showed that, when tested after the clause-boundary, words from the clause are, in fact, **less** available both in verbatim recall (Jarvella 1971; Jarvella–Hermann, 1972) and in word recognition (Caplan 1972; Walker–Gough–Wall 1968). These results, together with evidence showing a local increase in processing load at the end of the clause, were interpreted as showing that at the end of the clause surface material is recoded into a more abstract representational format, resulting in a general decrease in the availability of morphological information from the clause after the clause-boundary (see Fodor–Bever–Garrett 1974).

However, the classical results might be irrelevant for the present hypothesis, as they all used post-sentence measures testing for morphological availability **after the end of the second clause**. But according to the present hypothesis, the function of the selective foregrounding of topic NPs from an initial subordinate clause is to facilitate the backward search for a discourse antecedent during the processing of the second clause by making likely candidate arguments temporarily more accessible. Since, however, the process of finding a matching discourse antecedent for the second clause is likely to have been completed by the time the end of the sentence is reached, there is no reason to expect the hypothesized foregrounding process to exert an influence on post-sentence measures. Rather, it seems clear that for an effective test of the hypothesis one needs to measure word accessibility on-line, **while the second clause is being processed**. Therefore, the present experiment tests the on-line availability of initial clause targets **early in the second clause** rather than following the sentence-boundary.

Let us assume for a moment that the hypothesized process of topic foregrounding from initial subordinate clauses at the clause-boundary receives empirical support. One might then ask what the consequences of such a demonstration would be for the status of the general hypothesis of early clausal processing models (see Fodor–Bever–Garrett 1974) that at the end of the clause the clausal representation is recoded into a more abstract representational format resulting in an overall decrease in morphological availability after the clause-boundary. I believe

that while the demonstration of topic foregrounding at the clause-boundary would be a clear counterexample to the general hypothesis of recoding at the end of the clause, nevertheless, it would necessitate only a modification, and not a total abandonment, of the latter model.

Thus, it can be argued that whenever (i) a clause has been "fully encoded" by the end of the clause (implying by this not only the assignment of underlying grammatical structure to the clausal sequence, but also the completion of other computational processes such as assigning coreferent representations to anaphoric pronouns and linking the topic argument to a matching discourse antecedent), and (ii) no forward referring, across-clause discourse integrational inferences are being computed at the clause-boundary, recoding of the clausal representation into a more abstract representational format will take place. As long as either condition (i) or condition (ii) is not met, the recoding of the clausal material will be temporarily postponed.

There are two kinds of discourse cues that must be available for the listener to compute the hypothesized predictive inferences during the processing of an initial clause: (a) those that identify the discourse functions (topic vs. focus) associated with the different initial clause constituents, and (b) those that specify the particular semantic relation (encoded by subordinate conjunctions such as *if*, *though*, etc.) that connects the initial with the final clause proposition. By hypothesis, if either of these discourse cues is absent, the listener will be unable to generate predictive inferences on the basis of the initial clause. In this case, the negative effects of recoding on after-clause word accessibility would be expected to be present (given that the condition of 'full encoding' is met).

A case in point is that of an initial clause, where the listener has no information while processing the clause about the particular semantic relation that relates it to the second clause. (As a matter of fact, till the end of the clause he might not even know whether he is processing a simple sentence or the main clause of a subordinate construction.) Thus, by examining initial main as well as initial subordinate clauses it becomes possible to test the above hypothesis about the relative contribution to after-clause morphological accessibility by the hypothesized processes of foregrounding and recoding at the clause-boundary. It can be predicted that only in initial **subordinate** clauses, where the initial conjunction word (e.g., *if*, *though*) cues the listener about the particular inter-clausal semantic relation, will the process of topic foregrounding occur. On the other hand, in the case of initial **main** clauses no predictive inferences will be computed, and so, as a result of recoding, the accessibility of first clause constituents is predicted to **decrease** during the second clause. To test this hypothesis, the present experiment examines the on-line availability of first clause constituents both in initial main and subordinate clauses.

Assuming that, as hypothesized above, listeners indeed foreground the argument representation of a focus-based predictive inference from an initial subordinate clause, one may ask at what point during the processing of the clause this process takes place. This is an interesting question because in Hungarian sentences both kinds of discourse cues necessary for generating the hypothesized predictive inferences can be available to the listener **long before the end of the clause**. Therefore, it is conceivable that the hypothesized selective activation of the topic NP could take place as soon as the processing of the discourse cues, on which the predictive inference is based, is completed, i.e., before the end of the initial clause. On the other hand, since the hypothesized processing function of the foregrounding process is to facilitate the integrational processing of the **final** clause, it might be more efficient for the processor to delay the foregrounding of the topic constituent until the end of the clause is reached.

Earlier it was hypothesized that the local increase in processing load at the end of the clause shown in numerous earlier studies might not be due to within-clause assignment of underlying structure, as previously supposed, but might, at least, in part, correspond to across-clause discourse integrational processes. The hypothesized process of topic foregrounding from an initial subordinate clause is a case in point: it might be that the process of foregrounding a candidate argument from a first clause, that is likely to serve as a discourse antecedent for the second clause, **is concentrated at the end of the clause**, even though its informational basis is available already at a much earlier point in the clause. To test this hypothesis, the present experiment examines the on-line accessibility of initial clause constituents at two different points during the processing of two-clause sequences: (1) while still in the incomplete initial clause (but after the relevant discourse cues have been processed), and (2) early in the final clause.

1.9. Clause-boundary effects as a function of functional completeness, informational completeness and referential specificity

We have seen that the early models of clausal processing (see Fodor–Bever–Garrett 1974) were characterized by two basic assumptions on which their interpretation of the clause-boundary effects was based: (a) the local increase in processing load at the end of the clause was considered to reflect within-clause processes of assigning underlying structural relations to surface constituents, and (b) the output structure established in this process was assumed to be the linguistically defined deep structure representation of the clause. Note that our alternative hypothesis, according to which the local increase in processing load at the clause-boundary is due to across-clause discourse integrational processes (such as the hypothesized topic foregrounding from an initial subordinate clause) rejects both of these assumptions.

In fact, the viability of the above assumptions became first questionable as a result of a series of experiments (see Carroll 1976; Tanenhaus–Carroll 1975; Carroll–Tanenhaus–Bever 1978) demonstrating that syntactically equally well-formed surface clauses differ significantly in the degree to which they result in clause-boundary effects, such as perceptual closure around the clause. For example, it was shown that a gerund construction, such as the italicized portion of (6a), acts as a poorer perceptual segmentation unit in a click location task than the corresponding construction in (6b) involving a full NP:

(6) (a) *Falling off the chair* caused Harry to act strange for days.

(b) *Harry's falling off the chair* caused Harry to act strange for days.

Carroll (1976) sought to accommodate these results by relinquishing the linguistically based assumption according to which the object of perceptual segmentation in clausal processing is the purely syntactically defined clause. Instead, he assumed that the basic units of encoding that are the output representations of the speech comprehension device are “independent mental structures” that are “propositional” in nature (Carroll 1976). It was assumed “...that linguistic sequences which can be directly mapped onto complete propositional structures are the ideal segmentation units in sentence perception” (Carroll *et al.* 1978). To account for the differential effectiveness of surface sequences in prompting perceptual segmentation, Carroll *et al.* (1978) proposed the principle of ‘functional completeness’ which states that a surface sequence is functionally complete in so far as it contains “a complete, explicit, and coherent set of grammatical relations”. The more completely and explicitly a surface sequence marks the underlying structural relations of the encoded propositional unit, the better they function as segmentation units during processing.

While the principle of functional completeness could successfully accommodate the differential segmentation effects of constructions such as (6a) and (6b), it needed to be further modified to account for the kind of differences in clause-boundary effects demonstrated by Marslen-Wilson–Tyler–Seidenberg (1978) using sentence pairs such as (7) and (8):

(7) (a) Even though Ron hasn't seen many *bears*, they are apparently his favorite animal.

(b) Even though Ron hasn't seen many, *bears* are apparently his favorite animal.

- (8) (a) Even though he hasn't seen many *bears*, they are apparently Ron's favorite animal.
- (b) Even though he hasn't seen many, *bears* are apparently Ron's favorite animal.

Marslen-Wilson *et al.* found that in sentence pairs like (7a) and (7b), with a full NP (*Ron*) in the subject position, rhyme-monitoring times were significantly faster for target words (such as *bear*, in italics) which appeared as the last word of the first clause (as in (7a)) than for corresponding targets appearing as the first word of the final clause (as in (7b)). However, this clause-boundary effect disappeared in sentence pairs such as (8a) and (8b) where the initial clause subject is a forward referring anaphoric pronoun (*he*).

As the authors pointed out, the principle of functional completeness cannot account for the lack of clause-boundary effect in (8a) and (8b) since the initial clauses with the anaphoric pronoun *he* mark the underlying structural relations of the encoded proposition as "completely and explicitly" as the corresponding initial clauses with the full subject NP *Ron* in (7a) and (7b). Marslen-Wilson *et al.* (1978) proposed an alternative explanation in terms of the degree of "informational completeness of the interpretative unit" encoded by the surface sequence. In this view, in (8a) and (8b) the recoding of the clausal representation at the clause-boundary is postponed because the encoded interpretative structure is "informationally incomplete" in so far as the referent properties of its subject argument are left unspecified.

In fact, Carroll was aware of the problem posed by anaphoric pronouns for the functional completeness principle (see Carroll 1976), and proposed a modification along similar lines to Marslen-Wilson *et al.*'s notion of informational completeness. Thus, Carroll *et al.* (1978) suggested an elaboration of the property of functional completeness in terms of the degree of "...specificity with which grammatical relations are represented in a sequence" (emphasis added). Carroll *et al.*'s examples make it clear that what is meant by 'specificity' here concerns the amount of referent properties in terms of which the arguments of the encoded proposition are represented. For example, they suggest that the subject NP (in italics) in (9a) is more 'specific' than the corresponding pronoun in (9b):

- (9) (a) After *the little fellow with the moustache* left,...
- (b) After *he* left,...

Thus, supplementing the principle of functional completeness with a further condition of specificity, Carroll *et al.* (1978) proposed that "...sequences with more spe-

cific grammatical relations may be better potential segmentation units than sequences with less specific grammatical relations”.

1.10. The principle of computational completeness

It can be argued, however, that the degree of elaboration of specific referent properties is not the relevant factor that results in the postponement of recoding at the end of the clause of clausal sequences involving a forward referring anaphoric pronoun such as (8a) and (8b) above. First of all, let us note that without contextual specification of the referent properties of the subject argument *Ron* in (7a) and (7b), where recoding at the clause-boundary did take place, the degree of referential specificity of the encoded representation is only slightly higher (in so far as it specifies the property of the name *Ron*) than in the case of the pronominal subject *he* in (8a) and (8b). That is, NPs like *Ron*, *the man*, *somebody*, *one*, or *he* are all very low in the amount of specific referent properties they encode which, in general, include no more than person, number, and sometimes gender information. At any rate, it seems doubtful that the differential effect on the clause-boundary measure between the full ((7a) and (7b)) and the anaphoric pronoun subject ((8a) and (8b)) constructions in Marslen-Wilson *et al.*'s experiment can be correctly attributed to the slightly higher degree of referential specification of the initial clause proposition in the former case.

It seems more plausible to interpret the results in terms of a hypothesized processing requirement of syntactic **computational completeness**. In this view, the presence of a forward referring anaphoric pronoun in an initial clause acts as a syntactic cue which triggers an automatic search for a coreferent NP. By hypothesis, if the coreferent cannot be identified while within the clause, full clausal encoding is blocked until across-clause coreference assignment is achieved. As a result, the recoding of the clausal representation at the clause-boundary will be postponed, and the clausal sequence will be kept in a transient representational format. Hence the lack of clause-boundary difference between (8a) and (8b) in the morphological accessibility measure used by Marslen-Wilson *et al.* (1978).

Note that this requirement of computational completeness is independent of the degree of specification of referent properties in the encoded representation. However, in the case of the sentences used in the Marslen-Wilson *et al.* study, the alternative interpretations in terms of informational versus computational incompleteness of the anaphoric pronoun constructions such as (8a) and (8b) converge on the same prediction, and so it is not possible to empirically evaluate the alternative hypotheses on that data alone. However, as described above, a particular structural feature of Hungarian grammar, the 'pro-drop' parameter, makes it possible to clear-

ly separate informational versus computational completeness in certain constructions. Consider, for example, the sentences (10a) and (10b) below:

- (10) (a) Ugyan az előadás végén a színésznőt megtapsolták, a rendező mégsem volt elégedett.

/Though at the end of the performance the actress+t (=acc) applaud+ták (=past tense, 3rd person plural subject), the director was still not satisfied./

- (b) Ugyan az előadás végén a nézők a színésznőt megtapsolták, a rendező mégsem volt elégedett.

/Though at the end of the performance the spectators+0 (=nom) the actress+t (=acc) applaud+ták (=past tense, 3rd person plural subject), the director was still not satisfied./

Hungarian can optionally leave the subject NP unrealized in the surface sequence, as is the case in (10a). This is possible because the verb is marked for agreement with the subject. Thus, the initial clause in (10a), where the subject is an empty element, is **informationally equivalent** to the English clause “Though at the end of the performance they applauded the actress”, since the verb encodes the same information about the subject (i.e., third person, plural) as the English personal pronoun *they*. However, the Hungarian construction is **not** equivalent to the English in terms of computational completeness, because syntactically it is not necessary to find a coreferent NP for the empty subject in the initial clause of (10a) as it can also receive an unspecified subject reading.⁵

Thus, (10a), when compared to (10b) that has a full subject NP, can be regarded informationally incomplete in so far as it only provides number and person information about its unrealized subject, without specifying a full subject referent. Nonetheless, it forms a complete unit of encoding in terms of syntactic **computational completeness**, as there is no necessity to search for a coreferent NP to fill the empty subject slot.

⁵ In fact, informational and computational completeness could be separated in English, too, if we contrasted truncated with full passive constructions (e.g., “Though the actress was applauded,...” vs. “Though the actress was applauded by them,...”). Notice that there is a difference between the English truncated passive and the Hungarian subject-drop construction (10a), in that the latter provides person and number information about the subject while the former does not. Apart from this, the Hungarian subject-drop construction can correspond to either the truncated or the full passive (with the pronoun *them* in the *by*-phrase) in English: in the former case the empty subject receives an unspecified reading (and no syntactic coreference assignment is necessary), while in the latter the empty subject is anaphoric.

Therefore, by contrasting subject-drop constructions like (10a) with corresponding sentences containing a fully specified subject NP as in (10b), we can test whether clause-boundary effects are a function of informational or computational completeness. If the critical factor is informational completeness, then, similarly to the Marslen-Wilson *et al.* study, we could expect to find a clause-boundary effect in the case of the informationally complete full subject constructions such as (10b), but the effect would disappear in the case of the informationally incomplete subject-drop constructions such as (10a). On the other hand, if the critical factor is computational completeness, then we would predict the clause-boundary effect to be present in (10a) just as much as in (10b) as both of these constructions are computationally complete. To test this hypothesis, the present experiment tests the on-line availability of initial clause constituents using sentences that either contain full subject NP (as in (10b)) or a corresponding empty subject (as in (10a)).

To sum up: the present experiment will examine the relative accessibility of initial clause constituents during the processing of complex Hungarian sentences using an on-line probe recognition task. Word probes will be presented in one of two serial positions: **either before or after the clause-boundary**. In the incomplete clause condition the point of testing will be before the appearance of the last obligatory constituent of the initial clause, while in the complete clause condition the word probe will be presented after the first constituent of the second clause. The initial clauses tested will be either **subordinate** (*if* and *though*) or **main** clauses. The tested constituent will be always the object NP of the initial clause appearing in a serially identical position in the different clauses. The **discourse role** of the tested object NP will be varied: it will be either the **topic** of the initial clause or its **focus**. Finally, in the complete clause conditions the initial clauses tested will be either **informationally complete** or **informationally incomplete**.

2. Method

2.1. Subjects

Twenty-four subjects (14 females and 10 males), with a mean age of 25 years, participated in the experiment. The subjects were students at the Eötvös Loránd University in Budapest, their mother tongue was Hungarian.

2.2. Materials

Each subject read a total of 48 sentence fragments which contained 18 experimental fragments randomly intermixed with 30 filler fragments. The 18 experimental fragments in varied **Clause Type** ('if' /= *ha*, 'though' /= *ugyan*, and main), in

Clause Completeness (syntactically incomplete, syntactically complete but informationally incomplete /empty subject/, and syntactically complete and informationally complete /full subject/), and in the **Discourse Function** of the tested object NP (topic vs. focus). This produced 18 experimental types: each subject was presented with one token fragment of each type.

All 18 experimental sentence fragments were of the same length (except for the extra conjunction word *ha* or *ugyan* introducing the two subordinate clause types). In all experimental fragments the tested object noun always appeared in the same serial position, and the distance between the position of the tested word and the point of probe presentation was identical in all cases. The three sentence pairs (11), (12), and (13) below illustrate the six experimental types corresponding to the combinations of the three Clause Completeness (/A/, /B/, and /C/) and the two Discourse Function conditions. The sentence fragments were presented to subjects constituent-by-constituent in a subject-paced reading paradigm. Below vertical lines separate the individual units of presentation, the asterisk marks the serial position where the recognition word probe was presented, and the probed object nouns are indicated by italics:

/A_T/ Syntactically incomplete clause: Topic target

- TOPIC₁ TOPIC₂ FOCUS
- (11) (a) Ugyan | az estélyen | a *herceget* | bemutatta | a báró a... *
- /Though | [T₁: at the party] | [T₂: the *prince* +t (=acc)] |
 [F: 'be-' (=V-mod)] '+mutatta' (=V) introduced | the baron +0 (=nom)
 the.../
- ‘Though at the party the baron has introduced the prince to the...’

/A_F/ Syntactically incomplete clause: Focus target

- TOPIC FOCUS
- (11) (b) Ugyan | a szalonban | a *színésznőt* | kínálta meg | a doktor a... *
- /Though | [T: in the saloon] | [F: the *actress* +t (=acc)] |
 ‘kínálta’ (=V) ‘meg’ (=V-mod) offered | the doctor +0 (=nom) the.../
- ‘Though in the saloon it was the actress whom the doctor offered the...’

The syntactically incomplete clause fragments were formed with three-argument predicates (such as 'NP₁ introduce NP₂ to NP₃' as in (11a), or 'NP₁ offer NP₂ NP₃' as in (11b)), with the obligatory third argument missing except for its introducing definite article. The recognition target noun appeared after the incomplete sequence (indicated by asterisk), i.e., at least one argument before the end of the clause is reached.

In Hungarian, it is possible to vary the discourse role of the preverbal NP without changing the order of constituents in the sequence. Briefly, the element, that is the focus of the sentence, always occupies the immediately preverbal structural position, the 'focus' slot. In (11a) the preverbal position is filled by the verbal modifier *be-*, which makes the perfective verb itself the focus of the clause. The element(s) appearing in the structural position that is before the focus slot is/are the topic(s) of the Hungarian sentence. Therefore, in (11a) the discourse role of the object noun *herceget* (prince +t / =acc/), that is the tested target word (indicated by italics), is topic, as it appears before the focused element. In (11b), however, the verbal modifier 'meg' is in postverbal position, and so the target object noun *színésznőt* (actress +t / =acc/) here appears in immediately preverbal position, and so it is the focus of the clause. The discourse role of the tested object noun was varied in exactly this manner in all experimental types.

/B_T/ Syntactically and informationally complete clause: Topic target

- TOPIC₁ TOPIC₂ FOCUS
- (12) (a) Ugyan | a gerillák | a *herceget* | elrabolták, | az őrnagy a... *
- /Though | [T₁: the guerillas +0 (=nom)] | [T₂: the *prince* +t (=acc.)] |
 [F: 'el-' (=V-mod)] +'rabolták' (=V) kidnapped, | the major +0 (=nom)
 the.../
- 'Though the guerillas have kidnapped the prince, the major ...'

/B_F/ Syntactically and informationally complete clause: Focus target

- TOPIC FOCUS
- (12) (b) Ugyan | a tolvajok | a *színésznőt* | fosztották ki, | az ügyész a... *
- /Though | [T: the thieves +0 (=nom)] | [F: the *actress* +t (=acc)] |
 'fosztották' (=V) 'ki' (=V-mod) robbed, | the attorney +0 (=nom) the.../
- 'Though the thieves have robbed the actress, the attorney...'

In this condition the initial clause is complete both syntactically and informationally, as it contains a two-argument transitive verb with a full subject and object NP in an SOV word order. After the end of the first clause (indicated by an obligatory comma in Hungarian) a further constituent appears which is the initial subject NP of the second clause. This constituent is followed by the introducing definite article of a second constituent, and then the sequence is interrupted and the word probe is presented (at the point indicated by the asterisk). Thus, the point of testing occurred one constituent after the clause-boundary, while the subject was reading the second clause. In this way, though the probe was presented either one constituent before (as in (11)) or one constituent after (as in (12)) the clause-boundary, the probed object noun, nevertheless, appeared in the sequence at equal distance from the point of testing in both cases, and the sequence of lexical categories separating them was also identical (Object-Verb-Subject).

/C_T/ Syntactically complete but informationally incomplete clause: Topic target

- TOPIC₁ TOPIC₂ FOCUS
- (13) (a) Ugyan | a színházban | a *herceget* | megcsodálták, az elnök a... *
- /Though | [T₁: in the theatre] | [T₂: the *prince* +t (=acc)] | [F: 'meg-' (=V-mod.)] 'csodálták' (=V) [they] admired, | the president +0 (=nom) the.../
- 'Though in the theatre the prince was admired, the president...'

/C_F/ Syntactically complete but informationally incomplete clause: Focus target

- TOPIC FOCUS
- (13) (b) Ugyan | a szünetben | a *színésznőt* | tapsolták meg, | az ügyvéd a... *
- /Though | [T: during the interval] | [F: the *actress* +t (=acc)] | 'tapsolták' (=V) 'meg' (=V-mod) [they] applauded, | the lawyer +0 (=nom) the.../
- 'Though during the interval the actress was applauded, the lawyer...'

The sentence fragments in (13) are similar to those in (12) except for the fact that the subject NP is not realized, i.e., there is an empty subject in the surface sequence. In spite of this, however, the fragments in (13) are equal in length to those in (11) and (12), since they contain as their first constituent an extra adverbial phrase (e.g.,

'in the theatre'). Again, the serial distance between the probed object noun and the point of probe presentation (indicated by asterisk) is identical to that in (11) and (12), and so is the sequence of lexical categories between them (Object-Verb-Subject). In order to ascertain that the subjects would not mistakenly process the initial subject NP of the second clause as the missing subject of the first clause (which could conceivably happen despite the obligatory comma that separates clauses in Hungarian), the second clause subject was always in the singular, while the first clause verb was always marked for a plural subject.

For each of the three pairs of 'though' clauses presented in (11), (12), and (13) above, there were two additional experimental fragment pairs which were analogous to them in every respect except for clause type: one pair being introduced by the subordinate conjunction 'if' (=ha), while the other pair consisting of initial **main** clauses.

For each of the three clause types ('if', 'though', and main) there were two probed object NPs (e.g., 'the prince' and 'the actress') which were crossed with subjects in such a way that each of them, appearing in a given clause type (e.g., 'though'), was presented to half of the subjects in the sentence frame in which its discourse role was topic (as 'the prince' in (11a), (12a), and (13a)), while for the other half of the subjects it appeared in the alternative sentence frame in which it was focus (as 'the actress' in (11b), (12b), and (13b)). Therefore, differences in probe latencies for topic vs. focus targets within a given clause type could not be attributed to differences in the relative frequency or length of the lexical items probed. The same holds for the three completeness conditions: for a given clause type (e.g., 'though') the same pair of (crossed) object nouns (e.g., 'the prince' and 'the actress') were presented to subjects in all three completeness conditions (/A/, /B/, and /C/). Thus, a given object noun tested was seen by each subject three times during the list. To neutralize the distorting effect of repeated presentation of the same probes on recognition times, the experimental list was divided into three blocks, each containing one occurrence of a given probe. The blocks were rotated in such a way that across subjects they appeared equally often as the first, second, or third block of the sentence list. As a result, any given probe in any particular completeness/discourse function sentence frame was seen by an equal number of subjects in each of the three block positions. Otherwise, the lexical materials in the 18 experimental fragments were different, though they were carefully matched for lexical category, grammatical role, syllable length, relative frequency, and serial order of grammatical categories (as exemplified in (11)–(13)).

The 18 experimental fragments were randomly intermixed with the 30 fillers in such a way that the different clause types appeared in the three blocks with equal frequency. The 30 fillers contained 12 negative cases in which the probe presented did not appear in the sentence. The negative probes appeared with equal frequency

throughout the list. The remaining 18 fillers were made up of several different types of fragments which all differed from the experimental fragments in syntactic type as well as in length, thereby reducing the likelihood of subjects developing strategies on the basis of the similarity of the experimental fragments. For the same reason, the serial position, and the lexical category and syntactic role of the probed words in the fillers were also varied.

The experimental list was preceded by six practice sentences which contained four positive and two negative probes, and varied in syntactic type, sentence length, point of testing, and the position of the probed word.

2.3. Procedure

Each subject read a list of 48 sentence fragments which were presented constituent-by-constituent on the monitor of a Commodore 64 personal computer in a subject-paced reading paradigm. In this task it was the subject himself who controlled the length of time each constituent unit appeared in the center of the screen by hitting the space bar on the computer keyboard with his left hand, resulting in the appearance of the next constituent unit. The length of time each unit appeared on the screen was recorded by the computer, providing unit-by-unit reading time data. Before the presentation of each sentence, the experimenter, by hitting a given key, initiated the appearance of a visual warning signal (a row of 10 '\$' signs) in the middle of the screen. This disappeared when the subject first pressed the space bar with his left hand, which started the timer and resulted in the simultaneous appearance of the first reading unit at the place of the warning signal. Subjects were instructed to start the new sentence only when they fully attended to the visual display. They were told to read the sentences for full comprehension and with normal reading speed.

The units of presentation for the experimental fragments are separated by vertical lines in the example sentences (11)–(13) above. (12b) is reproduced below as (14) ('SC' stands for 'subject controlled' presentation time):

SC	SC	SC	SC
(14) Ugyan	a tolvajok	a színésznőt	fosztották ki,
	.5 sec	.5 sec	PROBE
	az ügyész a...	*****	színésznőt

The length of presentation of the subordinate conjunction word (when there was one) and of the first four constituent units of the experimental fragments were subject-paced. However, the last constituent unit of the sequence always appeared for

a .5 sec in order to avoid significant differences in the length of the time interval between the appearance of the tested word and that of the probe, which could have resulted from differential hesitation times by the subjects at the point of interruption. After the .5 sec presentation of the last unit (which was just long enough for the subjects to read the constituent), a warning signal appeared in the middle of the screen consisting of 10 '*' signs. This was also presented for .5 sec, and it indicated to the subject that the probe word was about to appear.

When the warning signal disappeared, the probe word was presented, and the subject's task was to decide as fast as he could whether or not the probe appeared in the sentence. Subjects responded by hitting a YES or a NO response key with their right hand. The time from the appearance of the probe to the subject's response was recorded by the computer, providing data about the on-line accessibility of the tested word of the sequence at the point of the presentation of the probe.

Following their response to the probe word, the subjects were required to perform a further task. The experimenter completed the sentence fragment verbally, and subjects had to judge whether the completion resulted in an acceptable, "good" continuation of the sentence, or in an unacceptable one. The importance of this second task was emphasized to assure reading for full comprehension: subjects were told that their responses (which were recorded by the experimenter) will be rated by a set of other subjects for correctness. The sentence completions were either clearly acceptable or they were unacceptable in one (or both) of two ways: they were anomalous either syntactically (e.g., plural verb conjugation where singular was required), or semantically (i.e., the continuation was syntactically well-formed, but made no sense).

The tasks and the experimental procedure was explained to the subjects in detail, and they were presented with six trial sentences before the presentation of the experimental list. It was made possible for them to run through the six trial sentences several times if they wished, to make sure that they were thoroughly familiarized with the experimental set-up before starting the critical trials. The experiment lasted an average of 40 minutes.

3. Results

Extreme response times that deviated more than two standard deviations from the mean response values were excluded from the data analysis. These constituted less than 3% of the data. Table 1 shows the mean probe latencies for positive targets in the 18 experimental types. The data were analyzed by a three-way analysis of variance, where the three within-subject variables were Clause Type ('If' /=*Ha*/, 'Though' /=*Ugyan*/, and Main), Clause Completeness (/A/ Syntactically

Incomplete, /B/ Syntactically Complete and Informationally Complete /full subject/, and /C/ Syntactically Complete but Informationally Incomplete /empty subject/), and Discourse Function (Topic vs. Focus).

Table 1

Mean recognition times (msec) for topic vs focus targets in the different clause conditions of Exp. 1

	Syntactically incomplete		Informationally incomplete		Informationally complete	
	TOPIC	FOCUS	TOPIC	FOCUS	TOPIC	FOCUS
Though	909	802	739	837	751	846
If	840	823	739	802	721	801
Main	816	742	877	882	890	910
mean RT	855	789	785	840	787	852

The ANOVA showed a significant main effect of Clause Type ($F(2, 46) = 7.25$, $p < .003$), and a tendential main effect of Discourse Function, which, however, did not reach significance ($F(1, 23) = 3.27$, $p < .09$). Clause Completeness did not have a main effect and there was no interaction between Clause Type and Discourse Function. However, there was a significant Clause Type/Clause Completeness interaction ($F(4, 92) = 7.28$, $p < .001$) as well as a significant interaction between Clause Completeness and Discourse Function ($F(2, 46) = 11.26$, $p < .001$). There was no sign of a three-way interaction.

As Fig. 2 shows, the significant main effect of Clause Type is clearly attributable to the difference between the two subordinate clauses ('if' and 'though'), on the one hand, and the main clause, on the other. In fact, the two subordinate clause types show a remarkably similar pattern in all the three Clause Completeness conditions (none of the pairwise comparisons between 'if' and 'though' showed a difference). Figure 2 also illustrates that the Clause Type/Clause Completeness interaction is due to the fact that, while probe latencies are somewhat faster for the main than for the subordinate clause targets in the Syntactically Incomplete clause condition /A/, they are significantly longer in both Syntactically Complete clause conditions (/B/ and /C/) ($F(1, 92) = 11.21$, $p < .01$, for Informationally Incomplete /C/, and $F(1, 92) = 5.42$, $p < .05$, for Informationally Complete /B/).

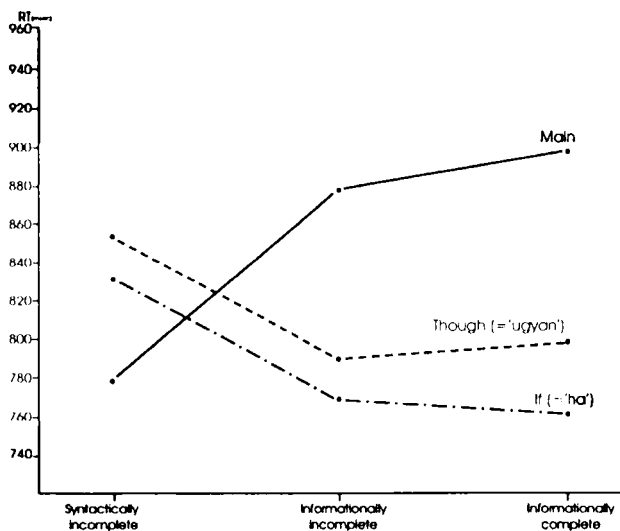


Fig. 2

Mean probe recognition times in the three completeness conditions

The fact that main clause targets are significantly less available in the Syntactically Complete clause conditions than are corresponding subordinate clause targets is clearly in line with the prediction that recoding at the end of an initial clause will result in a decrease in word accessibility after the clause-boundary for main clause, but not for subordinate clause targets. That recoding at the end of the clause has a clear negative effect on word accessibility after an initial main clause is further shown by the fact that main clause targets are significantly less accessible in the two Syntactically Complete clause conditions than in the Syntactically Incomplete clause condition ($F(1, 92) = 14.04, p < .01$).

Figure 3 illustrates the nature of the Clause Completeness/Discourse Function interaction. We can see that, overall, focus targets are more accessible in a syntactically incomplete clause than are corresponding topic targets ($F(1, 46) = 7.61, p < .01$), while the reverse is true for the two Syntactically Complete clause types ($F(1, 46) = 5.29, p < .05$, for Informationally Incomplete /C/, and $F(1, 46) = 7.38, p < .01$, for Informationally Complete /B/).

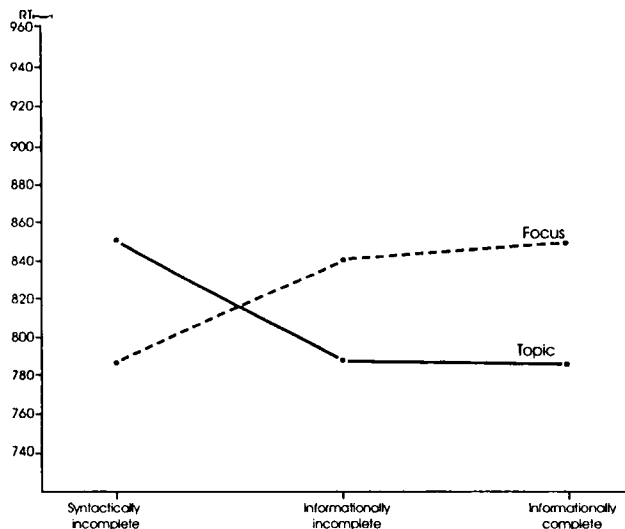


Fig. 3

Mean recognition times for topic vs. focus targets in the three clause completeness conditions

An inspection of Fig. 2 and Fig. 3 reveals that relative target accessibility in the two Syntactically Complete (/B/ and /C/) conditions shows no difference whatsoever. In fact, none of the pairwise comparisons between the Informationally Complete /B/ and the Informationally Incomplete /B/ conditions for either target types (Topic or Focus) showed a difference. Thus, it seems clear that informational completeness does not interfere with either the recoding or the foregrounding effects which take place as a function of the clause-boundary. This finding suggests that it is, as hypothesized, the syntactically governed computational rather than informational completeness that is the critical factor in determining clause-boundary effects in clausal processing.

Since Discourse Function had a marginal effect, in order to see the origins of the Clause Completeness/Discourse Function interaction (see Fig. 3) more clearly, it seems worthwhile to look at the pattern of results for the two discourse functions separately. Figure 4 shows the mean probe latencies for Topic targets only. It can be seen that while topic targets are more available **after** the clause-boundary for initial subordinate clauses, for main clauses their accessibility in the two Syntactically Complete clause conditions (/B/ and /C/) decreases. Subordinate clause topic targets are significantly more accessible in the two Syntactically Complete clause conditions than the corresponding main clause topic targets ($F(1, 92) = 14.33, p < .01$). This finding supports the hypothesis that while topic NPs are foregrounded from initial subordinate clauses at the clause-boundary, in initial main clauses the process

of recoding at the end of the clause results in an overall decrease in the availability of clausal material following the clause.

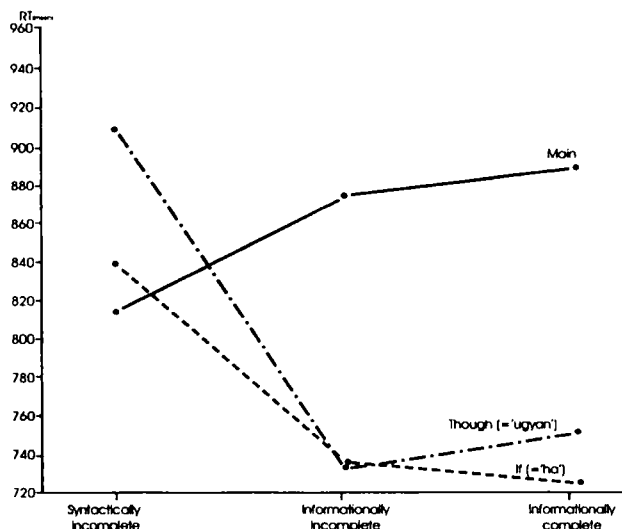


Fig. 4

Mean recognition times for topic targets in the three clause completeness conditions

The availability of topic targets in the two kinds of subordinate clauses ('if' and 'though') shows a rather similar pattern: pairwise comparisons between 'if' and 'though' produced no significant differences in either of the three Clause Completeness conditions. Subordinate clause topic targets are significantly more accessible **after** the clause-boundary (in the two Syntactically Complete clause conditions) than before (in the Syntactically Incomplete condition) ($F(1, 92) = 12.62, p < .01$). This indicates that the process of topic foregrounding from initial subordinate clauses is concentrated at the clause-boundary, as hypothesized. This finding, therefore, gives support to the hypothesis that part of the local increase in processing load at the end of the clause is due to discourse integrational processes. Finally, Fig. 4 again shows that, as predicted, there is no sign of foregrounding after an initial main clause: in fact, due to recoding topic availability is decreased after the clause-boundary.

Figure 5 depicts the pattern of results for Focus targets only. Focus accessibility in initial **main** clauses shows a very similar pattern to that of topic: focus targets are also less available after the clause-boundary than before, showing the effect of recoding at the end of the clause.

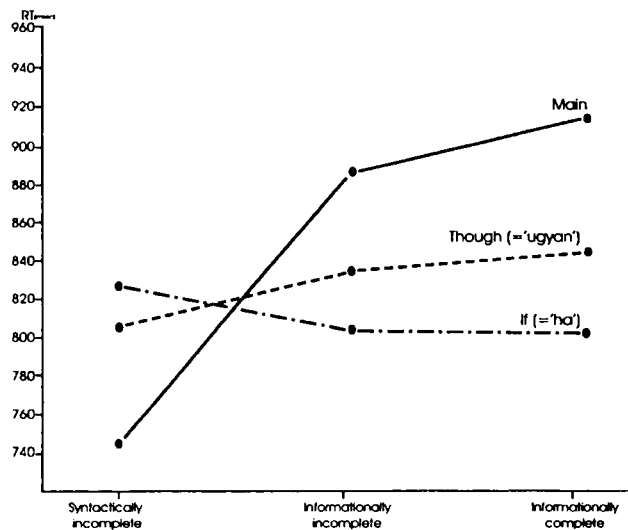


Fig. 5

Mean recognition times for focus targets in the three clause completeness conditions

Similarly to topic targets, focus accessibility also shows a rather comparable pattern in the two subordinate clause types: none of the pairwise comparisons between 'if' and 'though' showed a significant difference in either of the three Clause Completeness conditions. Furthermore, the relative availability of the subordinate clause focus targets stayed at the same level in the three Clause Completeness conditions: unlike in the case of topic targets, for subordinate clause focus targets there was no difference in accessibility between the Incomplete Clause condition, on the one hand, and the two Complete Clause conditions, on the other ($F(1, 92) = .054$, n.s.). At the same time, it is clear that the subordinate clause focus targets do not show the negative effect of recoding either. In fact, in the two Complete Clause conditions, main clause focus targets were significantly less available than the corresponding focus targets in the two subordinate clause types ($F(1, 92) = 7.46$, $p < .01$).

Figure 6 shows the relative accessibility of topic versus focus targets for subordinate clauses only. In the two Complete Clause conditions, subordinate clause topic targets were significantly more accessible than the corresponding focus targets ($F(1, 92) = 7.11$, $p < .01$).

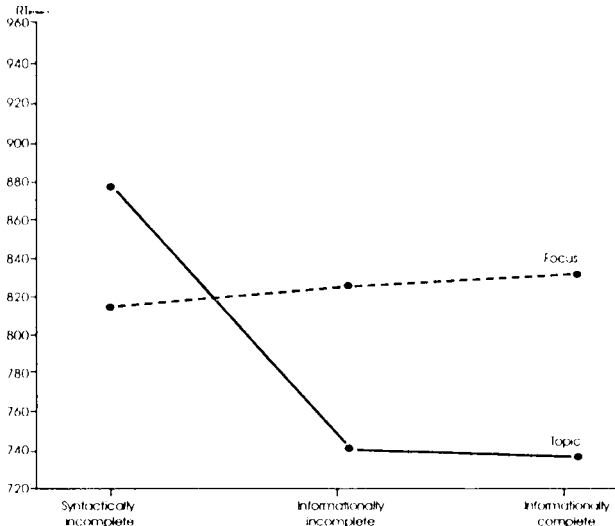


Fig. 6

Mean recognition times for topic vs. focus targets in subordinate clauses in the three completeness conditions

This supports the hypothesis that, due to foregrounding, the object NP of an initial subordinate clause becomes more accessible after the clause-boundary when it is topic than when contrastively focused. Furthermore, we have seen that both topic and focus targets of an initial subordinate clause are more accessible during the processing of the second clause than the corresponding targets of an initial main clause. This finding is in line with the hypothesis that, due to the active inferential process resulting in the foregrounding of topic targets at the clause-boundary, the recoding of clausal material at the end of the clause is postponed in initial subordinate clauses. The fact that the availability of subordinate clause focus targets (that are not foregrounded) stays at the same level in the two Complete Clause conditions as in the Incomplete Clause condition (see Fig. 5) supports this interpretation.

Finally, the unit-by-unit reading time data yielded one interesting result: verbs with postpositional verbal modifiers, that followed the focused object NP (Focus target condition) (as in (19b)) took significantly longer to read ($\bar{x} = 619$ msec) than those with prepositional verbal modifiers (where the modifier is in the focus position), that followed the topic object NP ($\bar{x} = 553$ msec) ($z = 2.86$, $p < .01$).

4. Discussion

Overall, the results clearly support the general hypothesis that when the relevant discourse cues are available during the processing of initial clauses, the listener generates **focus-based inferences** whose function is to facilitate the integration of the second clause proposition into its discourse context. In particular, the experiment demonstrates that the **topic objects of initial subordinate clauses**, which are inferred to serve as likely discourse antecedents for the final clause proposition, are **foregrounded at the clause-boundary**, making them more accessible for discourse antecedent matching during the processing of the second clause (Fig. 4).

The results show that the availability of **both** kinds of discourse cue is crucial for the generation of the forward referring discourse inferences underlying topic foregrounding. Thus, when information about the particular **inter-clausal semantic relation** is not available, as in the case of initial **main** clauses (see Fig. 2), topic objects are not foregrounded at the clause-boundary. In fact, in such cases, irrespective of their discourse role in the first clause, the tested object nouns became significantly **less** accessible after than before the clause-boundary, due to the process of **recoding at the end of the clause** (see Fig. 2, 4, and 5).

This result is in line with earlier findings of the clausal processing literature generally showing that surface material becomes less accessible after the clause-boundary. However, the present findings clearly indicate that the process of end of the clause recoding is not as general as previously supposed: it is demonstrated that when a sentence initial subordinate conjunction word (such as 'if' or 'though') specifies the inter-clausal semantic relation, and when there are clear cues to impose topic-focus segmentation on the initial clause, recoding at the end of the clause is **postponed**. This is shown by the finding that both topic and focus constituents of the tested initial 'if' and 'though' clauses were significantly more accessible after the clause-boundary than the corresponding constituents of initial main clauses, where recoding at the end of the clause did occur (Fig. 2, 4, and 5).

Thus, the present findings support a **modified version of the recoding hypothesis**, according to which surface aspects of the clausal representation are discarded at the clause-boundary only if the following two conditions are met: (1) the final encoding of the clausal proposition into the larger discourse structure is completed (note that, apart from assigning underlying grammatical structure to the clause, this condition involves other requirements as well, such as finding coreferents for anaphoric pronouns, or mapping clausal topics onto matching discourse antecedents) and (2) no forward referring inferential processes, whose function is to facilitate the processing of the upcoming clause, are being computed at the clause-boundary. In our experiment the latter condition was violated in the case of initial subordinate clauses where the hypothesized

focus-based discourse inferential process resulted in increased accessibility of the foregrounded topic targets after the clause-boundary. That the end of the clause recoding of the clausal material was, in fact, postponed, is also shown by the fact that the focus targets (which were not foregrounded) remained at the same level of accessibility after the clause-boundary as before the end of the clause (Fig. 5 and 6).⁶

The finding that topic foregrounding from initial subordinate clauses was present only in the two **after-clause** conditions (see Fig. 4) indicates that the selective activation of the topic object of the initial clause is **concentrated at the end of the clause**. It is important to note that this was the case in spite of the fact that the cues encoding the critical discourse information necessary for the computation of the focus-based inference underlying topic foregrounding (i.e., the clause initial subordinate conjunction encoding the inter-clausal semantic relation, and the preverbal focus position marking the topic-focus segmentation of the clause) were available in the Hungarian clauses tested much earlier than the point of probe presentation even in the **incomplete clause** condition. Therefore, it seems that the utilization of this information to generate topic foregrounding is **delayed** until the end of the clause is reached.⁷

This gives further support for the proposed functional interpretation of the role of topic foregrounding in terms of across-clause discourse integrational processing. In this view, the function of foregrounding topic constituents from initial subordinate clauses is to facilitate the integration of the second clause proposition into its discourse context by making those first clause constituents, that are expected to serve as discourse antecedents for the final clause, more accessible at the clause-boundary. Therefore, since the increased availability of the potential discourse antecedents of the first clause becomes functionally relevant only during the processing of the second clause, the foregrounding of the relevant initial clause constituents takes place only at the clause-boundary.

⁶ Note that the modified version of the recoding hypothesis proposed above can also successfully accommodate the lack of after-clause decrease in relative morphological accessibility of clausal material demonstrated by Marslen-Wilson *et al.* (1978) in the case of initial clauses containing a forward referring anaphoric pronoun subject. Such constructions violate condition (1) above, and so the lack of recoding effect is predicted.

⁷ It should be pointed out that these results were replicated in a different study reported in Gergely (1992b): there, too, (i) topic NP targets from initial subordinate ('if' and 'though') clauses were found to be significantly more accessible after the clause-boundary than before the end of the clause, and (ii) topic NP targets from initial main clauses showed no such facilitation as a function of the clause-boundary.

Note also that while the present study tested for after-clause accessibility only after the first constituent of the second clause has been processed, in Gergely (1991) the probe was presented 500 msec after the clause-boundary with no preceding second clause material. Therefore, the presence of topic foregrounding under the latter condition makes it clear that the process is concentrated at the clause-boundary, as hypothesized, rather than during the processing of the beginning of the second clause (as could have been the case given the position of probe presentation in the present experiment).

This, in turn, supports the general hypothesis that, at least, in initial subordinate clauses, **the local increase in processing load at the end of the clause is due to across-clause discourse integrational processes** that are concentrated at the clause-boundary, rather than to the recoding of the clausal representation, as hypothesized in early clausal processing models (see Fodor *et al.* 1974).

Turning now to the incomplete clause condition, the results show that **focus targets are significantly more accessible than topics** when tested before the end of the clause is reached (Fig. 3). This finding is in line with Cutler's results (Cutler 1976) discussed earlier, who showed, using a phoneme-monitoring task, that the on-line accessibility of a target word is higher when it is the focus of the sentence. However, in her experiment the identification of the focused element was made possible by intonation contour, a cue that was lacking in our reading task. Thus, it is clear that the subjects in the present study had to rely on the structural cues available in Hungarian sentences to assign discourse roles to surface constituents. Let us, therefore, examine how the on-line identification of discourse functions takes place while reading Hungarian sentences, and see if this process might contribute to the explanation for the higher accessibility of focus targets in incomplete clauses.

As described earlier, the position of the verbal modifier around the verb provides a clear structural cue marking discourse functions. Thus, when reading a Hungarian sentence the subject can identify its focus when reaching the verb that carries the verbal modifier particle. If the modifier appears in the immediately preverbal position (i.e., in the syntactic 'focus slot') as in (11a), then the focus is the perfective verb itself, and the constituent(s) preceding it (i.e., appearing in the 'topic slot') is/are the topic(s) of the sequence. If, however, the verbal modifier surfaces in postverbal position as in (11b), then the focus of the sequence is the constituent immediately preceding the verb. If there are further constituents preceding the focused constituent, as is the case in (11b), they belong to the topic of the sequence.

It can be hypothesized that in the constituent-by-constituent reading paradigm of the present experiment the subject applies a processing strategy for tentatively assigning discourse roles to constituents as they are encountered sequentially. In this case, since in Hungarian the topic position is before the preverbal focus position in the surface sequence, it would seem reasonable to tentatively assign topic role to **all** constituents before reaching the verb.

On this assumption, subjects would first assign topic role to the preverbal object NP in both discourse function conditions (e.g., both in (11a) and (11b)). However, in the focus condition (as in (11b)), upon reaching the verb that is **followed** by the verbal modifier, the subject has to realize that the tentative assignment of topic role to the preceding object NP is incorrect. At this point he has to access the preceding

object NP **again** to change its discourse role assignment from topic to **focus**. No such reassignment is necessary, however, in the topic condition (as in (11a), where the verbal modifier, that is **prefixed** to the verb, occupies the focus position.

Note that as a consequence of the hypothesized processing strategy, the object NP is accessed **twice** in the focus condition. This could contribute to the observed increase in on-line accessibility of the object noun when it is the focus in the incomplete clause condition (Fig. 3).⁸

One prediction that follows from the hypothesized processing strategy concerns the relative length of verb reading times. If the secondary retrieval and recoding of the preceding object NP takes place during the processing of the non-focused verb, as hypothesized, then the reading times for such verbs should increase relative to corresponding verbs that are focused and where, as a result, no discourse role reassignment is necessary. In fact, this prediction is borne out by the reading time data as non-focused verbs took significantly longer to read than focused ones.⁹

While the hypothesized left-to-right processing strategy for on-line discourse role assignment might result in, or contribute to, the increased availability of focus targets in Hungarian, our results also imply an independent **functional** reason that predicts **focus** dominance for both Hungarian and English initial clauses. We have seen that the hypothesized inferential process underlying the demonstrated topic foregrounding effect in initial subordinate clauses is based on the focus of the initial clause. Furthermore, our results demonstrate that the process resulting in topic foregrounding is concentrated at the clause-boundary. Therefore, it should not surprise us to find that the focused constituent is kept in a highly accessible processing state during the processing of the clause, as it serves as the inferential basis of topic foregrounding that takes place only at the end of the clause.

Finally, the results show that informationally incomplete Hungarian initial clauses (containing an empty subject) exhibit exactly the same pattern of clause-boundary effects as the informationally complete initial clauses (with a full subject). This suggests that earlier findings (Marslen-Wilson *et al.* 1978), in which initial clauses with pronominal subject NPs resulted in the disappearance of the

⁸ Note also that the recoding of the preverbal object NP would take place while reading the **verb**, which is one unit closer to the point of testing. This might result in a recency effect which could also contribute to the increased availability of focus over topic targets.

⁹ However, it should be noted that there is also a morphological asymmetry between focused vs. non-focused verbs which might have resulted, or contributed to, the observed difference in reading times. When the verbal modifier particle is prepositional (i.e., when it occupies the preverbal focus position, as *be-* in *bemutatta* in (11a)), it is attached to the verb as a continuous element, but when it is postpositional (and so it is not focused, as in *mutatta be*), it follows the verb as a discontinuous element. It might be the case that verbs with discontinuous postpositional modifiers take longer to read than verbs with continuous prefixed modifiers.

clause-boundary effects that were present in corresponding clauses with full subject NPs, can be attributed to **computational** rather than informational completeness. In other words, it seems that in the initial clauses with a forward referring anaphoric pronoun in the Marslen-Wilson *et al.* study the process of recoding of the clausal representation at the end of the clause is postponed not because one of the arguments of the “interpretative unit” lacks the specification of its referent properties (and so it is “informationally incomplete”, see Marslen-Wilson *et al.* 1978), but, rather, due to the fact that in such clauses anaphoric coreference assignment is syntactically obligatory (and so they are computationally incomplete).

That the critical factor is computational rather than informational completeness is shown by the fact that in the Hungarian informationally incomplete clauses tested, where the plural subject is dropped, the resulting empty subject can receive an unspecified subject reading, and so there is no syntactic necessity to initiate an across-clause search for a coreferent. Such a clause, however, is just as informationally incomplete as the English pronominal subject clause, as it is equally missing the specification of a full subject referent. Therefore, it seems that the presence of an anaphoric pronoun in the English clause acts as a syntactic cue initiating an automatic search for a coreferent NP, and until coreference assignment is completed (i.e., as long as the clause is computationally incomplete) recoding at the end of the clause is blocked.

5. Conclusions

The results support current interactive models of speech processing (such as Crain–Steedman 1985; Marslen-Wilson–Tyler 1987; Johnson-Laird 1984) which hold that the listener maps utterances directly onto a discourse model in which he attempts to reconstruct the speaker’s intended meaning. In this process a central role is played by **predictive elaborative inferences** whose function is to facilitate the integration of upcoming propositions into the discourse model under construction. Such discourse inferential processes are jointly determined by different sources of discourse information, such as (i) **topic-focus structure**, (ii) **inter-clausal semantic relations**, and (iii) **pragmatic knowledge**. The results demonstrate (see also Gergely 1991; 1992b) that such discourse cues, when available, are employed **directly and interactively** in the construction of a discourse interpretational model for the sentence, even before its full linguistic processing is complete.

In particular, the present study has shown that early models of speech comprehension, which considered the special status of the clause-boundary during processing to reflect solely within-clause processes of assigning underlying linguistic structure to the clausal unit, need revision. It is demonstrated that, at least, in the case of

initial subordinate clauses, **the end of the clause increase in processing load is due to across-clause focus-based inferences** concentrated at the clause-boundary, which result in the **foregrounding of the initial clause topic object** making it more accessible during the processing of the terminal clause. The processing function of the predictive inference is to facilitate the direct integration of the second clause proposition into its discourse context by making the most likely discourse antecedent from the initial clause more accessible for efficient antecedent matching at the beginning of the second clause.

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THE ORDER OF ACQUISITION OF FUNCTIONAL CATEGORIES AND MOVEMENT IN HUNGARIAN*

ANNA BABARCZY

Abstract

Observed on a large timescale, children's language development seems to involve three distinct stages: one-word stage, pregrammatical stage and grammatical stage. It is a puzzling observation that the transition from the pregrammatical (or lexical) stage to the grammatical (or functional) stage appears to occur relatively abruptly.

An interesting approach to this problem within the framework of Principles and Parameters theory is Radford's maturational hypothesis. This hypothesis proposes that the functional categories are absent from the child's mental Universal Grammar at early stages of development and the transition to the grammatical stage is attributed to the biological maturation of these categories. Thus, the theory predicts that the different features of language which presuppose the operation of functional categories should all be present or absent at a given stage of maturation.

The present paper examines to what extent the maturational theory could account for data from Hungarian language acquisition. I carried out a descriptive statistical analysis of a naturalistic longitudinal child language corpus and found that the stages of Hungarian language development may not be as clearly defined in terms of the lexical/functional distinction as has been proposed for English. In particular, inflections classed as lexical (the nominal paradigm) develop in parallel with functional inflections (the verbal paradigm), while other functional categories (components of the Determiner Phrase and Focus) are 'acquired' later, with a considerable time lag between them.

On the basis of this analysis it is argued that the maturation of the mental grammar is not a sufficient condition for the transition from one stage to another: learning seems to play a significant role. The observed order of the acquisition of functional elements suggests that the learning strategies employed by the child may in part be determined by the morphological type of the target language and by its primary means of identifying grammatical and/or semantic relations.

* This study is based on my MA dissertation, which was written under the supervision of J. R. Hurford, Dept. of Linguistics, The University of Edinburgh. I would also like to thank R. Cann and C. Heycock for their assistance.

0. Introduction

Radford (1990) provides an analysis and tentative explanation for the stage of language acquisition which is characterised by what is known in the literature as telegraphic speech, i.e. utterances lacking functional lexical items and grammatical morphemes. Working within the framework of Government and Binding/Principles and Parameters Theory, he proposes that the set of principles or modules responsible for functional category systems are not available to the child at this stage because they are genetically programmed to come into operation at a later, biologically determined, stage of maturation than those responsible for thematic mapping.

As the title of his book (*Syntactic theory and the acquisition of English syntax*) suggests and as Radford himself emphasises, his study is based entirely on a corpus of monolingual children acquiring English as their first language.

The present study investigates the relative order of acquisition of lexical and functional categories in Hungarian as defined by Government and Binding Theory. It is shown that the maturation of functional categories cannot fully predict empirical findings. In Section 1 a summary of Radford's maturational theory is given. Section 2 focuses on current theories of Hungarian syntax within the GB framework and the predictions of the maturational theory applied to Hungarian language acquisition. Section 3 describes the child language data and in Section 4 some implications are suggested.

1. Radford's theory of language acquisition

Radford distinguishes three, empirically observed, stages (pre-categorical, lexical-thematic categorial and functional-non-thematic categorial) in the development of child English, which correspond to the three well-established stages in language acquisition literature: one-word stage, early multi-word stage and later multi-word stage. The terminology used by Radford is chosen to reflect the conclusions drawn from his analysis of child language data.

The syntactic theory adopted by Radford as the background for his research is that elaborated in Radford (1988), Chomsky's *Barriers* monograph (Chomsky 1986) and Abney (1987), where the lexical categories in English are N(oun), V(erb), A(djective) and P(reposition) and the class of functional categories comprises D(eterminer), C(omplementizer) and I(nflection). A further functional module of the grammar is Case Theory, which states that every Determiner Phrase must be

assigned either structural Case or inherent case¹ under government. In order to account for the whole range of data, however, the lexical/functional distinction needs to be refined. Radford describes second-stage child grammars as **thematic**: a word level category is thematic if it assigns theta-roles to its sister complements and its maximal projection theta-marks its sister subject specifier. Conversely, the category is nonthematic if it has a nonthematic complement or a nonthematic specifier or both.

Radford presents a set of observable phenomena that characterise each stage of child English and can be taken as evidence for the maturational theory. At the earliest stage child English is acategorial in nature: words or expressions are learnt as unanalysed wholes and are associated with particular concepts but have no syntactic properties, therefore cannot be combined productively. At some point, Radford claims, children enter the lexical categorial stage of language development which is marked by the ability to 'recognise' grammatical categories. Evidence for this is provided by the productive, selective and meaningful use of a set of lexical inflections (plural *-s* and gerund *-ing*) tied to particular word classes; by 'correct' combinations of lexical categories; and by the selection of appropriate word classes in completing unfinished sentences or answering *wh*-questions. As the grammatical categories are acquired, children also develop a uniform X' schema for projecting lexical heads:

- (1) [_XP specifier [_X' adjunct [_X' [_X head] complement]]]

At this stage, Radford proposes, the categorial component comes 'on-line', the lexicon now includes the subcategorization properties of words and there is a set of mechanisms which map argument structures onto lexical syntactic structures on the basis of their thematic function. The schema in (1) looks very similar to that of a structure in adult grammar. The main, and far from negligible, difference is that in child grammar at this stage X will never stand for a functional category. For instance, Radford assigns the following structures to the utterances *lady cup tea* and *birdie flying*:

- (2) [_{NP} lady [_N' [_N cup] tea]]

- (3) [_{VP} [_{NP} birdie] [_V' [_V flying]]]

¹ The word Case with a capital letter will refer to structural case, which is an abstract concept and is not necessarily realised morphologically. It contrasts with always overt, thematically determined inherent cases.

While the corresponding adult utterances would be represented in the grammar as

(2') [DP the lady [D 's] [NP e [N' [N cup] of tea]]]

(3') [IP [DP the birdie] [I' [I is] [VP flying]]]

The absence of functional categories would mean that the child has not acquired structures which presuppose these functional category systems. First of all items which are base-generated in the head position of such a system in adult grammar are altogether absent or sporadically, nonsystematically used in child grammar. Radford argues that constituents in child vocabulary which have a functional categorial status in adult grammar will be miscategorized as having lexical status. Secondly, constituents which are required to be transformationally moved into the head or specifier position of functional phrasal projections remain in their lexical base position. Since there are no nonthematic category systems, which serve as landing sites for moved constituents, the transformational module at this stage remains inoperative, all structures are base-generated constructions. Thirdly, child grammar is not subject to syntactic constraints, such as Case-marking or grammatical feature checking, which are motivated by the properties of functional systems.

The maturational theory postulates that the functional categories of Universal Grammar become available to the child at the third, functional stage of language acquisition, thus enabling her to observe constraints and processes associated with the I-system, the D-system and the C-system. The theory thus predicts that this stage should be marked by the parallel onset of previously missing syntactic phenomena that presuppose the operation of the functional modules of UG.

2. Description of Hungarian syntax

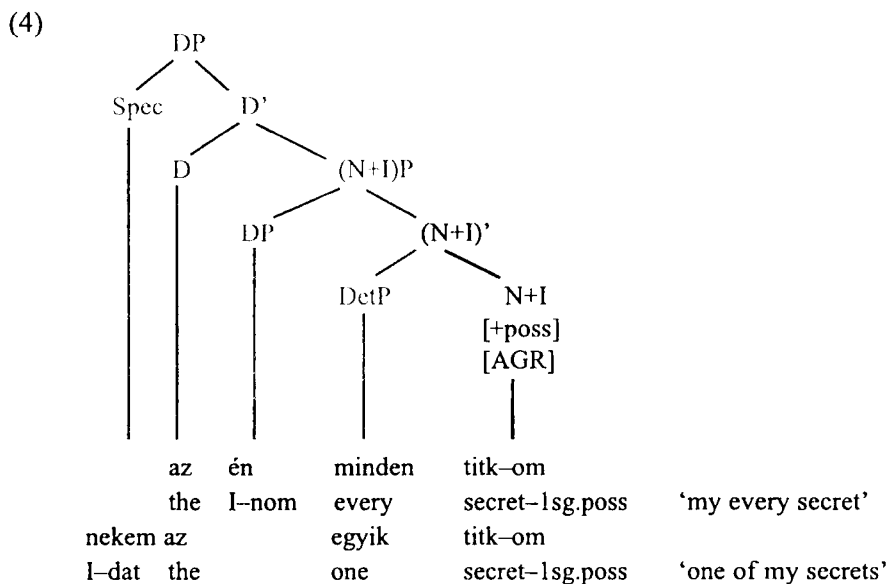
2.1. The Hungarian noun phrase

Hungarian is a nominative/accusative language: the subject of a clause is in the nominative case and the object of a transitive verb in the accusative. In addition, Hungarian has a rich suffixing agglutinating case system with over 20 cases in the nominal paradigm and a number of (mostly locative) postpositions. Case marking is the primary means of identifying the grammatical and/or thematic roles of nouns in a sentence.

The internal structure of the Hungarian noun phrase is rather complex, as evidenced by possessive constructions:

- the possessed noun agrees in number and person with the possessor;
- the possessor may get nominative case or dative case;
- articles regularly co-occur with ‘possessive’ pronouns and quantifiers.

In the framework of Government and Binding Theory, the structure of the Hungarian Determiner Phrase was developed by Szabolcsi in a series of papers (Szabolcsi 1987; 1990; 1992). The phrase structure proposed by Szabolcsi is as follows:



Thus while in the English possessive construction it is the genitive ‘s that heads the DP, in Hungarian the head D position is reserved for the article and the possessive morphological marker appears with the noun in the head position of a complex lexical–functional phrasal category, (N+I)P, whenever this carries a [+poss] and, consequently, [AGR] feature. The [+poss, AGR] feature of the head N+I assigns structural nominative Case to the possessor in the specifier position of (N+I)P; the oblique case of the dative possessor follows from its position outside (N+I)P, where, for lack of a governing AGR, it cannot be assigned structural Case, therefore needs inherent case. This proposal is based on the assumption that all oblique case suffixes, as well as postpositions, represent inherent cases in Hungarian, i.e. there is no PP category. In non-possessive constructions D may not be lexically

filled. Non-specific oblique and predicative nouns take zero article in certain linguistic contexts. Szabolcsi proposes that (N+I)P carry a [\pm specific] feature, which, when set to negative, selects zero article.

2.2. Hungarian sentence structure

The system of verbal agreement marking is similarly complex, which, one is tempted to say, allows the omission of not only pronominal subjects, but also of pronominal objects. Verbs (in all tenses and moods) agree in number and person with the subject of the sentence and with the definiteness of the direct object, so that there is a set of six verbal inflections for intransitive verbs, and two sets of six inflections for transitive verbs which are attached to the verb root (in present tense indicative) or to the tense/mood marker observing certain morphophonological restrictions. The third person singular present indicative indefinite is the base form of the verb. There are two tenses (present and past) and three primary moods (indicative, conditional and imperative/subjunctive). Verbs can also carry prefixes. Verbal prefixes most commonly express perfective aspect and direction of movement or in certain ways modify the meaning of the verb.

The order of sentence constituents is basically free. Whether there is a neutral or canonical constituent order is subject to debate. Taken out of discourse context all permutations are grammatical, albeit not synonymous. The discourse functional structure of sentences is rather rigid: it follows the (Topic)–Focus–Verb–Comment order, where, informally, Topic is contextually and/or situationally ‘given’ and Focus, which immediately precedes the (modal) verb, is the new or contrastive information. There is a class of elements, which includes verbal prefixes, that occupy the preverbal slot in neutral sentences (see Pléh–Ackerman–Komlósy 1989). When a constituent is focussed and in imperative constructions, however, the verbal modifier must occur in postverbal position.

Hungarian is generally classified as an, at least partially, non-configurational language. Thus underlyingly a Hungarian main clause projects onto a VP, with the verb occupying the V-node and the other constituents, including the subject, are base-generated in random order as sisters. The verb carries tense and agreement features and finite I assigns structural nominative Case to DPs within VP. Although in É. Kiss’s (1990; 1992) analysis the verbal prefix (variously termed as ‘preverb’ or ‘Verbal Modifier’) is base-generated postverbally, Marácz (1990), Brody (1990), Kenesei (1992) and Piñón (1992) place it in preverbal position adjoined to the V-node.²

2 The arguments for base-generating the prefix in preverbal position are rather complex and will not be discussed here. For a discussion see especially Piñón (1992).

The surface structure may be equivalent to the deep structure, resulting in VSO or VOS order, but most frequently it will be derived by extracting constituents from the VP and creating Topic and Focus positions for them. Functionally, É. Kiss (1990) argues, the topic bears the same predication relation to the rest of the clause as in a configurational language the subject bears to the VP. Topic will accordingly occupy a position in a higher level phrasal projection from Focus. Three criteria can be applied to identify preverbal elements as focussed:

(a) they are stressed;

(b) they express new information, receive identificational, contrastive or emphatic interpretation;

(c) they trigger prefix-verb inversion, i.e. when a constituent is focussed (and in imperative constructions), verbal prefixes are obligatorily separated from the verb and moved into postverbal position.

There is a class of constituents that are obligatorily focussed: wh-constituents, negated constituents and negative quantifiers.

(5) El-megy.

away-go

'S/he is leaving'

(6) Mikor megy el?

when go away

'When is s/he leaving?'

(7) Men-j-en el.

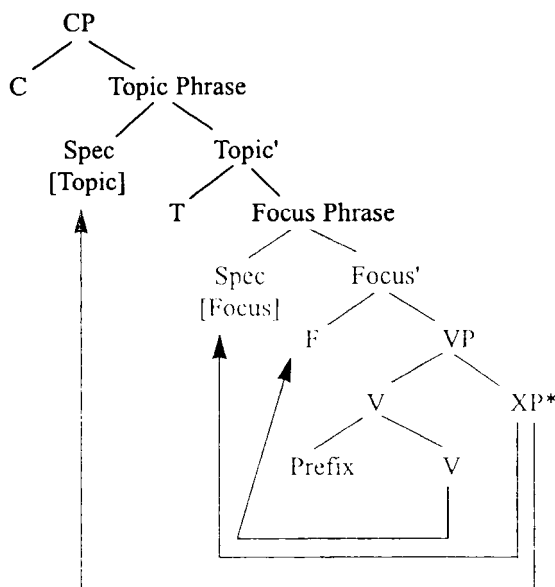
go-imp-3sg away

'S/he should leave'

Sentential negation is a special instance of negated constituent focusing, where the negated verb occupies focus position leaving the prefix behind.

A somewhat simplified and generalised Hungarian sentence structure would be as follows:

(8)



Brody (1990) proposes that the motivation for projecting a focus phrase could be a [focus] feature which is carried by the verb. When this feature is present, the focussed constituent occupies the specifier position of the focus phrase and the verb moves to its head position. To account for prefix–verb inversion in imperative constructions, Piñón (1992) classes the imperative morpheme as a ‘focus’ element, which occupies the head position of the Focus projection, and by virtue of the features carried by the head, it triggers verb movement.

In summary, the nature and roles of functional projections in Hungarian syntax are in most aspects dissimilar from those of English sentence structure. The only role of the CP in Hungarian is to provide a position for the complementizer. An independent IP category is missing from Hungarian syntax, although INFL is incorporated into the NP and into the VP. There are two functional category projections which do not appear in English phrase structure. The Topic Phrase has the functional role of IP in so far as it serves as a landing site for the ‘subject’ of the clause. The Focus Phrase carries a focus feature and provides a landing site for verb movement. The only structural Case is the nominative, which is assigned to subjects in their base-position. Thus, unlike in English, the movement of constituents is independent of Case assignment, in its stead, it is motivated by the projection of Focus or Topic.

2.3 Predictions of the maturational theory in Hungarian language acquisition

The English criteria for the onset of the lexical–thematic categorial stage of language development can be straightforwardly applied to Hungarian language acquisition. At this stage, Hungarian children as well are expected to be able to combine lexical word categories as well as to complete unfinished sentences and answer wh-questions using appropriate word classes. We should also find that children use lexical inflections productively, selectively and meaningfully. The ‘lexical inflections’ category in Hungarian grammar comprises the plural morpheme as well as all oblique case inflections. The next, functional, stage should be then marked by the appearance of evidence for the projection of the DP and the Focus phrase and the acquisition of elements associated with the INFL category and Case marking mechanisms.

The properties that are expected to be characteristic of Hungarian child language at the lexical–thematic stage are summarised below. The individual predictions will be discussed in some detail in Section 3.

1. Evidence for the onset of the categorial stage

- the ‘correct’ combination of different lexical categories;
- the selection of appropriate word classes as answers to wh-questions;
- the acquisition of the plural morpheme and some common case inflections (e.g. accusative, locative cases, dative and instrumental).

2. Evidence for the absence of DP

- the lack of articles;
- semantic errors in speaker/listener reference.

3. Evidence for the absence of structural Case marking mechanisms

- preference for the semantically transparent inherent dative case over the structural nominative Case in noun phrase subject position;
- the occurrence of semantically motivated inherent oblique cases in sentential subject position, that is, the categorization of subjects as discourse functional Topics rather than syntactic subjects.

4. Evidence for the absence of I

- the lack of possessive marking;
- verbs uninflected for tense or agreement;
- the frequent omission of existential copulas.

5. Evidence for the absence of FP

- the lack of prefix-verb inversion in sentences with wh-constituents, negated constituents or imperative verbs.

Crucially, the maturational theory of language acquisition predicts that the lexical–thematic stage of language development should be characterised by **all** of the discussed phenomena. When one functional module becomes operative in child grammar, the other modules are also predicted to come ‘on-line’.

3. The linguistic development of a Hungarian child

3.1. The data and methods of analysis

The data were taken from the CHILDES database (MacWhinney 1974; 1991), a naturalistic corpus of child language. The Hungarian section contains the transcripts of recordings of five children’s (and their caretakers’) spontaneous conversation in their nursery school. The children were recorded for three or four days every two months over a period of ten months. They were all native speakers of Hungarian, with no known neurological or hearing deficits. For each recording session a target child was selected, who wore an apron with a microphone attached to it. This study focuses on the language of one child, Zoli, the only subject whose recordings span the period of transition from the telegraphic stage to the grammatical stage. Zoli’s age, the number of turns he took in the conversation and the mean length of his utterances at the time of each recording session are shown in Table 1.

Table 1

Zoli’s age, the number of turns he took in the conversation and the mean length of his utterances at the time of each recording session

SESSION ³	AGE (years; months)	TURNS	MLU (words, morphemes)
JANUARY	1;5–1;6	96	1.22, 1.62
MARCH	1;8	1303	1.54, 2.20
MAY	1;10	996	1.82, 2.40
JULY	2;0	649	2.36, 2.90
SEPTEMBER	2;2	1419	2.62, 3.10

³ The sessions are labelled by names of months for ease of reference. Since at each stage the recording took place over a few days, the labels do not always match the exact date of the recordings.

The data were analysed by counting the number of correct and the number of incorrect realisations of each of the linguistic phenomena listed in Section 2.3. (For a few of the constructions simply the number of occurrences was counted. These are oblique cases in sentential and noun phrase subject positions. The reasons for their different treatment will be discussed in the appropriate sections.) The child's forms and constructions were categorised as 'correct' or 'incorrect' based on the following general criteria:

Correct forms were those where

- the child's form matched the form that the adult grammar requires in the same context;
- the child's form approximated the adult form but it contained identifiable phonological or morphophonological errors;
- the child's form contained a grammatical error belonging to a category other than the one under analysis.

Incorrect forms were those where

- the child failed to use a word, an inflection or inversion in a context where it is required in the adult grammar;
- the child used an inappropriate word or inflection;
- the child used a word, an inflection or inversion in a context where it is ungrammatical in the adult grammar. This criterion was applied when errors of this kind indicated rote-learned, unanalysed forms rather than the overgeneralization of some rule.

An expression was excluded from the quantitative analysis when

- the reference of the expression or the intentions of the child were unclear;
- it was impossible to decide whether the error was of phonological or syntactic nature;
- the construction used by the child is strictly speaking ungrammatical but frequently occurring in adult performance;
- the expression was the exact repetition of the child's immediately preceding utterance.

The aim of this study is to test whether the acquisition curves of the different functional categories rise simultaneously and whether there is a relatively steep rise at any point indicating the onset of the functional stage. The analysis of a single child's language development is, of course, insufficient for statistical inference. It can, however, support or raise questions about Radford's maturational hypothesis. Since the Hungarian functional category system is markedly different from the English system, a single example that satisfies the predictions of the theory could

indicate that the parallel onset of functional categories is not an accidental property of English language acquisition. On the other hand, since the predictions of the maturational theory are based on assumed species universal, biological properties (a genetically inherited Universal Grammar and its biologically determined maturation), a single counter-example could prompt alternative or complementary explanations.

To aid the comparison of the development of different constructions, the graphs showing the development of a linguistic function were drawn by calculating the percent of all 'correct' realisations of that function. Due to the relatively small size of the database, however, some functions occur in small numbers, which can only give weak evidence. The actual numbers of 'correct' and 'incorrect' forms are shown in the Appendix. A further disadvantage of a quantitative analysis, is that it does not necessarily show whether a certain function has been acquired for two reasons. Firstly, there is no universal criterion on the basis of which one could specify a certain rate of accuracy above which the linguistic function could be regarded as 'acquired'. Secondly, the biasing influence of rote-learned forms is difficult to control for. To counteract these disadvantages, reference will be made to possible influencing factors whenever it is appropriate. Following Radford's lead, a phrase will be labelled as formulaic when its constituent parts do not occur in any other combination. On the other hand, the condition for regarding a structure as 'acquired' is that it is used consistently, productively and meaningfully.

3.2. The results of the analysis and discussion

3.2.1. Zoli's overall language development

At the first stage Zoli's language shows little evidence for the onset of the lexical categorial stage of language development. His utterances consist mainly of single words or set phrases. Only 31% of his nouns with non-subject roles are inflected for case; of the case inflections only the accusative is represented and all of the case marked nouns refer to Zoli's toys. In answers to *wh*-questions Zoli frequently repeated the last word of the question. Questions with *hol* 'where' or *hova* 'where to' occurred several times, to which Zoli gave the answers *ott* 'there' or *oda* 'thither' interchangeably. The question *Mit csinálsz?* 'What are you (sing.) doing?' occurred twice. On one occasion Zoli's answer was *halacska* 'fish', on the other occasion *bácsi* 'uncle'.⁴ Word combinations include short commands and a few semi-productive phrases. A few examples are given below:

⁴ The word *bácsi* is used by children to refer to or address an unrelated male adult.

- (9) add oda
 give-2sg.imp thither
 'give me'
- (10) nézz oda
 look-2sg.imp thither
 'look'
- (11) ott a (noun)
 there the
 'there is the ...'
- (12) jött a (noun)
 come-3sg.past the
 'the ... came'

It seems reasonable to assume that these phrases were unanalysed for three reasons. Firstly, the imperative verbs did not occur in any other form at this stage and at later stages errors were made by attaching verbal suffixes to the phrase, rather than to the verb. Secondly, the adverbs *ott* 'there' and *oda* 'thither' were always used appropriately in these phrases, although in Zoli's one word utterances the two forms showed no contrast. Thirdly, the definite article frequently occurred after *ott* and always after *jött* 'came' even when no noun followed it.

Zoli's language in March gives a markedly different picture. Six nominal cases were used (with 69% accuracy) and the plural morpheme was consistently attached to nouns and nominal pro-forms with plural referents. Evidence for the productivity of lexical inflections is provided by the occurrence of inflected nonsense words that the child was taught by the investigator. At this stage, several adjective-noun and verb-object combinations occurred and a variety of appropriate word classes were selected as answers to *wh*-questions. At later stages three more lexical cases appeared and Zoli's performance rose to 90% accuracy. Postpositions did not appear until the last recording session.

The acquisition of functional categories exhibits a less clear pattern. The development of three functional systems, DP, I and FP are shown in Fig. 1. Each curve shows the percent of the sum of the correct occurrences of different linguistic structures associated with each functional category. (For sample size see the Appendix.)

Overall development of functional categories

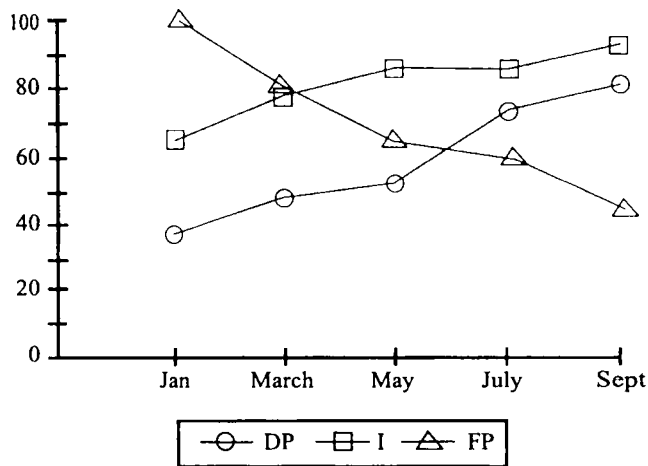


Fig. 1

Correct usage of constructions associated with three functional categories: Determiner Phrase (articles and speaker/listener reference); INFL (possessive marking, verb inflections and existential copulas); Focus Phrase (prefix/verb inversion in negative, imperative and wh-constructions). (Represented as a percentage of all utterances that targeted the construction.)

As can be seen from the diagram, the curves for the different functional categories do not rise simultaneously. Indeed, Zoli's performance in prefix/verb inversion declined over the studied period! Furthermore, although it is difficult to specify when a certain structure had been acquired, the data suggest that verbal inflections were consistently and confidently used in March, while the determiner system remained obscure until July. Before any conclusion can be drawn, however, some details and possible influencing factors will have to be considered.

3.2.2. The Determiner Phrase

The absence of DP in the Hungarian child's grammar should be indicated by the omission of definite and indefinite articles, since the grammar is expected to lack a D site, in which they could be generated. The absence of a D-system is also held to account for the phenomenon that children have difficulty determining the referential properties of personal pronouns: they refer to themselves by their name, fail to identify the referent of *I* (= the speaker) and *you* (= the addressee). The development of these components is shown in Fig. 2.

The Determiner Phrase

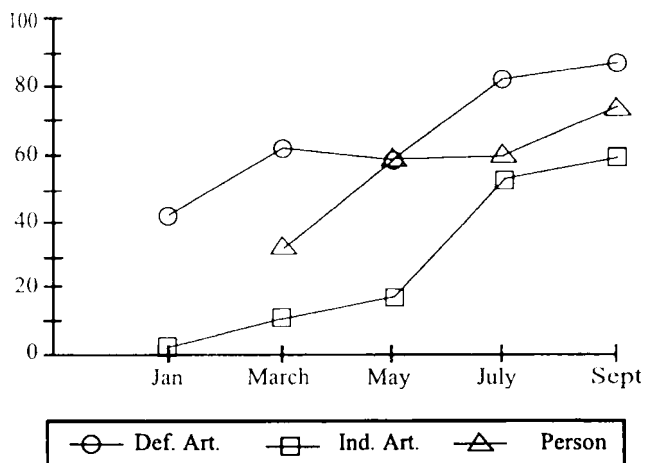


Fig. 2

Correct usage of definite articles, indefinite articles and speaker/listener reference. In the January session there were no clear examples of speaker/listener reference. (Represented as a percentage of all utterances that targeted the construction.)

A striking feature of the graph is the large gap between definite and indefinite articles. Both curves, however, show relatively sudden improvement between May and July. The lower accuracy rate in the use of indefinite articles may be due to two influencing factors. Firstly, the discrepancy at the early stages may in part be due to the fact that the most frequent semi-productive phrases that Zoli used in January contained a definite article (see examples (11) and (12) above). These phrases were also used at later stages, although in increasingly wider environments, with varied word orders and different verb forms. The indefinite article, on the other hand, did not occur in Zoli's semiformulaic utterances. A second factor to consider is the complex nature of the rule determining the occurrence of indefinite articles, which may have delayed their consistent use. In Hungarian non-specific oblique nouns and non-specific predicative nouns take no article in certain linguistic contexts. Thus, even though the DP category might be available, the child faces the semantic difficulty of assigning [+specific] or [-specific] feature to the noun.

The curve showing Zoli's performance in using personal pronouns to refer to himself and to the listener rises relatively quickly between March and May. Nevertheless, Zoli reached only 56% accuracy in May and 57% in July. Radford (1990) argues that

since pronouns are in fact pronominal determiners, their referential properties are determined by the D-system. Assuming that Zoli had acquired the D-system by July (and the relatively frequent omission of indefinite articles is due to the semantic features of the noun), it would seem that although a D-system may be a necessary condition for the acquisition of speaker/listener reference, it is not a sufficient condition.

3.2.3. The case system and the INFL category

In finding evidence for the absence of functional category projections, the proposed existence of complex categories (N+I and V+I) may blur the distinction between functional and lexical projections. This problem can be resolved if we assume that, if the lexical–thematic hypothesis is correct, at this stage children miscategorise N+I as N and V+I as V, along the lines of English-learning children’s miscategorisation of functional categories as lexical. However, the effects of miscategorisation would be fundamentally different. While in English child grammar, as Radford proposes, these apparent functional elements are adjoined to existing lexical nodes, in Hungarian miscategorisation would create a lexical node in place of a complex node and would mean that the features carried by I ([Tense], [AGR] and [poss]) are absent. Consequently those elements of the grammar whose presence is motivated by these features are expected to remain essentially unexpressed.

The maturational hypothesis predicts the absence of restrictions imposed on subjects by Case Theory, which is closely related to both the DP and the I categories. If the Case-assigning INFL category is ‘missing’ from the child’s grammar, sentential subjects and noun phrase subjects (possessors) will not be assigned nominative Case. In possessive constructions, child grammar at this stage should show no contrast between nominative and dative possessor. Given no Case requiring DP category or Case-assigning I, the possessor noun or pronoun would be miscategorised as an NP (within an NP) lacking structural nominative Case. Since the Theta Theory is expected to be operative at this stage and the child will have acquired lexical case marking, we should find frequent occurrence of the dative possessor, which clearly shows the thematic role of the subject of the possessive construction. As for non-possessive structures, the lack of structural Case assignment would be revealed by the child’s failure to contrast nominative case with oblique cases in sentential subject position. We should expect the over-extension of oblique cases, i.e. the use of oblique subjects in constructions where the subject has a theta-role which is marked by an oblique case in non-subject positions.

As Zoli ‘dropped’ the subjects in over 80% of his utterances at all stages, the ratio of nominative to oblique subjects would not be an appropriate measure of his ‘knowledge’ of Case Theory. The few erroneous occurrences of overt obliquely marked subjects, however, provide no conclusive evidence for the lack of Case-

marking mechanisms. Errors in sentential subject position only occurred at later stages, in July (2) and September (4). They seemingly resulted from the combination of two propositions or involved the verb *kér* 'want, ask for':

- (13) *Hol van a csipesz-em-et?
 where is the peg-1sg.poss.acc
 'Where is my peg-acc?≈Where is my peg? Give it to me.'
- (14) *Nekem kér-ek hal-at. should be: **Én** kér-ek hal-at.
 I-dat want-1sg fish-acc I
 '*Me want fish.'
- (15) *Nekem kér süti. should be: **Én** kér-ek süti-t.
 I-dat want cake I want-1sg cake-acc
 '*Me wants cake.'

Note that in example (15) the accusative marker is omitted and the verb 'agrees' with *cake*, which indicates that the verb has been miscategorized as an impersonal verb, probably on analogy with a frequently used impersonal verb with similar meaning.⁵

In possessive constructions, the use of dative possessors seems to increase, contrary to the predictions of the maturational hypothesis. However, the sample size is not sufficiently large for any conclusions to be drawn. Table 2 shows the number of overt nominative and dative possessors and the number of target possessive constructions:

Table 2
 Nominative and dative possessors in possessive constructions

	MARCH	MAY	JULY	SEPT
NOMINATIVE	4	0	0	2
DATIVE	0	3	2	5
TOTAL POSS.	16	40	25	34

The consequence of the absence of features carried by INFL in a possessive noun phrase is the lack of person and number agreement between the subject (possessor) and the possessive suffix on the head noun. In the VP, the absence of the INFL cat-

⁵ The verb *kell* 'need'.

egory should be indicated by the omission of verbal inflections (tense marking and subject agreement) and existential copulas.⁶ As we have seen in Section 3.2.1, Zoli's overall performance in this category was significantly more advanced than his determiner system. The development of the different linguistic functions, however, was not uniform, as can be seen in Fig. 3.

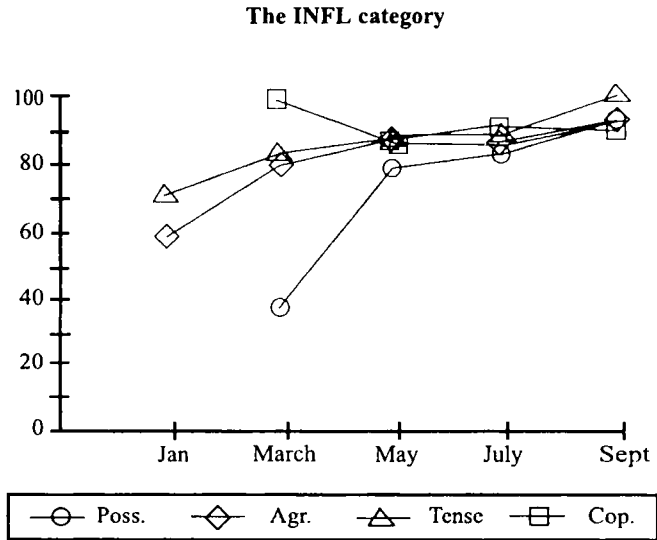


Fig. 3

Correct usage of possessive marking, subject/verb agreement, past tense inflections and existential copulas. In the January session no context occurred where a copula or possessive marking was required. (Calculated as a percentage of all utterances that targeted the construction.)

Verbal inflections and copulas were used more consistently than possessive marking at the early stages. The high rate of accuracy of verbal inflections in January, however, may not be a reliable indicator of Zoli's competence. At this stage, the number of forms across verbs was limited to the default 3sg. present form and three inflection types: 3sg. past; 1sg. present; and 2sg. imperative. Moreover, most verbs occurred in one form only, one irregular verb was used in two forms and no verbs occurred in more than two forms. In March, in contrast, nine different inflection types and 51 dif-

⁶ Since in Hungarian the third person present tense of non-existential copulas (as in *This mouse is clever* or *Mice are animals*) is phonetically null and children are expected not to have acquired inflected verb forms, this prediction can only be tested when the copula is used with an existential meaning (as in *The mouse is beside the keyboard*).

ferent verb-inflection combinations were used. Some verbs appeared in as many as 6 forms. The sudden increase in the number of verb-inflection combinations may, of course, be in part due to the larger sample size (see the Appendix) and the increase in Zoli's vocabulary. It is also possible that most forms were rote-learned. However, some evidence for the productivity of verbal inflections is provided by a few errors involving vowel harmony or where the tense or agreement marker was attached to an early rote-learned inflected form rather than to the verb stem:

- (16) *Ül-j-ök? should be: Ül-j-ek?
sit-imp-1sg
'Shall I sit?'
- (17) *Ad-d-oda-m. should be: Oda-ad-om.
give-2sg.imp-thither-1sg thither-give-1sg
'I'll give it to you.'
(cf. example 14.)

The default form of verbs (3sg) was rarely used with explicit or implicit non-third subjects. Errors involving verbal inflections most commonly derived from semantic properties. Agreement with second person subjects was acquired relatively late. When referring to the addressee, the child tended to use first person plural forms. Errors were also made by failing to invert person agreement in answers to yes/no questions with first or second person verbs. This behaviour correlates with Zoli's development in determining the referential properties of first and second person pronouns (see Fig. 2).

Hungarian transitive verbs agree not only with the person and number of the subject but also with the definiteness of the object. However, this property was disregarded as no reliable analysis of the development of object-verb agreement could be carried out. It was frequently impossible to decide whether Zoli used correct object agreement partly because of considerable overlap in form in certain dialects between definite and indefinite inflections and partly due to the fact that Zoli frequently omitted objects. Furthermore, as Zoli's 'default' form seemed to depend on the verb type, the few examples where the required inflection type could be established provide no evidence either for or against the lack of object-verb agreement mechanisms.

3.2.4. The Focus Phrase

If functional categories are not projected at the lexical stage of child grammar, the Hungarian sentence at this stage should be mapped onto a VP and we can expect a high proportion of verb-initial structures. Radford's definition of lexical-thematic phrase-structure does not altogether exclude non-verb-initial sentences, since a pre-

posed NP could be adjoined to VP. It cannot therefore be established from Hungarian language acquisition data whether the topic phrase is projected. What can be tested, is the projection of Focus: evidence for syntactic focussing is provided by the obligatory inversion of the verbal prefix and the verb. If a preposed constituent is not focused by children, but adjoined to VP, as predicted by the theory, we should not find prefix-verb inversion, since in the absence of a Focus category verb movement is unmotivated. In order to avoid having to rely on discourse pragmatic or suprasegmental properties of preposed constituents that can distinguish Topic from Focus, constructions with those types of constituent will be included in the data analysis which cannot be topicalized, only focused, i.e. wh-constituents, negated constituents, and imperative structures.

As can be seen in Fig. 1, the requirement for verb movement triggered by the projection of the Focus Phrase appears to have been observed at early stages but not at later stages. A closer examination may find an explanation for this phenomenon. Table 3 shows the number of correct and incorrect realisations of the three different construction types requiring Focussing.

Table 3

Number of correct prefix/verb inversions and incorrect default prefix-verb orders in wh-, negative and imperative constructions

	JANUARY		MARCH		MAY		JULY		SEPT	
	corr	incorr	corr	incorr	corr	incorr	corr	incorr	corr	incorr
WH INV.	–	–	–	–	–	–	–	–	2	0
NEG. INV.	–	–	1	2	2	2	0	4	6	22
IMP. INV.	7	0	9	0	22	12	22	12	24	20
TOTAL FP	7	0	10	2	24	14	22	16	32	42

In the sample, imperative constructions constitute the large majority of contexts where prefix/verb inversion was required. As in January and March these were the imperative phrases that showed no evidence for productive use (as in examples (9) and (10)), it is safe to claim that the high rate of accuracy in prefix/verb inversion at early stages was the result of rote learning. It seems that as these phrases later on gradually lost their formulaic character and their component parts became independent units, they appeared with the word order required by Zoli's grammar.⁷

⁷ Note that in É. Kiss's analysis (É. Kiss 1990; 1992), the verbal prefix is base-generated as an internal argument of the verb, i.e. the default linear order is verb-prefix. If this analysis is correct, verb-prefix linear order would not provide evidence for syntactic focusing. The prediction of this

(Frequent errors involving prefix/verb inversion have also been reported for somewhat older children (aged 2;7) by MacWhinney (1974) and Pléh (1992).)

4. Summary and possible implications

Radford (1990) predicts that the lexical–thematic stage of language development should be characterised by the non-acquisition of functional categories. In Zoli's language, however, the functional I category seems to develop simultaneously with lexical inflections (Fig. 4):

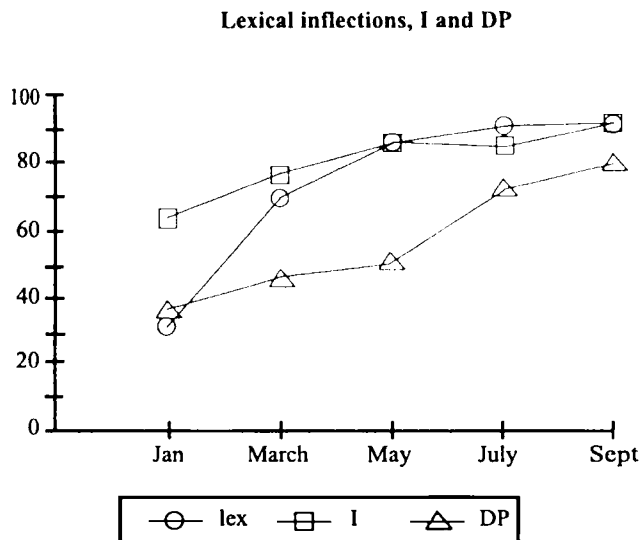


Fig. 4

The development of lexical inflections (plural and case morphology); functions associated with the I-system (possessive marking, verb inflections and existential copulas); and the DP (articles and speaker/listener reference).

At the functional stage, although the acquisition of linguistic phenomena associated with functional categories may not be simultaneous, the relevant properties should cluster into significant sets. One of these significant sets should include both

hypothesis would be the frequent occurrence of the default verb–prefix order not only in wh-, negative and imperative constructions, but also in 'neutral' utterances. Zoli's language, however, does not support this prediction.

the I-system and the D-system. Radford argues, that "if we assume that a finite I must discharge nominative case [...], and that only DP can receive case; it then follows that children cannot in principle develop a finite (case-assigning) I-system until they have developed a (case-receiving) D-system." (1990, 160). As Fig. 4 shows, however, the development of the D-system in Zoli's language was significantly slower than that of the I-system. There is no similar interdependence between the Focus Phrase and any other functional category, thus their strictly simultaneous acquisition is not predicted by the maturational hypothesis. As it is reasonable to assume that prefix/verb inversion associated with the Focus category had not been productively applied by the end of the studied period, the time lag between the acquisition of the D-system and the F-system cannot be determined.

The size and nature of the data base do not allow for more than some speculative generalisations. One such observation that can be made regarding the order of acquisition of different linguistic structures concerns the relative communicative value of the different functions. Radford observes that in early child English prepositions appear when their meaning is not implicit in context. In Hungarian verbal inflections carry important semantic information, while articles can be omitted without significant loss in meaning. In constructions associated with the Focus category, it is the *wh*-word, negative particle or imperative morpheme that determines the communicative properties of the utterance; word order seems to be 'redundant'. Another, related, factor to consider is the morphological type of the target language since in inflecting languages morphology, in general, plays an important role in determining semantic relations. Given that Hungarian is a relatively free word order language and allows 'pro-drop', the speaker and the listener have to rely on verbal and nominal inflections to identify semantic roles of arguments. That is, although case markers are labelled as lexical and verbal subject agreement markers as functional, from a pragmatic point of view they fulfill the same basic role. In order to build up a basic Hungarian tree structure, it is not so much the configuration, but the argument identifying features that are relevant for the child. Similar findings have been reported for some other languages with rich morphological structures: for Hindi (Varma 1979), Polish (Smoczynska 1985) and Turkish (Aksu-Koc-Slobin 1985).

It could be argued, however, that the high rate of accuracy in the use of verbal inflections and a few apparent examples for productivity do not provide conclusive evidence for the maturation of the I-system. It is also possible that the lack of prefix/verb inversion at later stages is to be attributed to some independent factor. If we assume, however, that both the maturational hypothesis and the syntactic analysis of Hungarian are correct, the results seem to suggest that the absence (or presence) of a functional system in the child's mental grammar does not in itself account for the non-acquisition (or appropriate use) of linguistic structures associ-

ated with functional categories. Further, if not alternative, processes of language acquisition need to be identified to explain significant crosslinguistic differences in the course of language development.

Appendix

Number of correct and incorrect realisations of linguistic structures associated with functional categories.

	JANUARY		MARCH		MAY		JULY		SEPT	
	corr	incorr	corr	incorr	corr	incorr	corr	incorr	corr	incorr
DEF. ART.	8	12	41	29	63	49	73	20	121	24
INDEF. ART.	0	2	1	12	2	12	5	8	12	10
PERSON	—	—	7	17	10	8	8	6	5	2
TOTAL DP	8	14	49	58	69	69	86	34	138	36
POSSESSIVE	—	—	6	10	31	9	20	5	31	3
AGREEMENT	7	5	84	23	163	25	114	21	226	23
PAST TENSE	5	2	27	5	27	4	21	3	32	0
COPULA	—	—	6	1	6	1	8	1	8	1
TOTAL INFL	12	7	123	39	227	39	163	30	297	27
WH INV.	—	—	—	—	—	—	—	—	2	0
NEG. INV.	—	—	1	2	2	2	0	4	6	22
IMP. INV.	7	0	9	0	22	12	22	12	24	20
TOTAL FP	7	0	10	2	24	14	22	16	32	42

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DEVELOPMENTAL LANGUAGE IMPAIRMENT: ASPECTS OF SPEECH PERCEPTION AND COMPREHENSION

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Abstract

The aim of this paper is to define whether the language impaired childrens' articulatory (motor) problems indicate also deficits affecting all or several areas of their speech perception and comprehension mechanism. 60 carefully selected 6-year-old language impaired children and another group of 60 normally developed children have been examined by means of the standardized Hungarian GMP test-package (containing 12 different tests). The results show larger deviations in their speech perception process and/or comprehension than it was assumed. 95% of all examined language impaired children showed relatively considerable delay and/or disorder in almost all areas of the decoding process.

1. Introduction

In analyses of children with various kinds of language and speech disorders it is usually a difficult question whether these children are delayed or deviant, in comparison with normal children, with respect to the way they acquire language. The experimental data do not provide a simple answer to that, particularly when language impaired children's production and perception abilities are considered. Some investigators have found additional perceptual problems in many language impaired children (Tallal-Piercy 1973; 1978; Tallal 1976; etc.). However, others claim that the simple fact that perceptual deficits exist in language impaired children does not mean they should be considered as factors which underlie the development of a language disorder (Ludlow 1980a). The present author views specific language impairment as a syndrome containing definable subgroups of impairments involving both speech production and perception.

Analyses of language impaired children's speech seem to cover all aspects which are important for assessment and remediation (cf. Ludlow-Bassich-Connor 1985). There are, however, relatively few studies of the speech decoding process and these often focus on one or some component(s) of speech perception instead of checking the whole mechanism (e.g. Lowe-Campbell 1965; Eisenson 1966; Ludlow 1980b; Adlard-Hazan 1994; etc.). Auditory processing deficits have been

demonstrated, but the contributions of such deficits to language development and the language acquisition process are yet to be determined (cf. Keith 1981). In the case of normal hearing, when no other sensory or cognitive impairment is present, either the subject's motor control or perceptual deficiencies or both are responsible for speech deficiencies. Learning problems, particularly reading disorders are often associated with central decoding difficulties, particularly with inadequate speech perception (Bakker 1971; Brown 1976; Vellutino 1980; Jerger 1981; Tallal–Stark–Kallman–Mellits 1981; Levine 1987; Johansen 1988; etc.). Language impaired children frequently have difficulties in acquiring reading and writing and can show dyslexia-like symptoms (Cooper–Ludlow 1985).

Perceptual deficiencies in language impaired children may appear in the whole perceptual mechanism or on one or some levels. The type and extent of disturbances may have a considerable impact on the child's articulation as well (Studdert-Kennedy 1986).

Speech perception itself is based on special brain processes beginning with decoding the acoustic patterns of the speech wave. A developmental, hierarchical, interactive model of speech perception (Gósy 1991a) is the theoretical framework within which our investigations were planned. This model endorses the hypothesis of gradual perception ("bottom-up-analysis") whose point is that, starting with the input acoustic stimulus, the process of understanding is characterized by consecutive levels corresponding to increasingly larger units of speech and/or deeper layers of understanding, ending up with a semantic representation of the message (cf. Pisoni–Sawusch 1975). The properties of this model are as follows: (a) the process of perception is represented in terms of interconnected levels: acoustic level, phonetic level, phonological level, syntactic level, semantic level and the level of associations; (b) these levels partly correspond to those of the psychological hierarchy and partly to degrees of linguistic abstraction; (c) language specificity is assigned crucial importance; (d) each level has its specific elementary perceptual unit; (e) the implementation of the principle of delayed feedback gives the possibility for interactive operations among the levels; and (f) the model can operate also simultaneously, i.e. positing subprocesses taking place at the various levels (roughly) at the same time.

The acoustic, phonetic and phonological levels are often characterized as automatic or semi-automatic, I find 'partially automatic' a better description. Automaticity means that the listener is normally unaware of the operations that precede word recognition; however, they are extremely important for successful lexical access. At the acoustic level of speech perception mechanism operations concerning time, frequency and intensity of speech wave take place. The output data of acoustic analysis serve as input to phonetic classification at the phonetic level.

This time, the input signal is explored in terms of decision rules concerning its linguistic-phonetic aspects, and the results are speech sounds. The last stage of the partially automatic portion of the speech understanding process is that of phoneme decision. Speech sounds are assigned to the appropriate phonemes at the phonological level on the one hand, and operations concerning the language-specific phonological rules take place also at this level.

Cerebral dominance is a factor contributing to correct linguistic operations (Milner–Taylor–Sperry 1968; Lenneberg 1971; Bever 1978). The exact age at which cerebral dominance is formed is a debated issue; the proposed intervals vary from the age of two to eleven (cf. Lenneberg 1967; Best 1988), and might depend upon the language to which the child is exposed. The 'lack' of dominance or any delay in the development of a division of labour between hemispheres might result in deficiencies in the speech perception process. The difference between right or left vs. mixed handers is that the two hemispheres of the latter are supposed to be equally involved in linguistic behaviour (Lebrun 1983). Many six-year-old mixed handers have shown deviations in their speech perception process (Gósy 1990).

Our aim was to analyze the speech perception process of specific language impaired (SLI) children as well as to define their actual perceptual abilities and the contribution of the latter to their communicative skills. (SLI terminology is used according to Tallal's understanding.) Since deficiencies have been supposed to be grounded in the speech perception mechanism of these children, we wanted to define the types and extents of these perceptual deficiencies, and on the basis of the results, to mark the direction of the remediation process.

2. Methods and materials

2.1. Subjects

Since 'language impairment' can cover several types of language disorders, a study of the present type could run into methodological problems because of the diversity. In order to avoid such problems, efforts were made to form a quasi-homogeneous group of children with respect to their speech disorders.

The children were carefully selected according to some basic criteria covering their biological, sociological, physiological, and psychological background as well as their general development, using standardized Hungarian tests. Age was measured in terms of the subjects' pre-school year: all the children were in their last kindergarten year, i.e. their last year before starting school, and their actual ages ranged from 6;2 to 7;0. The group consisted of 60 children: 14 girls and 46 boys. Two years prior to the present investigation, these children were advised on the

basis of a general screening process to attend a speech therapy course. The specific language impaired children were selected from those treated at a particular therapy centre during these two years. Their speech abilities can be characterized as follows:

(i) There was an overall delay in language development of these children, roughly of one year, with the children having started speaking around the age 2;6. This delay did not necessarily involve all areas of language acquisition.

(ii) The children's speech disorders concerned articulation: most of their speech sounds, both consonants and vowels were either substituted or distorted or missing. Examples of sounds affected are: [ø, y, s, ts, tʃ, ʃ, c, r], cf. [oju] instead of [øryl] 'glad', [deje] instead of [jere] 'come', [kavi] instead of [kavitʃ] 'stone', [vira:g] instead of [vira:g] 'flower'. At this age no substitutions, distortions or missing sounds are expected with Hungarian-speaking children.

(iii) The substitutions were systematic and predictable; the distortions were variable but identifiable as the target speech sound. Missing sounds appeared mostly at the very beginning or very end of words.

(iv) The acquisition of semantic knowledge and single word meaning was relatively intact.

(v) Their spontaneous speech production ability was diverse, but large differences were not found. However, slight deviations in the acquisition of Hungarian morphological, syntactic and suprasegmental rules were also observed, e.g. overgeneralization of the suffix *-nák* instead of *-nék*, this latter one is a stylistic rule expressing first conditional 'I would', or using rising instead of falling fundamental frequency patterns at the end of questions.

(vi) The children's IQ-values fell in the normal range.

A **control group** was formed of 60 kindergarten children also in their last year, and starting school at the same time as the SLI group. Again, their ages ranged from 6;2 to 7;0. These children had been selected according to the same basic criteria as the specific language impaired children. Since a group of a normally heterogeneous population was planned to serve as control, there were 30 girls and 30 boys in this group, a ratio that did not correspond to the sex distribution in the SLI group. We thought that a control group should contain female and male subjects half and half for comparison, despite the fact that the occurrence of the boys in the language impaired population was three times as numerous as that of girls. For the 'expected' age-specific requirements the standardized values of the GMP test-package were used (Gósy 1989). Speech abilities of children in the control group can be characterized as follows:

(i) They started speaking around the age of 1 with 'holophrases' and their language acquisition had shown a normal development according to Hungarian standards.

(ii) These children had no speech disorders concerning their articulation.

(iii) All children were normal hearers and their IQ-values fell in the normal range.

(iv) Their spontaneous speech production ability was diverse, but large differences were not found. However, slight deviations in the acquisition of Hungarian morphological, syntactic and suprasegmental rules were observed in this group, too. These deviations were the same as those observed in the SLI group.

(v) The social background of the children in the control group was similar to that of the SLI group.

2.2. The GMP test-package

At the Phonetics Laboratory in Budapest a special test-package (GMP) has been set up in order to detect children's age-specific speech perception and comprehension performance (Gósy 1989). In compiling the test-package, efforts have also been made to obtain information on the operations of each hypothetical level of the speech perception process (acoustic, phonetic, phonological levels), and also of the higher levels (semantic, syntactic, etc. levels) quasi-separately, i.e. to detect which (if any) of the decisions the understanding mechanism has to perform are mistaken or incorrect.

The GMP test-package consists of 12 subtests; their speech material varies from isolated words through sentences up to a longer text. These speech materials have been manipulated by various methods (such as masking by white noise, speeding up, and frequency filtration). Natural Hungarian speech announced by a trained male speaker and also artificially generated (synthesized) speech have been used for the subtests. Some of the listening tests have been administered to the subjects through headphones, others through a loudspeaker in a silent room. The subtests were meant to measure both peripheral and central hearing, the acoustic, phonetic, and phonological levels of speech perception, visual and verbal short-term memory performance, lip-reading ability (i.e. visual perception), handedness, direction identification, repetition ability of speech rhythm, word-completion skill, and text-comprehension.

2.3. Tests and procedures

Below is a list giving some information about the 12 subtests and the procedures used:

(i) G-O-H hearing screening with synthetic speech

The first test of the package is performed by means of the G-O-H hearing screening device (Gósy et al. 1987). The identification of synthesized monosyllables—separately administered to the right and left ear, at the intensity levels of 45 and 55 dB—gives information on hearing capacity on the one hand and, in the case of normal hearing, on the operations of the subject's acoustic perception.

(ii) Masking by white noise: masked sentences

In everyday communication the spoken message is frequently covered by noises of various types and intensities. For successful communication to take place the speech understanding process should work correctly even under noisy circumstances. The 'cocktail-party problem' arises especially for children because they do not have as much practice in understanding speech as adults do. The second task of the GMP test-package is to identify 10 well-formed sentences masked by white noise. The signal/noise ratio is 4 dB. The average intensity level used during the examination was 65 dB (cf. Yacullo–Hawkins 1987). Both the vocabulary and the syntax of the sentences were familiar to the children.

(iii) Masking by white noise: masked words

In the third task word recognition was examined by 10 (mono-, bi-, and trisyllabic) words also masked by white noise. The children's task was to identify and repeat the original words. All the words were familiar to the children.

(iv) Speeded-up speech

Identification of speeded-up sentences, with the normal tempo being electrically speeded up by 30% of the original version by means of a Varispeech, gave us an opportunity to detect basic hearing and perceptual problems in decoding a speech signal. The first signs of a disturbed speech perception/understanding process very often appear when the process is forced to work for time-compressed speech, i.e. in a narrower time structure (Berry 1969; Shriner–Daniloff 1970). Children with severe articulation problems have been shown to have difficulty in accurately processing time-compressed speech (Orchik–Oelschlager 1974). Correct perception of time-compressed speech is also a function of language acquisition (Beasley–Flaherty–Rintelmann 1976).

(v) Pass-band filtration

The next subtest was the identification of sentences filtered by pass-band filtration with the slope of 36 dB (by means of an Audio Frequency Meter, Type 440) and served the examination of the phonological level of speech perception (Nagafuchi

1976). After filtration all sentences were confined to the frequency range of 2200 to 2700 Hz. In the case of this filtration, identification can be made only on the basis of the secondary acoustic cues; which means that the operations at the phonetic level will be uncertain and the decisions at the phonological level will become of greatest importance.

(vi) Visual information integration: lip-reading ability

The next subtest was devoted to assessing the ability of integrating the visual information into the speech perception process (cf. Massaro 1987). The test was performed as a "face-to-face" game between the child and the examiner. 10 animals' names had to be guessed by the child from watching the accurate (but silent) lip-articulation of the word in question by the examiner. All the animal names were familiar to the children.

(vii) Nonsense word identification

The phonetic level was further examined by the next task involving 10 nonsense words of two, three, and four syllables which partly met, partly contradicted the phonotactic rules of Hungarian. They were pronounced by the examiner and had to be faithfully repeated by the child. The problem of whether real words or nonsense words are to be used as stimuli is an old one (Barton 1980, 104–5). The skill being tapped in this experiment was that of breaking words down into their components which is a necessary skill at the examined age. This skill is based on the processes taking place at the phonetic level of speech perception mechanism: categorization of the speech sounds without any semantic or syntactic information.

(viii) Verbal and visual STM tests

Verbal and visual short-term-memory examinations were performed by displaying 12 words and 12 colour pictures. Colour pictures were presented for 20 seconds. The child had to recall items that he/she had heard/seen. There was a time limit for recalling items: 1 minute.

(ix) Word completion test

It is a very difficult methodological problem to assess the size of a child's mental vocabulary. In the test-package we try to get information about the working of the active vocabulary by means of a word completion task. The child has to expand the syllable he has heard into a normal word, like *mo* → *money, monkey*, etc. The number of words he says—without too much thought—can be compared to the average of his age-group.

(x) Repetition of rhythmic sentences

The repetition of rhythmic sentences gives information about the child's ability for listening to various time structures in speech. Two short poems had been chosen for this test. The examiner recited the poems with exaggerated scansion (poems of quantitative prosody were used); the child's task was to repeat them in the same manner. The purpose of this test was to judge the child's ability for segmenting speech into syllables and for keeping the contrastive durations of both vowels and consonants.

(xi) Direction identification

The perception of directions together with handedness are also important factors not only for verbal perception but also in acquiring reading and writing. The correct identification of directions was checked by asking the children simply to turn right or left, to raise their hands towards right and left, to look right or left in order to find things both on their own bodies and in the room. Their ability to handle 'up' and 'down', as well as 'where' vs. 'where from' vs. 'where to' was checked in a similarly simple fashion.

(xii) Comprehension test

A short tape-recorded story was also administered to the children in order to assess their inferential comprehension. The comprehension of the story was checked by questions to be answered by the subject. Responses to the carefully prepared questions highlighted the successful comprehension processes. The comprehension questions touched upon various facts of the text: location, time, object, action, instrument, characters, cause/effect, problem/solution, etc. There was only one correct answer for each question (the manual of the test-package contained the correct answers for scoring).

3. Results and discussion

Our hypothesis was that specific language impaired children would perform more poorly in a majority of the subtests while no significant difference was expected between them and the normal population in some of the subtests like direction identification and repetition of rhythmic sentences. The data clearly show—though this was not obviously predicted—that the SLI children's performance in all examined areas of the speech perception process was significantly poorer than that of the control group. The statistical analyses were made by means of the BMDP software

package. Two sample t-tests were performed comparing the SLI and the control groups. Only means and the significance level will be presented.

Results show that SLI children underperformed in all subtests in comparison with the performance of our control children. The average performance of the SLI girls was better than that of the SLI boys, whereas the average performance of the control girls was poorer than that of the control boys. However, the differences between girls and boys were not significant. (The average figures in the tables represent the actual average values of the girls' and the boys' scores; however, percentages quoted in the text refer to the SLI group as a whole.)

Further more detailed examination of the SLI and the control group shows differences both (i) in the results obtained and (ii) in the distribution of children according to the various success rates. These will be presented below.

(i) G-O-H hearing screening with synthetic speech

The synthetic speech test provides information on the way acoustic cues of speech are handled by children during the identification process. Slight differences could be found in both groups between the responses for the synthetic words coming through the right or the left ear. However, no significant difference was found, either in responses for inputs to right or left ears nor in relation to the handedness variations. Table 1 contains the correct responses of children for the synthesized monosyllables.

Table 1
Identification of synthesized words

Groups of children	Correct responses for the synthesized monosyllables (%)				
	girls		boys		average
	right ear	left ear	right ear	left ear	
SLI group	72.85	71.42	70.86	71.3	71.6
Control group	88.66	87.33	87.33	88.0	87.82
Standard data	80-100		80-100		80-100

As it was expected, the results of the control group were significantly better ($p < 0.01$) than those of the SLI group whose average data did not reach those present in the standard data. Table 2 shows the distribution of children according to the various performance levels. The data are average values summarized for the two ears.

Table 2
Distribution of children in the synthesized speech test

Levels of correct performance (%)	Ratio of tested children according to level of performance (%)					
	SLI group			control group		
	girls	boys	average	girls	boys	average
95–100	14.28	4.34	9.31	26.66	40.0	33.33
85–90	7.14	10.86	9.0	33.33	23.33	28.33
75–80	14.28	23.91	19.0	33.33	16.66	24.99
65–70	28.57	32.6	30.58	6.66	13.33	9.99
60	35.71	28.26	31.98	–	6.66	3.33

According to the standard values, 61.66% of children in the control group can be considered as having performed normal operations with acoustic cues while the rest of them show deviations from the requirements. Altogether, only 13.32% of these children seem to be at risk for their further development. On the other hand, a huge difference has been found concerning the SLI group: only 16.6% of all SLI children were able to operate properly with the necessary acoustic cues in the speech perception process while 61.6% of them are predicted to have further learning difficulties particularly in reading acquisition (Vellutino 1980; Studdert-Kennedy 1976). There is a narrow range of children in both groups (21.6% of SLI and 25% of control children) performing at the “boundary”).

(ii) and (iii) Masking by white noise: masked sentences and words

The children’s word and sentence recognition abilities were examined by distorted speech material. The correct responses show significant differences between the SLI and the control group in the case of sentences masked by white noise; however, no significant difference could be found in their performance in word recognition (masked in the same way as in the case of the sentences). Since both materials were semantically acceptable for the children, i.e. all words administered in isolation or occurring in the sentences were familiar for them, comparisons could be made concerning their correct recognition. In sentence recognition, the level of morphological and syntactic relations is also of crucial importance and short-term verbal memory is supposed to play a more important role than is required in word recognition. However, at the ages examined, no significant differences are expected between word and sentence recognition for the materials used. Table 3 shows the results obtained for the SLI group, the control group and also the standard data.

Table 3
Identification of masked words and sentences

Groups of children	Correct responses for masked speech material (%)					
	sentences			words		
	girls	boys	average	girls	boys	average
SLI group	73.57	62.6	68.08	86.42	85.86	86.14
Control group	85.33	86.33	85.83	88.0	89.0	88.5
Standard data	90-100	90-100	95	90-100	90-100	90-100

As expected, there was no significant difference between sentence and word recognition in the case of normally developed children. On the other hand, significant differences existed in the case of the SLI group, both with girls and boys ($p < 0.01$). The number of correct responses given by the SLI children for the recognition of masked sentences was significantly poorer than in the control group but recognition of words was similar; this backwardness is even more serious if the standard values are taken into consideration. What do these poor results suggest? It is clear that word recognition is performed at an acceptable level by SLI children while sentence recognition is not. Although they have difficulties in recognizing words by their most significant acoustic cues (cf. their results in the identification of synthesized monosyllables, Tables 1 and 2), they can detect words much more correctly when there are redundant pieces of information concerning the acoustic structures (masked words). The SLI children seem to need more acoustic information for speech perception than normally developed children of this age would. It can be assumed that they cannot use the storage system of the speech perception mechanism perfectly, either. This kind of word recognition process is characteristic of the stage of language acquisition of 2-and-a-half-year-olds prior to the "boom of vocabulary" (Gósy 1984). The reason for this strategy of word recognition during the 'telegraphic speech' period of language acquisition is the existence of several phonetic forms for the same meaning at the same time (i.e. several phonetic approximations of the child, plus the adult model). The child needs all pieces of acoustic-phonetic information to get the meaning. However, the expected development of the speech perception process is exactly a decrease of the amount of acoustic-phonetic cues the child needs.

Correct sentence recognition is based, among other things, on the correct recognition of (i) words, (ii) morphological/syntactic relations, and (iii) on a well-developed skill in lexical access. If the child needs more operations on the lower

levels of the speech perception process than the actual decoding task would normally require, the interactions between the lower and the upper levels are getting slower, involving uncertainties which may cause failed sentence recognition. The age-required level of developmental lexical access is needed in order to establish a contact between the acoustic input and sentence recognition. Six-year-olds should be able to recall well-formed sentences containing 3–4 familiar words in spite of some distortion of the original acoustic structures. Large differences have been found between the two groups in the occurrences and types of errors in recalling. The SLI children very frequently repeated only 1 or 2 words of the masked sentences which were either correct or incorrect. Members of the control group generally made minor mistakes in recalling all the words of the sentences and they very rarely omitted a word or a few words from them. Not a single child has been found in the control group to be startled by the sounding of masked sentences, while 8 children in the SLI group seemed to be confused by the sounding so that they missed the first sentence completely (despite the methodological precaution that there is an example of a masked sentence in order for the subject to get used to its sounding before the test starts).

The distribution of children by their levels of performance in sentence recognition shows even larger differences between the two groups than those indicated by the average data (Table 4).

Table 4
Distribution of children in sentence recognition test

Levels of correct performance (%)	Ratio of tested children according to level of performance (%)					
	SLI group			Control group		
	girls	boys	average	girls	boys	average
90–100	28.57	15.21	21.89	56.66	43.33	49.99
70–80	50.0	36.95	43.47	36.66	50.0	43.33
50–60	14.28	23.81	19.09	6.66	6.66	6.66
30–40	–	19.56	9.78	–	–	–
10–20	7.14	4.34	5.74	–	–	–

18.3% of the SLI children performed well, i.e. according to the standard values of six-year-olds. Many of them (40%) showed some lesser divergence from the required results, while 41.6% of them seemed to have serious deficits in sentence recognition. Taking into consideration that the level where 70% of all responses are

correct is characteristic of 5-year-olds, it can be stated that almost half of the SLI children are delayed roughly by one year in their speech perception development, and a large number of them shows even more delay. The control group can be divided into two parts: one of children who reached the age-specific level of sentence recognition and another one of children who—on the basis of their present data—might have difficulties in future reading acquisition depending on their performance in the other subtests (cf. the results with reading-disabled children: Gósy 1991b).

(iv) Speeded-up speech

The results of the third type of “distorted” sentence recognition may or may not support our hypothesis. This speech material was speeded up from an average tempo of 11 sounds/s to an average of 15 sounds/s. Since children recognize sentences of this tempo without any problem, the content and the words were selected for the sentences so that most of them were beyond the six-year-olds’ vocabulary and knowledge. However, every sentence did also contain one or two familiar word(s). In normal cases by this age (as shown by our investigation, even by an earlier age) children should repeat, i.e. identify well-formed sentences that contain one or two semantically unfamiliar word(s). If a child has difficulty in the recognition of these sentences, it cannot be explained by the presence of unfamiliar word(s). On the other hand, it might highlight either (i) severe deficits of operations at the phonetic level of speech perception or, (ii) some central hearing deficiency. Since the operations of the phonetic level of speech perception refer to central hearing ability as well, one has to be careful in differentiating these two types of deficits. (‘Central hearing problems’ is an umbrella term referring to some specific disorders of decoding speech, cf. Keith 1981.) Table 5 summarizes the data obtained for the recognition of speeded-up sentences.

Table 5
Identification of speeded-up sentences

Groups of children	Correct recognition of speeded-up sentences (%)		
	girls	boys	average
SLI group	52.14	45.65	48.89
Control group	71.33	77.0	74.16
Standard data	80–100	80–100	90.0

There are, again, significant differences between the two groups examined ($p < 0.01$). The SLI boys performed poorer than the SLI girls, and the control boys did better than the control girls. So, the largest difference was found between the SLI boys and the control boys. (The difference is significant between the girls of the two groups as well.) Considering the previous data obtained from SLI children for sentence recognition, the majority of them are assumed to have central hearing deficits of various depth. Altogether 6 children were found to be able to recognize the sentences according to age-specific requirements. Not only the SLI children but also children who served as control had difficulty in this subtest which can be explained both by uncertainties of timing organization of their speech perception mechanism and by their underdeveloped communication skills. Table 6 shows the distribution of children with respect to this subtest.

Table 6
Distribution of children in speeded-up speech test

Levels of correct performance (%)	Ratio of tested children according to level of performance (%)					
	SLI group			control group		
	girls	boys	average	girls	boys	average
90–100	14.28	6.52	10.4	26.66	46.66	36.66
80	14.28	4.34	9.31	20.0	6.66	13.33
70	–	13.05	6.52	13.33	16.67	15.0
50–60	21.42	28.26	24.84	30.0	20.0	25.0
30–40	14.20	21.73	18.0	10.0	10.0	10.0
10–20	21.42	17.39	19.4	–	–	–
0	7.14	6.52	6.83	–	–	–

The distributions show even greater differences between the children of the two groups. Although half of the control children performed up to age-requirements, a relatively large proportion of them showed very poor performance (35% of all children). As it was expected, the SLI children's results are even worse: only 14.9% of them performed according to the age-specific norms while the majority of them did extremely poorly (73.2% of all children). More than 24% of these children could not even reach the required level of 3-year-olds. The poor performance of both groups can also be explained to a certain extent by the fact that Hungarian speech has speeded up during the past 30 years by roughly 3 sounds/s (Gósy 1991b) to be too much information per time unit for the children.

(v) Pass-band filtration

Sentence recognition ability was measured by means of another type of distorted speech material. Our expectation was that both groups should have nearly the same success rate around the standard values since the SLI children's articulatory deficiencies did not concern the phonological rules of Hungarian. On the other hand, the acoustic structure of the filtered sentences contained the most necessary cues for identification and also a certain amount of redundant information. The average values of the data obtained do not show significant differences between the two groups; however, a significant difference was found between the SLI boys and the boys of the control group ($p < 0.01$), cf. Table 7.

Table 7
Identification of filtered sentences

Groups of children	Correct recognition of filtered sentences (%)		
	girls	boys	average
SLI group	88.57	84.13	86.35
Control groups	95.0	97.66	96.33
Standard data	100	100	100

Analyzing the distribution of children by their performance and the age-specific norms, no significant differences were found. Almost all children of the control group (89.99%) performed 90% or more correctly, and the majority of SLI children did also quite well (73.28% of all SLI children). Only 11.7% of them showed extremely poor performance. Since the filtered sentences did not turn out to be as problematic for recognition as the masked sentences were, we can state that most of the shortcomings of the SLI children concern the operations of the phonetic level of their speech perception mechanism which means, in other words, that these children have serious perceptual difficulties in correct recognition of speech sounds and sound combinations.

(vi) Visual information integration: lip-reading ability

Visual speech perception ability, i.e. lip-reading or (as it has recently been called) speech reading (Massaro 1987) is very important for the hearing-impaired and deaf children. However, visual information, the reinforcement of articulatory gestures by eye, is also of crucial importance during language acquisition both for speech perception and production. In our case no significant difference was expected

between the two groups examined. Surprisingly, the results obtained show considerable differences (Table 8).

Table 8
Correct responses in visual speech perception test

Groups of children	Correct answers of animal names (%)		
	girls	boys	average
SLI group	22.85	14.56	18.7
Control group	53.66	45.66	49.66
Standard data	40–50	40–50	40–50

The SLI children's extremely poor results suggest that they exhibit a very strong and unexpected inability to integrate visual information with the speech perception process. The data suggest that the SLI children, for some unknown reason, cannot use this supplementary channel of information during perception/comprehension. The greatest number of "no response" could be found in this subtest (cf. Table 9).

Table 9
Distribution of children in visual speech perception test

Levels of correct performance (%)	Ratio of tested children according to level of performance (%)					
	SLI group			control group		
	girls	boys	average	girls	boys	average
90–100	–	–	–	6.66	–	3.33
70–80	–	–	–	30.0	10.0	20.0
50–60	14.28	6.52	10.4	23.33	43.33	38.33
30–40	28.57	13.0	20.78	36.66	40	38.33
10–20	28.57	39.13	33.85	3.33	6.66	4.99
no response	28.57	41.3	34.94	–	–	–

The distribution of children in the lip-reading test is quite scattered along the various levels even in the control group but not a single child was found providing no responses. Nearly 5% of the control children show a very poor level, more than 30% of them reached the required level of five-year-olds (which is 30–40% correct

of all responses) but the majority of these children did appropriately well or even better than the age-required norms. The standard values were performed by a mere 8.3% of all SLI children and about 20% of them reached the level of five-year-olds. The majority of this group, particularly the boys, showed a considerable backwardness in interpreting the visual information of speech.

(vii) Nonsense word identification

The results obtained in this test are summarized in Table 10.

Table 10
Identification of nonsense words

Groups of children	Correct repetition of nonsense words (%)		
	girls	boys	average
SLI group	60.71	60.43	60.57
Control group	84	88	86
Standard data	80–100	80–100	80–100

There is, again, an expected significant difference between the SLI and the normally developed children ($p < 0.01$). What is hidden in the numbers is the grades of difficulty the children had to face when repeating the meaningless sound sequences. Children of the control group had problems mainly in repeating the 4-syllable sound sequence [krisposcyvɔn] which contained 3 closed syllables, 3 “difficult” sound combinations and various (non-harmonic) vowels. SLI children had many more problems regarding almost all sound sequences. In repeating these nonsense words, their articulation problems provided extra difficulties. The incorrect repetitions of the two groups show significant differences also in occurrences of metathesis. 46.66% of all SLI children produced one or two metatheses when repeating the sound sequences while only 10% of all control children did the same. Comparing these data to the results obtained by reading disabled children (Gósy 1991b), it can be claimed that there is a high risk for future reading difficulties in the case of a large part of the SLI children. The distribution of children by performance is shown in Table 11.

Table 11
Distribution of children in nonsense word test

Levels of correct performance (%)	Ratio of tested children according to level of performance (%)					
	SLI group			Control group		
	girls	boys	average	girls	boys	average
90–100	21.42	17.39	19.4	50	63.33	56.66
80	7.14	10.86	9.0	26.66	26.66	26.66
70	7.14	19.56	13.35	16.66	10.0	13.33
50–60	35.71	30.43	33.07	6.66	–	3.33
40–30	21.42	13.04	17.23	–	–	–
10–20	7.14	8.69	7.91	–	–	–

The differences in performance between the two groups are again larger than those suggested by the average values. The normally speaking children had, in general, no problems in identification or repetition, i.e. perceiving and producing the nonsense words. Since the SLI children had difficulties both in perception and production, it was not easy in every case to define the basic source of the child's difficulty: whether it was caused by his/her perceptual delay, by the instability of his/her articulatory gestures, or both. No problem has been found with 18.3% of all SLI children; minor problems were found with 26.6% of them. Critical level of performance was found with the majority of children: 54.9% of the whole group (64.27% of all girls and 52.16% of all boys). These children are assumed to be influenced both by their perceptual and articulatory deficiencies.

(viii) Verbal and visual STM tests

Both verbal and visual short-term memories are of crucial importance for a successful working of the decoding mechanism. The standard values for recalling random items are 72, independently of the subject's age. Table 12 contains our data for verbal and visual short-term memories.

Table 12
Performance in short-term memory tests

Children's groups	Data on short-term memories					
	verbal			visual		
	girls	boys	average	girls	boys	average
SLI group	4.35	4.02	4.18	5.14	4.73	4.93
Control group	4.46	4.73	4.59	5.36	6.06	5.71

Although there are slight differences between the two groups and also between girls and boys, no significant differences were found. The average performances are very similar. The difference between the visual and verbal performances is bigger in the control group than in the SLI group. The data of both groups approximate the standard values. However, the individual children show a scattered distribution again by the levels of performance (Table 13).

Table 13
Distribution of children in short-term memory tests

Levels of correct performance (items)	Ratio of tested children according to level of performance (%)							
	SLI group				control group			
	verbal		visual		verbal		visual	
	girls	boys	girls	boys	girls	boys	girls	boys
7-8	-	6.52	21.82	10.86	6.66	10.0	33.33	30.0
6	7.14	8.69	35.71	28.26	20.0	23.33	10.0	36.66
5	42.85	21.73	7.14	13.04	20.0	23.33	23.33	16.66
4	42.85	17.39	7.14	21.73	30.0	20.0	20.0	13.33
3	-	19.56	21.42	23.91	16.66	16.66	3.33	3.33
2	-	8.69	7.14	2.17	3.33	3.33	10.0	-
1	7.14	8.69	-	-	3.33	3.33	-	-
0	-	6.52	-	-	-	-	-	-

The proportion of children who reached the required level of visual short-term-memory performance is significantly better in the case of the control group.

However, no significant differences were found between the two groups in their verbal short-term memory performance. The SLI boys performed more poorly than the control boys in both tasks ($p < 0.01$). There is a relatively high number of the SLI children who could recall only one or no word of those uttered to them: 7.14% of all SLI girls and 15.21% of all SLI boys.

(ix) Word completion test

There are several methods (all of them involving some uncertainty) for finding out the possible amount of children's active and passive vocabularies. Instead of choosing one of them, a word-detection method was used to explore the child's ability for activating his/her vocabulary. This method does not provide information either on the size of the child's vocabulary or the structure of his mental lexicon, but the results provide a possibility of judging how reliably the child uses his/her vocabulary. The standard values show that a six-year-old is able to recall 3–4 words from his mental lexicon without too much thought where the task is to expand one syllable into a meaningful word. From these recalled words, only independent roots were accepted, further inflected versions of the same root were discounted. The results of the two groups are different: the average value for the SLI girls is 1.6 words and for the boys 1.2 words while the girls of the control groups produced 2.9 words on average and the boys 2.86 words on average. Activating the mental lexicon and recalling items by expanding single syllables seems to be a very difficult task for the majority of the SLI children which is a predictable consequence of their delay in language acquisition (Table 14).

Table 14
Distribution of children in word completion test

Levels of correct performance (items)	Ratio of tested children according to level of performance (%)					
	SLI group			control group		
	girls	boys	average	girls	boys	average
4–5	–	4.34	2.17	26.66	23.33	24.99
3–3.5	7.14	13.04	10.09	30.0	36.66	33.33
2–2.5	42.85	10.86	26.85	2.66	20.0	11.33
1–1.5	42.85	28.26	35.55	16.66	20.0	18.33
0–0.5	7.14	43.47	25.3	–	–	–

50% of all SLI girls and 71.73% of all SLI boys could activate a maximum of 3 words for the two input syllables, i.e. 1.5 words for each. Nearly 20% of all these children could not figure out any word at all. There was no correlation between the children's activated vocabulary and their verbal short-term-memory performance; however, a strong correlation was found between the activated vocabulary and both the perception of speeded-up sentences and lip-reading ability. This supports the view that in those tasks where age-required lexical access is involved, the correct operations of the mental lexicon are of crucial importance.

(x) Repetition of rhythmic sentences

There are various tests which are intended to measure the child's rhythmic ability. Unfortunately, 'musical' and 'verbal' rhythmic abilities are often mixed in such tests, so the results may turn out to be controversial. In our subtest the child has to imitate the verbally administered rhythmic utterances so his performance refers certainly to the verbal speech perception process. Defining the necessary criteria, three judgements were made: 'poor', 'medium', and 'good' (cf. Table 15).

Table 15
Repetition of rhythmic sentences

Rhythmic ability	Children's performance (%)					
	SLI group			control group		
	girls	boys	average	girls	boys	average
good	14.28	28.26	21.27	66.66	70.0	68.33
medium	42.85	28.26	35.55	13.33	10.0	11.66
poor	35.71	43.47	39.59	20.0	20.0	20.0

The SLI children had problems not only in perceiving the differences between short and long syllables in utterances to be repeated, but also in producing the necessary segmentation of the utterances into syllables. These results show significant correlation with their performance in perceiving speeded-up sentences.

(xi) Direction identification

Correct identification and labelling of directions is necessary both for the decoding process and for reading acquisition. The majority of children in both groups were right handers: 78.57% of all SLI girls and 71.73% of all SLI boys, as well as 93.33% of all girls and 83.33% of all boys in the control group. 14.28% of all SLI

girls and 10.68% of all SLI boys were found with dominant left hand, while 6.66% of all girls and 13.33% of all boys were left-handers in the control group. There was only one boy in this latter group using both hands in all activities (including drawing). There were one girl and 6 boys in the SLI group with no dominant hand. The identification of directions both in space and on their body shows significant difference between the SLI and the control children. Results are labelled either 'normal' or 'disturbed' for direction identification (Table 16).

Table 16
Identification of directions

Identification of directions	Correct performance of children (%)					
	SLI group			control group		
	girls	boys	average	girls	boys	average
normal	28.57	41.38	34.97	66.66	66.66	66.66
disturbed	71.42	58.69	65.05	33.33	33.33	33.33

No correlation was found between handedness and the ability of direction identification.

(xii) Comprehension test

Since speech understanding and comprehension require a number of levels to be activated and work correctly, it is impossible to predict the accuracy of comprehension on the basis of the actual speech perception performance (particularly with children). In order to exclude the participation of additional compensatory factors in the comprehension process, we used a test containing a number of special comprehension questions to be answered. Table 17 contains the correct answers of all children.

Table 17
Data on comprehension of tested children

Groups of children	Correct answers for comprehension questions (%)		
	girls	boys	average
SLI children	56.42	49.78	53.1
Control group	71.0	73.66	72.33
Standard data	70–100	70–100	70–100

We claim that for correct comprehension it is not always necessary that the correct perception process be actually (and correctly) performed since a number of alternative strategies can be used which, to a certain extent, are able to replace the missing components of the process. However, during language acquisition, age-specific speech perception abilities define the accuracy of comprehension. Our data suggest that impaired children might have had permanent difficulties in speech perception and so it is to a larger extent that their comprehension must be based on supplementary factors (or strategies) to compensate for the failures. Most of these children are supposed to use the 'key-word-strategy' (Gósy 1984) for comprehension and many of them try to comprehend verbal messages by means of logic replacing the normally developed decoding activity. Table 18 shows the distribution of children in terms of their performance in the comprehension task.

Table 18
Distribution of children in comprehension test

Levels of correct performance (%)	Ratio of tested children according to level of performance (%)					
	SLI group			control group		
	girls	boys	average	girls	boys	average
90–100	14.28	13.04	13.66	30.0	26.66	28.33
70–80	28.57	19.56	24.06	23.33	50.0	36.66
50–60	35.71	23.91	29.81	46.66	16.66	31.66
30–40	7.14	23.91	15.52	–	6.66	3.33
10–20	7.14	15.21	11.17	–	–	–
no answer	7.14	4.34	5.74	–	–	–

As the data show, 34.9% of the SLI children reached the age-specific level of comprehension while 38.3% of them performed much poorer, at the level of 3–4-year-olds. In the control group 64.99% of all children did as well as expected and 31.66% of them showed some delay: they performed as normally developed five-year-olds do. There were 2 boys out of 30 in this group whose performance was unexpectedly poor. (The total speech perception process of these two children shows slight deviations from the standard values in the case of repeating nonsense words and one of them had difficulties with speeded-up sentences. This means that on the basis of these results no severe comprehension problems were predicted.) With no exception in both groups, every child was able to tell the essence of the story he had heard. The only differences in their story telling concerned their own vocabulary, the details of the story they remembered, and some children needed reinforcements (like “good, very good, go on, yes, okay”, etc.) in order to continue the story telling.

Comparing all the data for speech perception and comprehension, it seems to be clear that correct speech perception does not ensure correct comprehension, and correct comprehension does not necessarily involve correct perception either.

4. Conclusions

In language impaired children’s speech perception and comprehension processes, some delay and/or disorders are expected to exist. Results obtained by recent tests show deficiencies in almost all areas of these children’s decoding mechanism which are significantly different from that exhibited by normally developed children. The majority of the SLI children examined reached the performance level characteristic of 3–4-year-olds. Their deficiencies seem to accumulate and lead to a complete breakdown of age-required performance in speech perception and comprehension. The data obtained suggest that these language impaired children have perception and comprehension difficulties in addition to their articulation defects. Due to their communicative experience, good logic, intelligence and various compensatory strategies, they are usually able to hide the severe difficulties. These “hidden” deficiencies of some component(s) of their speech perception/comprehension mechanism will lead to further reading and learning difficulties. The severe speech perception and/or comprehension problems often come into light only when the child first goes to school (Adlard–Hazan 1994).

There were only 3 SLI children out of 60 (one girl and two boys) whose speech perception and comprehension mechanism is appropriate to the age-required norms. This means that (roughly) 5% of all examined preschool language impaired

children have purely motor deficiencies while 95% of them have deficiencies both in articulation and perception. The SLI boys show a more considerable backwardness both in speech perception and comprehension than the SLI girls do. No similar difference was found between girls and boys in the control group; there was a slight tendency for boys to perform better in all subtests.

Impairments of speech perception have also been found with children of normal speech and language skills, indicating (i) that communicative ability may be dependent on other aspects of cognitive and social development in addition to speech and language and (ii) that children with normal articulation can suffer from certain perceptual deficiencies as well.

The results of the present investigation have supported our assumption: SLI children have serious perceptual problems concerning all processes of the decoding mechanism. On the other hand these results may have multiple functions for SLI children: they (i) help evaluate the effectiveness of their communicative activity by detecting the deviations and/or delay, (ii) provide an opportunity to predict their reading acquisition, and (iii) indicate the treatment procedure by defining the actual type and extent of disturbance in the decoding process.

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THE STRUCTURE OF THE MENTAL LEXICON IN HUNGARIAN–RUSSIAN BILINGUAL CHILDREN

ALEXANDR JAROVINSKIJ

Abstract

The bilingual mental lexicon of 18 preschoolers (10 girls, 8 boys) brought up in 15 mixed-lingual families with Russian mothers and Hungarian fathers was investigated. Bilingual competence of passive and active lexis was defined by using versions of the PPVT and its picture demonstration.

In the case of our subjects both the active and the passive vocabulary permitted us to define a common thesaurus in which any of the denotata are associated with two linguistic signs. Apart from these we found words which were at a given moment more readily actualised either in Hungarian or in Russian. The qualitative error analysis shows that the bilingual mental lexicon of preschoolers consists of interconnected and independent systems.

First of all, it appears on the interlingual level. In every language there are some words which 'suggest' or potentially carry the possibility of lexical-semantic interference. One of these groups consists of words in the two languages which are phonologically similar and semantically identical (cognates or paronyms). Lexical interference may easily appear with word pairs in which phonological shapes are similar or identical although the meanings are different (homophones) or when the semantic equivalent of a word in the other language is phonologically simpler than the one in the language just utilised. All these types of words are potential candidates for borrowing, code-mixing and code-switching. Another type of error is connected to acquisition of form and meaning of words in Hungarian and Russian separately. The set of so-called associated answers, phonologically isomorphic, erroneous responses (malapropisms), neologisms, functional descriptions substituted for direct naming indicate the process of word acquisition on an intralingual level.

1. Introduction

Modern psycholinguistics defines the mental lexicon of monolingual adults as a component of the grammar that contains the phonological, morphological, semantic, and syntactic information that speakers know about words or morphemes (Aitchison 1987; Emmorey–Fromkin 1988; Marslen-Wilson 1992). In brief, the mental lexicon is the stored mental representation of our knowledge about the words in a given language. The mental lexicon links two different kinds of knowledge: word forms—phonological and orthographic—and knowledge of

lexical contents—the meanings and the grammatical information linked to different word forms.

Some theories of the mental lexicon try to explain its structure.

Hierarchical network models proposed by Collins and Quillian (1969) postulate that we store our knowledge of words in the form of a semantic network. In the models of Rips *et al.* (1973) words are represented as bundles of semantic features.

Spreading activation models (Collins–Loftus 1975) are a variation on network models. According to this model, words are organized into interconnecting nodes and the distance between them is determined by categorial relations and functional considerations. The degree of accessibility depends on the frequency of word usage and typicality. The authors suggest that the process of retrieval begins at the level of a single node's activation and continues by spreading throughout the network. Closely related concepts are more likely to be activated than distant concepts. Collins and Loftus propose that there is a threshold for the activation of a given node. A given node will be activated when different stimuli accumulate to a level beyond this threshold.

In recent years many models have been created to analyse the process of lexical access, but the majority of them are restricted to the English language (for details, see Aitchison 1987). In this connection Gergely and Pléh (1994), who studied the lexical processing and the organization of the lexicon in monolingual Hungarian adults, stress that these considerations often cannot be applied directly to agglutinative languages, such as Hungarian, or inflectional languages, such as Russian, because of the rich case and derivational word formation systems. The authors found that in Hungarian, subjects showed a double representation of words: words may be stored as holistic unanalyzed units, that is, as independent lexical entries, and as morphologically decomposed forms, that is, as separate or serially specified morphemic entries. Gergely and Pléh suggest that this double representation depends on the relative frequency of the Hungarian word form variants.

Since Weinreich (1953) word representation in the bilingual brain has been a popular research topic. The central question of such research is whether the words of the knowledge of two languages have a common storage area in memory or whether words are stored separately by language. Weinreich postulated three possible organisations of words in the bilingual brain: “coordinate”, “compound” and “sub-coordinate”.

Coordinate word representation means that a word in one language and its translation into another language have two conceptual representations, one for each language, indicating little interaction between them. The coordinate bilingual person is typically one who has learned both languages in different environmental conditions from childhood, for example, one language at home, another one at the kindergarten. This contextual distinction causes the separation of languages on the cognitive level, representing in the bilingual brain two independent memory storage areas.

Weinreich talks about compound word representation when a word in one language and its equivalent in another have a common conceptual representation. The bilingual learned two languages in the same environment, for example, in a bilingual family. In this case, the two languages in the cognitive system frequently interact with each other, showing a single interdependent memory store for both languages.

In the sub-coordinative type, the bilingual interprets words of the learned L2 language through the words of the first language. In other words, the sub-coordinative bilingual has the conceptual representation of L1 words, but two modes for production: one for L1 and another for L2 learned by means of the first.

Ervin and Osgood (1965) also distinguished compound and coordinate bilinguals, stressing the different cognitive organization. A compound language system has two sets of linguistic signs associated with the same set of meanings. In a coordinate type, translation equivalents have their own meanings and affective loads.

In the models used in cognitive psychology, the environmental conditions of acquiring two languages as well as interrelations between systems of perception and memory have become independent targets of investigation. Two opposite theories have emerged from research concerning word representation and memory in bilinguals.

Advocates of the first view (Kollers 1963; Tulving–Colotla 1970) assume that each language is assigned, at least functionally, a separate memory store. These stores are independent of each other. This hypothesis is associated with the idea that representations of elements in reality are coded and stored jointly with linguistic elements by means of which the former constituents of reality have been perceived. This would imply that given something coded in one of the languages, it will not be accessible for direct naming in the other language. The latter task can only be accomplished by translation.

Authors proposing the second hypothesis (Lopez–Young 1974; Rose *et al.* 1975) assert that a common memory storage mechanism is operating for both languages. Objects or phenomena in reality are coded only once, at the first perception. Perceptual traces will be stored in the joint storage system. The languages acquired by a bilingual person can be seen as a pair of different tools both fit for retrieving and verbalising or actualising percepts stored in memory when necessary, without any difficulty or blocking.

As if to resolve the controversy regarding these opposite approaches Paivio and Desrochers (1980) proposed a so called dual-coding model of language and cognition. According to this model, linguistic information is stored in two different ways, namely as verbal representations (*logogens*) and nonverbal information (*imagens*). For the bilingual, there are two verbal representations, one for each language, both linking with the image system. The authors stress that these three systems are independent of each other but they can interact because of interconnections that

permit one system to initiate activity in the others. The image system is connected to both languages. For example, a logogen of L1, which is linked with a logogen of L2, may evoke not only that, but may also activate an imagen, and at the same time this imagen may activate verbal representations in L2.

In the cognitive psychology of bilingualism there is a well-known, so called three-store model proposed by Paradis (1985; 1993). According to this, words or languages have two levels of representation, one for each language and a common conceptual store for the bilingual's knowledge of the world.

In the last decade, researchers began to investigate the structure of the mental bilingual lexicon more deeply using not only traditional psychological instruments such as association tests, translations, free recall, picture naming or lexical decision tasks but the priming technique, too.¹

Tzelgov and Eben-Ezra (1992) studied components of the between-language semantic priming effect in two experiments with Hebrew-English adult bilinguals. In these experimental tasks, the authors manipulated the stimulus onset asynchrony between the prime and the target, prime-language, and target-language. The experiments showed that a semantic priming effect was found within and between languages. This effect is explained by the automatic spreading activation within conceptual memory. The authors suggest that in a bilingual mental lexicon words and their translations have the same conceptual representations.

Keatley and de Gelder (1992), who investigated the processes underlying cross-language priming in four cross-language primed lexical decision experiments, came to the opposite conclusion. The subjects were French-Dutch bilingual students. The authors support a separate-store model of bilingual memory.

Sánchez-Casas *et al.* (1992) studied the representation of the cognate and non-cognate types of translation words in the mental lexicon of Spanish-English bilingual adults. Cognate prime-target pairs are orthographically and/or phonologically similar and, additionally, have a common stem and sometimes the same meaning, for example, the cognate pair: English *rich* and Spanish *rico*, and non-cognates, when the words of two languages have different structure and roots: *luna* - *moon*. Sánchez-Casas *et al.* propose that cognates share a common storage area in memory, whereas non-cognates do not.

¹ Generally, in monolingual investigations using the semantic priming paradigm the subject is presented with a prime stimulus and a target stimulus. He/she has to judge, by pressing a button, whether or not a target belongs, for example, to the same semantic category as the prime. The processing of the target is faster if it is semantically related to the prime. There is also a language priming technique, which is not the same as semantic priming. In typical bilingual studies of the language priming effect, subjects have to decide very quickly which language a visually or auditorially presented word belongs to. For bilinguals, words in one language are harder to recognize when immediately preceded by a word in their other language.

De Groot (1992a; 1992b; 1993), de Groot *et al.* (1994) reviewed current models of bilingual lexical representation such as “word-association” (similar to Weinreich’s subordinate word representation), “concept-mediation” (similar to Weinreich’s compound word representation), “mixed” and “asymmetrical” models. In the mixed model, memory structure integrates the word-association and concept-mediation models. In this case, word-equivalents are connected both directly and indirectly, via a shared representation in conceptual memory. In asymmetrical memory structure, representations of the words of the two languages have two directions of connection: one from the L1-node to the L2-node and one in the reverse direction. The link from the word of L2 to the word of L1 is stronger than the reverse connection. However, the connections from the L1-node in lexical memory to the L1/L2-node in conceptual memory are stronger than the connections from a word of L1 to the word of L2 in lexical memory. Kroll and Stewart (1994), who proposed the asymmetrical model for bilingual lexical representation, stress: “these differences between the strengths of individual links cause forward translation to proceed generally via conceptual memory, whereas backward translation typically exploits the direct links between nodes in lexical memory” (de Groot *et al.* 1994, 604).

De Groot investigated the bilingual lexicon of Dutch–English adults in different translation situations (normal, forward and backward) using different variables (imageability, the frequency of the stimulus word, the frequency of the response word, cognate status, context availability, etc.) and came to the following conclusion: “Different words may be represented differently within one and the same bilingual’s mental lexicon: some words may be represented in a compounded fashion, some coordinate, and yet others in a subordinate way” (de Groot–Barry 1992, 242).

Contrary to adults, monolingual children have to build up their mental lexicon, picking up more and more new words and acquiring their meaning in various social contexts. During language acquisition the children’s pronunciation is modified, continually coming close to the adult norms for a given speech community. With the growth of cognitive competence the meaning of a word is also modified: from diffuse to conventional meaning, passing through different stages of its development (Bates 1979; Aitchison 1987; Clark 1993).

McNeill (1970) proposed two hypotheses for the development of the child’s mental lexicon. In the horizontal development of vocabulary the words enter the mental lexicon by way of word connections, in the form of syntagmatic relations. A word’s semantic features are included in a word meaning from the time of initial acquisition. The addition of other semantic features—received from context—helps the child to define a word.

According to the vertical hypothesis, the same word in an early stage of its acquisition may have a number of independent and separate meanings. Later, dur-

ing semantic development, the different meanings of this word combine and transform into the deep meaning structure.

What kind of psychological mechanisms stand behind the acquisition of word meaning? According to Luria (1979), in two-three-year-old children the meaning of a word is closely connected with its emotional world. The child knows very well that the word *shop* does not mean *dog* nor *book*. However, the child also knows very well that from that place the mother brings delicious things: sweets, chocolates, etc. Later, he forms a mental picture, an image of a certain shop, say, the one on the corner. The child knows that in this place mother, in exchange for money, may buy food and for him, sweets. In this period, concrete experience and imaginary thought stand beyond the word meaning. Being a student, the child acquires an economic meaning of *shop*, namely, commodity–money relations.

Thus, word meaning develops and is reorganized and the following psychological mechanisms stand behind it: affect—imaginary thought—verbal and logical thought.

If a child is reared in a mixed-language family in which each parent speaks a different language, he/she has the opportunity to become bilingual. The investigations of parallel acquisition of two languages are well known (Leopold 1949-1954; Imedadze 1967; De Houwer 1990). These studies rely on the longitudinal observations on the researcher's own children and deal with linguistic or psycholinguistic aspects of early childhood bilingualism. Some investigations are devoted to language acquisition of bi- and trilingual children (Mikes 1990), the growth of communicative competence of a bilingual child (Jarovinskij–Fabricius 1987), or to the phenomena of creativity in multilingual children (Oksaar 1988).

The present study on the structure of the bilingual mental lexicon of Hungarian–Russian children is part of an integrated project studying their bilingual competence and socialization (for details, see Jarovinskij 1995). The aim of this investigation is to reveal mechanisms by which bilingual preschoolers acquire word forms and their meanings and to shed light on their representation.

2. Methods

2.1. Subjects

Knowing the complexity and confusion of the topic of childhood bilingualism we selected our pool of bilinguals very carefully. Eighteen children (10 females and 8 males) brought up in 15 mixed-language families with Russian mothers and Hungarian fathers were investigated. It is important to point out that the Russian language is not part of the natural sociolinguistic environment in Hungary, i.e. it is not a language spoken by an ethnic minority in Hungary.

All the mothers were from Russia, and their mother tongue was Russian. The families have been residents of various districts of Budapest for an average of six years and none of them lived with their grandparents. As for socioeconomic and sociocultural status the observed families were homogeneous: all the parents had university degrees.

In all the families, the home setting during the period of testing was characterized by a predominance of conversation in Russian. In extrafamilial situations (visiting relatives, shopping, etc.), however, the Russian-speaking parent tended to switch to Hungarian.

The ages of the children varied from 3;5 to 6;11. Group A included nine children (average age: 4;2) and Group B, the remaining nine (average age: 6;1). The bilingual children attended Hungarian nursery schools.

2.2. General setting

All experiments were carried out in a relaxed home atmosphere in playful settings, usually on weekends. Testing was first in Russian, and two weeks later in Hungarian with native researchers.

2.3. Lexical measures

Bilingual competence on the lexical level was defined, as follows:

1. Measurement of receptive vocabulary of the children in both languages by using versions of the Peabody Picture Vocabulary Test (PPVT) and the computation of a dominance coefficient of passive vocabulary. The researchers asked each question only once. For example: "Show me, please, where object X is".

2. The assessment of dominance coefficients in the active use of words by using the picture demonstration material of the PPVT to elicit vocabulary. In this case the researchers asked one of the two possible appropriate questions also only once: "Tell me, please, what it is" or: "What is he/she doing?".

3. Results and discussion

Quantitative analysis showed that on the level of word recognition and word production the Hungarian language was dominant in both groups of children. Dominance coefficients for receptive vocabulary were four times as high at age four as at age six. On the active use of words the dominance coefficient is twice as high in group A as in group B (for details, see Jarovinskij 1995).

As the procedural materials for the two languages were equivalent, there was a possibility to compare between languages the nonverbal and verbal responses of

each subject on the basis of the recognition and naming of the same objects or actions. Correct identification revealed in each child's development a characteristic passive and active common thesaurus and accordingly a lexicon in which denotata are associated with two linguistic signs. Apart from such cases, quantitative analysis also revealed elicitors which led to recognition and naming performance only in Russian or only in Hungarian as well as those for which correct recognition and naming were not recorded in either language (see Tables 1 and 2).

Table 1
Words actualized in Hungarian only
(over 50% of children):

Group A (N=9, av. age 4;2, dominance coefficient for active lexis – DCA=+15%, from 66 words)			Group B (N=9, av. age 6;1, dominance coefficient for active lexis – DCA=+7%, from 100 words)		
pisztoly	'pistol'	89%	boríték	'envelope'	89%
torta	'cake'	89%	csomag	'pack'	56%
kulcs	'key'	78%	királynő	'queen'	56%
vitorlás	'sailing boat'	56%			

Table 2
Words actualized in Russian only
(over 50% of children):

Group A			Group B		
nozh	'knife'	56%	banka	'tin/can'	56%
podmetaet	'is sweeping'	56%	bulavka	'safety pin'	56%
sh'et	'is sewing'	56%			

Our findings concerning bilingual children's mental organization of lexicon confirm the investigations of Ojemann and Whitaker (1978). These authors determined the localization of two languages in the lateral cortex of the dominant cerebral hemisphere by a technique of mapping sites where electrical stimulation altered naming in two bilingual patients (Dutch-English, English-Spanish). Sites in the center of the language area of each patient were involved in both languages. Peripheral to this, in both the frontal and parietal cortex, sites were involved in only one of the languages. In each patient, each language, in part, used different areas of the brain.

The quantitative analysis of erroneous responses in a picture naming task showed that in both groups the number of erroneous answers in Russian was significantly higher than that of erroneous answers in Hungarian. In group A in Russian it was 44% (for 66 pictures), in Hungarian 24%, in group B (for 100 pictures) 34% and 10%, respectively.

4. Qualitative analysis of incorrect answers

Above all, we found inadequate perception and interpretation of some pictures in each language separately. This effect especially occurs in group A with verbs of motion. For example, a picture indicates that somebody *is catching* a ball. The child however answers: "(Somebody) *is throwing* a ball" (see Table 3).

Table 3
Inadequate perception/interpretation of picture contents
or choice of a word from the same semantic field

HUNGARIAN		RUSSIAN	
picture	response	picture	response
húzza 'is pulling'	tolja 'is pushing'	lovit 'is catching'	brosact 'is throwing'
(A +35%)		(A -8%)	
kancsó 'pitcher'	csésze 'cup'	stuchits'a 'is knocking'	otkrivaet 'is opening'
(A +2%)		(A +13%)	
gyűrű 'ring'	tükör 'mirror'	loshad' 'horse'	verblud 'camel'
(A -8%)		(A +22%)	

(examples indicating group and language dominance: "+" Hungarian dominant, "-" Russian dominant)

4.1. Erroneous verbal responses at the intralingual level

Some older children of group B in the nondominant language, usually in Russian, used the following strategy: "stay at any cost in the frame of one language". This means that when they did not know the right word they choose a more common word from a higher category of hierarchically linked superordinates, for example, *mama* was substituted for *schoolmistress*.

One of the type of “stay at any cost in the frame of one language” strategies was the conscious use of it on a level of functional descriptions substituted for direct naming. The bilingual children utilized it very often. For example, to the Russian question: *What is he?* the answer was: *Man (mister) is cutting his hair.* (In brackets I have to note that this utterance is a syntactic calque from Hungarian.)

Bilingual children of both groups and with a differential knowledge of languages, demonstrated their creativity by coining new words in Hungarian as well as in Russian (see Table 4).

Table 4
Neologisms

HUNGARIAN	RUSSIAN
összetevőjáték (for <i>összerakó játék</i> 'jig-saw puzzle') (B +16%)	pililo (for <i>pila</i> 'saw') (A -8%)
toló (for <i>talicska</i> 'barrow') (A +19%)	rukavnik (for <i>varezhka</i> 'mitten') (A -8%)
fejszel (for <i>vág</i> 'is axing') (A +19%)	pal'chatnik (for <i>varezhka</i> 'mitten') (A +13%)

Speech errors may shed light on the process of the word's sound form acquisition, its storage and access by bilingual children. Actualization of these phonologically isomorphic words (malapropisms) is connected with a well-known naming phenomena such as “slip of the tongue” or “tip-of-the-tongue” (Brown-McNeil 1966). The name *malapropism* comes from Mrs Malaprop (in French *mal à propos* ‘not to the purpose’), a character in Richard Sheridan's play “The Rivals”, who kept muddling up words (Aitchison 1992). Substitution errors have a significant correspondence for length and stress placement and a marked similarity of initial segment to the target word (Fay-Cutler 1977; Garrett 1988). Interestingly, the substitutive word almost always belongs to the same grammatical category as the word needed (Motley *et al.* 1982).

Let me give one example from our study. The picture demonstrates a fence (in Russian: *zabor* or *zagorodka*). To a Russian question: “What's this?”, the six-year-old boy from group B answered in Russian: *Skovorodka* (in English: ‘a pan’). Then he changed his mind abruptly: “*N'et* (no), *eto* (this is) ...*eto* (this is) ...*zagorodka* (a fence)”.

Elbers (1985) investigated the speech production of her monolingual Dutch two-year-old son and found that the child's lexical search processes had many characteristics which are typical for "tip-of-the-tongue" phenomena.

Our bilingual children as well as monolinguals demonstrate the effects of malapropisms especially in the nondominant language, namely, all malapropisms—except two—appeared in Russian for both groups of children. Vihman (1981) and Aitchison (1987) propose that in producing malapropisms monolingual children use a rhythmic pattern and stressed vowel strategy. A malapropism very often contains the same number of syllables as a target word. Our data support their assertion (see Table 5).

Table 5
Malapropisms (phonologically isomorphous words)
(' indicates the stress position in the word)

Group A			
HUNGARIAN		RUSSIAN	
picture sze-gel 'is hammering'	response esz-el 'you' re eating' (-4%)	picture nózh 'knife'	response nózh-nica 'scissors' (-4%)
zokn-i 'socks'	szokn-ya 'skirt' (-8%)	grúsha 'pear' (+19%)	i-grúshka 'toy' (+22%)
		kolo-kól'chik 'bell'	kól'chik [meaningless]
Group B			
picture —	response —	picture kol'có 'ring' (+13%)	response kal'só-ni 'underpants'
		pilá 'saw' (+19%)	ko-pilká 'money-box'
		pod-metáet 'is sweeping' (+6%)	metáet 'is throwing'

The fourth category of erroneous verbal responses at the intralingual level is tied with the so-called associated answers in both groups for both languages (see Table 6).

It is necessary to stress that these associations were evoked by pictures presented spontaneously.

Table 6
The set of so-called spontaneous associative answers

Group A				Group B			
HUNGARIAN							
syntagmatic		paradigmatic		syntagmatic		paradigmatic	
picture	response	picture	response		picture	response	
ás	lapát	cérna	gomb	–	kulcs	kilincs	
'is digging'	'shovel'	'thread'	'button'		'key'	'door-handle'	
	(-8%)		(+35%)			(+6%)	
kés	vág						
'knife'	'is cutting'						
	(-4%)						
RUSSIAN							
gladit	ut'ug	shetka	pricheska	–	remen'	dzhinsi**	
'is ironing'	'iron'	'brush'	'hair-do'		'belt'	'jeans'	
	(+12%)		(+20%)			(+8%)	
metla	metet	zabor	vorota		korobka	konfeti*	
'broom'	'is sweeping'	'fence'	'gate'		'box'	'sweet'	
	(+22%)		(+13%)			(+19%)	
		remen'	chasi**		kluch	zamok**	
		'belt'	'watch'		'key'	'lock'	
			(+12%)			(-4%)	
		banka	m'aso*				
		'tin'	'meat'				
			(+13%)				
		banka	pashtet*				
		'tin'	'meat-spread'				
			(+20%)				
		banka	varen'e*				
		'tin'	'jam'				
			(+19%)				
		kuvshin	vino*				
		'pitcher'	'wine'				
			(+13%)				

According to formal grammatical relations these responses may be classified as syntagmatic (somebody *is digging* – stimulus, reaction: *shovel*) as well as paradigmatic relations (*thread–button*). Interestingly, the number of paradigmatic associations given by four-year-olds (group A) in Russian (nondominant language) was higher than the number of Russian syntagmatic responses and higher than the number of Russian paradigmatic answers in group B. These results contrast with studies investigating the nature of children's word associations (Entwisle 1966; Ervin-Tripp 1973). The point is that the number of paradigmatic answers compared with syntagmatic responses increased with age indicating the child's more advanced semantic development. However, we obtained a different picture. It is obvious from our data that most of the so-called paradigmatic associative answers are tied to appropriate pictorial references by very strong contexts. These pairs of words may be found together, that is, they are collocated by a common situation. (In Table 6 they are marked with an asterisk.) Indeed, there is an immediate sequence of syntactic relations between, for example, Russian *banka* ('tin' – pictorial stimulus) and *varen'e* ('jam' – answer): *banka varen'ja* 'a tin of jam', or *kuvshin* 'pitcher' – *vino* 'wine': *kuvshin vina* 'a pitcher of wine'. In this case the Russian genitive case is marked only by inflection. The pairs of words having two asterisks in Table 6 require in Russian a function word and an inflection for genitive case. For example: *kluch ot zamka* 'key of the lock'. Although in the latter case, the immediate sequence is broken, nevertheless these pairs of words are syntactically much more tied in Russian than such words as *zabor* (pictorial stimulus) *i vorota* (verbal answer) 'fence and gate'.

It seems to me that our so-called paradigmatic answers might have to be classified as collocational links despite the fact that they belong to the same grammatical class.

However, our findings might be explained in another way. Perhaps words such as 'tin' or 'pitcher' are still unknown in Russian for most four-year-old children and they use words for fillings 'meat', 'meat-spread', 'wine' substituting them for the names of containers. Indeed, in a natural context the name of the container is often omitted by adults: "Give me the jam, please".

For the Hungarian language the number of spontaneous associative answers was insignificant and half of them were given by children who dominated in Russian. Interestingly, four-year-old children did not produce, in associative responses for containers, their erroneous answers in Hungarian. Instead, they named the demonstrated pictures using words from related semantic fields (for example, 'pail' for 'pitcher').

In order to acquire an independent meaning for each word of the collocational links it has to be included separately in different contexts, that is, the word must be decontextualised.

4.2. Erroneous verbal responses at the interlingual level

In naming pictures, children demonstrated a phenomenon of lexical interference (borrowings or loan words) with Hungarian words put into Russian contexts in the following percentages: Group A – 32%, Group B – 2%. The same ratios for Russian words put into Hungarian contexts were: Group A – 0.2%, Group B – 0.8% (see Table 7).

A number of authors (Volterra–Taeschner 1978; Lanza 1990; Kwan-Terry 1992) have reported that young children frequently transfer equivalents of concepts from one language to the other. (For good reviews, see Genesee 1989; De Houwer 1995.) An example is provided by our pilot studies. To a question by the Russian experimenter: *Chto eto?* ‘What is this?’, the older of two brothers responded by saying: *Flag* ‘a flag’. The younger brother corrected: “Net, eto *zászló*” (No, this is a...plus the Hungarian noun for ‘flag’).

Paradis (1993) suggests that interference must be distinguished into two types: interference due to deviant competence and interference due to performance errors. The first is connected with the bilingual’s verbal behaviour in L2 when its grammar systematically contains elements of L1. From the point of view of the native L2 speakers’ competence this behaviour is deviant. Competence interference refers to the contents of the grammar of the language (what is stored) and does not depend on the way the two languages are organized in the mind.

Interference due to performance errors takes place when the inadvertent intrusion of an L2 element embeds itself in the processing of L1. In this case, on occasion, an element of L2 becomes activated instead of an element of L1, and the bilingual produces an interference error. Interference may refer to the activation of a competing response, for example, in the context of lexical decision. Similarly to this, in picture naming tasks, measuring reaction time, both the words of L1 and their translation equivalents in L2 would be activated until a selection is made in the bilingual brain. However, this process may be accompanied by interference.

According to Grosjean (1995), interference may manifest itself at all levels of language (phonological, lexical, syntactic, semantic, pragmatic) in its spoken as well as written forms. He distinguishes two kinds of interference: static and dynamic. In the case of static interference there are permanent traces of the influence of one language on the other. For example, accent, syntactic calques, the extension of meaning in particular words, etc. Dynamic interference characterizes accidental, temporary intrusions of the other language.

There are several immediate causes of borrowing, code-mixing or code-switching: primarily the type of situation itself, the topic of conversation, the nature of the audience, the absence of a concept in one of the two cultures, personal factors, etc. (Grosjean 1994).

However, in my opinion, in every language there are some words which “suggest” or potentially carry the possibility of lexical-semantic interference. In this case, the words of two languages derived from the same root have a semantic relationship and similar pronunciation. These words are called paronyms or cognates and they are the potential candidates for borrowing. From the point of view of etymology, Hungarian has a lot of paronyms like many other languages. Kniezsa (1955) gathered and analysed paronyms derived from Slavic languages, for example, such as Hungarian *moly* – Russian *mol'* ‘moth’, *széna* – *seno* ‘hay’, *répa* – *repa* ‘turnip’, and so on.

In our pool, we had some cognates, that is, some words in the two languages which were phonologically similar and semantically identical. For instance, Russian *kljuch* – Hungarian *kulcs* ‘key’. The younger group of children (group A) used only the Hungarian equivalents of these pairs (see Table 7).

Table 7
Cognates or paronyms – words that are phonologically similar
and semantically identical in the two languages

HUNGARIAN	RUSSIAN	
kulcs	kljuch	‘key’
torta	tort	‘cake’
pisztoly	pistolet	‘pistol’

Lexical-semantic borrowing may also easily appear with homophones, that is, with word pairs in which phonological forms are identical although the meanings are different, for example, Hungarian *puska* – Russian *pushka*. The meaning of the Hungarian word *puska* ‘rifle’ is expressed in Russian by *ruzh'e*. The phonologically identical Russian word *pushka* means ‘cannon’.

Loan words will easily transfer when the semantic equivalent of a word in the other language is morphophonologically simpler than the one in the language just utilised. The Russian word such as *bulavka* ‘safety pin’ containing three syllables may be more frequently incorporated into a Hungarian context than the actualization of its Hungarian equivalent containing five syllables, and vice versa (see Table 8).

Table 8
Words shorter in length than their equivalent in the other language

Russian	vs.	Hungarian
ban-ka 'tin'		kon-zerv-do-boz 'tin'
bu-lav-ka 'safety pin'		biz-to-sí-tó-tű 'safety pin'
Hungarian	vs.	Russian
fod-rász 'hairstresser'		pa-rik-ma-her 'hairstresser'
csen-gő 'bell'		ko-lo-kol'-chik 'bell'

It is interesting to note that if conditions allow—for example, in a bilingual situation—the choice of shorter words of one language in comparison with the longish word-equivalents in another one is not a privilege of bilingual children only. According to Aitchison (1987), monolingual children avoid the use of longish words because they require stringing the sounds together very fast, and in the right order.

Lexical-semantic interference from the inappropriate language may appear when one of the two languages is used more frequently in a certain social context than another one. In our material there were some pictures that were easily labelled in one language but not in the other. For example, Russian *sh'et* 'sews' or *nozsh* 'knife' closely coincided with such household scripts as 'to sew something' or 'to cook' reflecting the child's participation in mother-child interactions. On the other hand, the high frequency of the actualization of Hungarian words such as *vitórlás* 'sailing boat' and others reflects their envolving in different social contexts with the father or other Hungarian-speaking persons (see Tables 1 and 2).

In our pool, there were only two examples of so-called language-mixed spontaneous associative responses (see Table 9). However, one of them, Russian *kurica* 'hen' – Hungarian *kukorica* 'corn' may be classified as erroneous response on the intralingual level, namely a malapropism, inasmuch as they have similar phonological forms with different meaning.

Table 9

The set of so-called language-mixed spontaneous associative answers

Russian		Hungarian	
picture		response	
zabor (A +20%)	'fence'	kapu	'gate'
kurica (A -8%)	'hen'	kukorica*	'corn'

5. Conclusion

The process of acquisition of words and their meanings by bilingual children in a homogeneous (Hungarian) language environment outside the home shows that the structure of their mental lexicon, on the one hand, is similar to that of a monolingual's of the same age, but on the other hand, it completely differs from the latter.

Bilingual children store in their memory twice as much information as monolingual children do on the level of word recognition and production. The bilingual mental lexicon of Hungarian-Russian preschoolers consists of interconnected and independent systems, that is, there are some words which create the common passive and active thesaurus for two languages, while other words are stored in each lexical and conceptual memory separately.

Bilingual competence is a dynamic phenomenon determined by a number of factors (Pléh *et al.* 1987; Jarovinskij 1995). In this connection, the word representation in the bilingual mind could be imagined in a virtual multidimensional space. Some words and their concepts may be represented in a compound or subordinative way, other words may have coordinative organization. With the growth of bilingual competence, some words and their meanings, organized at the beginning in the bilingual mind in a compound way, may later show features of coordinated lexical representation.

Erroneous responses at the intralingual level, especially in the nondominant language, could reveal the process by which a bilingual child builds the words into his/her mental lexicon. The words of the mental lexicon in each language may be tied on the morphophonological level, to which the number of malapropisms testifies. In picture naming tasks, an inadequate use of words indicates that during spreading activation of the lexical-semantic networks there is an actualization of lexical items which are phonologically isomorphous to a target word. The selection of an erroneous lexeme demonstrates the instability of storage of a word's sound in

phonological memory or, maybe, this phenomenon is connected with a difficulty in retrieving the right word because of its rare usage in the appropriate language. In some cases, however, malapropisms in the nondominant language indicate that children operate with word forms without knowing their meaning.

The set of so-called spontaneous associative answers (syntagmatic and paradigmatic) shows that the words in the bilingual mind of preschoolers are collocated by a common situation and context, organizing integrated semantic networks in each language separately. However, for the most part the so-called paradigmatic responses, that were given by four-year-old children in the nondominant language (Russian) may be explained as collocation links with the pictorial stimulus. To acquire an independent meaning for each word of the collocational links the lexeme must be decontextualised.

The number of neologisms shows the creative process of building a mental lexicon in both languages separately.

The qualitative analysis of erroneous verbal responses at the interlingual level could detect the words which "suggest" or potentially carry the possibility of lexical-semantic interference. Cognates or paronyms (words that are phonologically similar and semantically identical in the two languages), homophones (word pairs having identical phonological forms and different meanings), words shorter in length than their equivalent in the other language, words more frequently used in a certain social context than in another, are all potential candidates for borrowing, code-mixing and code-switching.

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PROSODIC ERRORS IN THE ACQUISITION OF HUNGARIAN: A CASE STUDY

ILONA KASSAI

Abstract

There is some evidence, at least in Hungarian, that prosodic development applies the same trial-and-error principle that operates in segmental development. After the very first achievements children may be (and are) mistaken both in the number of stresses to assign and their placement. Intonation errors occur mainly in yes/no intonation questions whose patterning is intimately related to semantic focus. The elimination of errors takes place through learning the complex interplay of prosody, syntax and semantics.

The paper proposes to shed light, through a tentative analysis of the types of prosodic errors found between 1 and 3 years in a longitudinal case study, on some aspects of the above mentioned interplay. The seemingly chaotic data conceal regularities which are discussed together with their implications. The findings are presented as a contribution to the theoretical controversy regarding the extent to which prosody guides children in acquiring syntax and, in turn, syntax facilitates the acquisition of prosody. The limited evidence available suggests that the process goes both ways, with prosody, however, having some priority over syntax.

1. Preamble

1.1. Prosody and language acquisition research

Researchers of child language have paid less attention to the acquisition of prosody than it would merit on the basis of its importance both in speech production and speech perception (for adults see e.g. Nootboom *et al.* 1978; Levelt 1989, esp. 365–411; for children cf. Konopczynski 1987; Echols–Newport 1992; Mandel *et al.* 1994). In 1936, Lewis said: “The whole question of intonation in children’s speech is ... extremely obscure” (95). In 1973, Crystal closed his survey of the issues in non-segmental phonology in language acquisition by stating: “It is depressing, nearly forty years later, still to have to agree with him” (35). As an exception among the anecdotal references he mentions Bühler who placed great emphasis on the “musical devices of syntax” in the early development of language and insisted on its theoretical relevance for syntactic analysis (Crystal 1973, 11). One should also quote

Scripture who stated as early as in 1902 that the child makes use of the degrees and modulations of intonation in the course of language acquisition (487).

It is all the more surprising that, in the 60s, on the basis of limited evidence such axiomatic questions were raised among leading scholars as whether prosody guides children in acquiring syntax or, just the opposite, syntax facilitates the acquisition of prosody. The first position was adopted by Brown (1973), Weir (1966), Menyuk (1971), and many other researchers, while the second view was expressed by Bever *et al.* (1965), and argued for very strongly by Bloom (1973).

Within this poorly represented field the topic of prosodic errors, i.e. deviations from adult language, has received even less attention, than the normal course of acquisition, although child language research is, to a large extent, research into speech errors. It suffices to look at the two volumes of *The crosslinguistic study of language acquisition* edited by Slobin (1985) which is based primarily on error analysis. It is true that it is very difficult to analyze systematically the paths the child takes to learn the adult system, given that we lack a clear picture of that system in all its complexity. In particular, we lack clear descriptions of spoken language use which serves as an input to the child and from which we could draw data to analyze the child's points of deviation from and subsequent return to that adult system. Fortunately, for about the last two decades there has been a growing interest in the acquisition of prosody (see Konopczynski's review of the literature, 1988; Hallé *et al.* 1991).

1.2. Background and goal

I started research on child prosody by asking the following questions: (1) How does the conventional prosodic system of the adult language emerge out of the physiologically controlled, therefore highly symptomatic vocalizations of the child? I have been particularly interested in the emergence and evolution of intonation and stress; (2) How does the child make use of prosodic features in performing different functions and what kind of functions does s/he perform through these features? As a philosophy I adopted the desiderata expressed by Crystal (1978): "To begin empirically, then, by examining early child data, using as a framework of reference only the most general considerations of phonetic and phonological theory, and by attempting to see the intonational system of the child in its own terms, would seem to constitute a promising and well-grounded (albeit vast) enterprise" (257).

For the purposes of the intended longitudinal study I regularly recorded the spontaneous productions of my first-born daughter Fruzsina [fruzinɔ] (henceforth F) from age 1;0 to age 6;0. The auditory and instrumental analyses I made on F's utterances, starting with the earliest one-word utterances (1988a; 1991) all the way to complex sentences (1987; 1988b) revealed a wide variety of stress and intona-

tion patterns, part of which proved to be inconsistent with the prosodic rules of adult Hungarian. I labelled these inconsistencies, or even deviations, as **prosodic errors** and I thought that the application of error analysis to prosodic errors might be illuminating not only with respect to prosodic development but also regarding syntactic development as prosody forms part of the syntactic component (although the recognition of this fact is not a commonplace).

This paper, after giving a short account of the prosodic skeleton of adult Hungarian, proposes to shed light on some aspects of F's linguistic development, through a tentative analysis of the types of prosodic errors found in her corpus between ages 1;0 and 3;0. While this is a case study, I consider F as a typical learner/speaker of Hungarian of her age because her productions are examples of phenomena widely attested by a population familiar with child language performance, i.e. parents, caregivers, nursery and elementary school teachers. In order to gather evidence for this claim, I tested, among the aforementioned population (N=147), a few erroneous utterances for their frequency of occurrence on a five point scale (no occurrence, rare, fairly frequent, frequent, very frequent). In addition, I had 75 first-year university students majoring in Hungarian judge the same utterances for their acceptability or nonacceptability. The results of these two tests will be presented in the form of charts inserted in the appropriate sections of the paper.

Where possible, I will supplement the discussion with crosslinguistic evidence.

1.3. Definitions

Thanks to insightful treatments by Bowerman (1985, 1263–6), Ochs (1985, 783–8) and Smoczyńska (1986), one has a clearer picture about what is and what is not an error in language acquisition. In my formulation, I distinguish deviations which are **paradigmatically motivated** and are thereby systemic from those which are **syntagmatically or pragmatically triggered** by some factor external to the child's linguistic system and are thus incidental. For them 'slip of the tongue' would be the proper label.

In developmental research the first category is of interest. In Ochs' highly refined conception (1985, 783–8) a speech phenomenon counts as an error if it (1) deviates from a norm of speaking and (2) warrants negative sanctioning as judged by members of the speech community. The errors thus identified by Ochs are further divided into **socially variable errors** violating linguistic rules variable across social contexts and **categorical errors** violating rules invariable across social contexts. In order to assess deviating speech phenomena according to these definitions, one should rely on a sociolinguistic grammar. As, however, such a grammar is at present unavailable, researchers, including myself, have to rely on 'intuition grammars' i.e. on their own linguistic intuitions supplemented by those of other mem-

bers of the speech community. In addition, they can widely use the observational data of the language spoken to the child.

Thus, this study takes advantage of F's and my living together which gave me access to rich background information about my daughter's unrecorded verbal and nonverbal behaviour, her overall development as well as environmental factors. All this helps a great deal in identifying, classifying and interpreting the deviations detected in her language use.

2. The system to be acquired

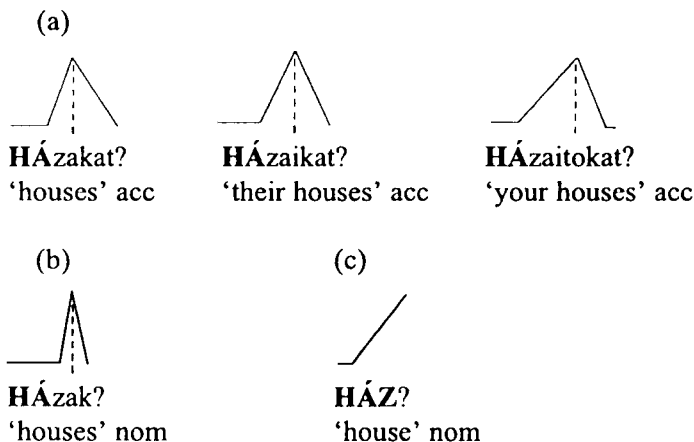
Hungarian, a "free" word order language, has fixed, first-syllable stress. Nevertheless, for purposes of contrast, stress can shift to some non-first syllable. Sentences may have several, equally strong primary stresses and also some secondary stresses. In this case one cannot speak about sentence stress. The rightmost primary-stressed syllable initiates a character tone (=terminal contour) which can be one of the following types: falling (\searrow), falling-rising ($\searrow\swarrow$), rising (\swarrow), descending (\sim) and rising-falling (\wedge). The character tones actually appear in phonetic variations conditioned by the number of syllables on which they are spread out. The one-syllable, two-syllable and three-or-more syllable variants (=allotones) are in complementary distribution. If there are any primary-stressed syllables before the terminal pattern, each of them initiates a half-falling tone, i.e. a steep fall not reaching the base line. These primary stressed sequences are subject to downdrift. If there is only one primary stress in the sentence, it is most often located on the focus position, i.e. on the position immediately preceding the verb or, if the F-position is vacant, on the verb itself. However, it may happen that sentence stress falls on some other constituent within the comment. Both word order and stress placement seem to be governed by the speaker's communicative needs reflected in topic-comment structure and resulting in 'pragmatic word order'. Accordingly, a word shows variation depending on context: it can receive (1) no stress at all, (2) secondary stress, (3) primary stress and (4) contrastive stress. Intonation patterning itself, as is obvious from the above description, is dependent on stress placement. (For details see Fónagy-Magdics 1967; Varga 1983; 1984; Kiefer 1967; É. Kiss 1981; 1987; de Sivers 1965; Ladd 1983; Kálmán-Nádasdy 1995.)

The patterning within yes/no questions deserves special attention for at least two reasons. First, unlike many other languages, in Hungarian intonation is the unique marker of yes/no questions differentiating them from statements. Therefore, the formal aspects of intonation are crucial for listeners (see Gósy-Terken 1994). Second, Ladd (1981) used Hungarian yes/no question intonation as an argument in

favour of the Nuclear Tone Hypothesis, and against the Strong Universalist Hypothesis. The former claims that intonation is conventional and language-specific in character, while the latter claims that intonation has an innately specified character.

Yes/no questions in Hungarian show three, apparently distinct intonation patterns according to the number of syllables contained in a word constituting a question by itself as in (1).

(1) One-word questions



The basic pattern from which all the remaining forms can be derived seems to be a low-rise-fall movement appearing on the last three syllables in questions containing a single three-or-more syllable word as in (1a). The magnitude of the rise is about a musical third while that of the fall is a fourth. (Throughout the study bold capitals refer to stressed syllables). In disyllabic questions both the rise and the fall take place on the last syllable as in (1b). Finally, in monosyllabic questions only the rising part of the pattern is usually realized as in (1c), though a half-fall remains possible in the final part of the contour.

This fairly simple, basic distributional rule to be applied mechanically, becomes more complicated when the question contains more than one word. The intonation patterning of such questions becomes dependent upon the location of the sentence stress or the last primary stress which, in turn, is dependent on the topic-comment articulation of the question. To put it differently, intonation patterning in yes/no questions is intimately related to semantic focus. The rule is as follows: if the last stress group of the question is monosyllabic, it displays the contour of

monosyllabic questions regardless of the number of words and syllables contained in the previous part of the question as in (2a); if the last stress group is disyllabic, the pattern is that of bisyllabic questions as in (2b); finally, if in the last stress group there are three or more syllables, the intonation pattern is that of the corresponding one-word question as in (2c). Thus, for instance, a monosyllabic word at the end of a multi-word question can be realized in three different ways.

(2) Multiword questions

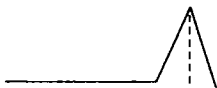
(a)



ISkolába jársz?
ISkolába is jársz?
ISkolába járnak?

‘Do you go to school?’
 ‘Do you go to school too?’
 ‘Do they go to school?’

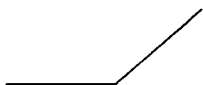
(b)



Iskolába **JÁR**nak?
 Iskolába **Ő** jár?

‘Do they *go* to school?’
 ‘Is it he who goes to school?’

(c)



Iskolába **JÁRSZ?**

‘Do you *go* to school?’

The above system implies, for the Hungarian child, that, in order to produce the appropriate prosodic shape, s/he has to learn the complex interplay of prosody, syntax and semantics. Therefore, the errors s/he makes on the way, constitute a major challenge to the linguist for they can tell how far the child’s grammatical knowledge actually extends.

3. The course of acquisition

3.1. Data analysis

Data processing both for stressing procedures and intonation patterning was based on my auditory observations as well as acoustic measurements made on F's regularly recorded spontaneous speech material. In addition, to evaluate stress patterns in the early period (until 1;7), I supplemented the data with a psychoacoustic judgement test constructed from F's recorded speech material and administered to 20 adult native listeners. The results of this test made it possible to relate perceived stress to the acoustic parameters of the signal on the one hand and to shed light on the stressing procedures adopted by the child, on the other hand.

3.2. Stressing procedures

For stressing procedures both my auditory analysis and the judgement test yielded the result that the child's errors may consist of either the number of stresses and/or their placement. The detailed picture is set out below.

One-word utterances. — In many instances one-word utterances display **more than one** stress and this does not agree with the stress rule of adult Hungarian assigning a single stress to the first syllable of a word. The solutions adopted by the child that deviate from standard Hungarian are as follows:

– There is **one** stress which can fall on any syllable; usually, however, it falls on the first or the last one. This variation can even be observed in different occurrences of the same word, like in *utCA/UTca* (1;7) 'street' *AtlÉta/atLÉta/atléTA* (1;7) 'athlete'.

– There are **two** stresses, one placed preferably on the first and one on the last syllable as in *BAbakoCSI* (1;8) 'baby carriage', *FELvetTE* (1;9) "on-put-he" 'he put it on'.

– There are **more than two** stresses as each syllable of the word has its own stress, e.g. *PINGVINEKET* (1;8) 'penguins-acc' *OLLÓVAL* (1;8) 'with scissors'.

These procedures are present simultaneously during the one-word period and are applied mainly in newly acquired words and in emotionally strongly marked requesting utterances. In later stages, however, as acquisition progresses, stress gradually stabilizes on the first syllable, which is its canonical place in Hungarian, and from among the deviating procedures only last syllable stress seems to persist throughout the period of this study, and even longer.

Final syllable stress in early child speech is quoted by Vértés O. (1955, 20), Meggyes (1971, 19) as well as Fónagy (1972, 33). The latter author also reports on multiple stresses assigned to single-word utterances (1972, 35–6).

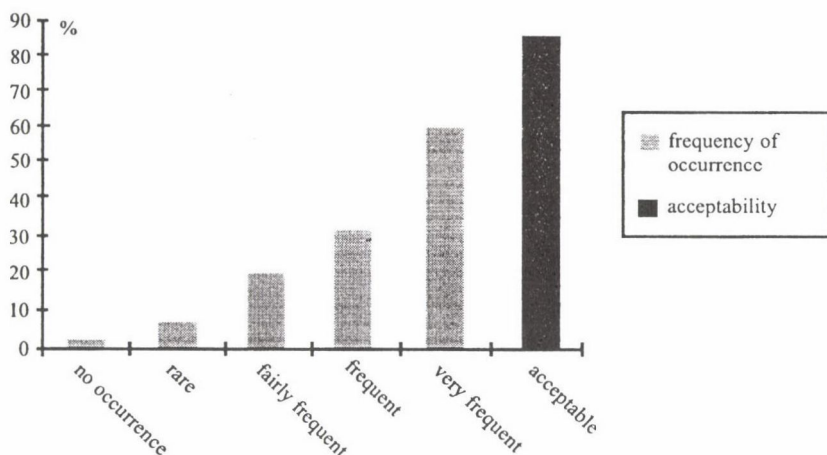
Crosslinguistic outlook: Researchers of other languages, while concentrating on "normal" features, mention in passing the same kinds of deviations, i.e. stress shift and/or multiple stressing. For English, Weir quotes two equal stresses on the

same word (1962, 38). Leopold mentions polysyllabic words with equal stresses on each of the constitutive syllables (1947, 24, 243). Allen and Hawkins also observed inaccurate stress placement in young children (1980). Klein noticed both stress shift and multiple stressing at the onset of the acquisition of stress in English (1984, 381). For German, Wode (1980, 337) and for Spanish, Hochberg (1988) report on such phenomena.

Two-word utterances. — As a general rule, stress can be assigned by the child to either of the constituents and even to all syllables of both constituents (see also Fónagy 1972, 42 and Dezső 1970, 86). The details are as follows:

– Both words are stressed in spite of the fact that, according to the communicative situation the sentence occurred in, only one of them—that expressing new information—should bear stress. In the child's production, however, both new and old information are given emphasis, e.g. *EZ PIros.* (2;4) "this red" 'This is red'.

EZ PIros.



The high percentage of both the 'very frequent' option and the 'acceptable' label is motivated by an occurrence of the same prosodic shape in the standard usage expressing incredulity: 'do you think seriously that it is red?'

– There is only one stress, as semantically justified, but it is misplaced: it is assigned to the word expressing old information, e.g. *ITT nincs.* (2;4) "here is-not" 'It isn't here'.

In both types an utterance-final extra stress can also occur, e.g. *MÁsik LÁbaMAT.* (2;7) "other leg-my-acc" 'My other leg', *Akkor KIvenNI* (2;4) "then out-take" 'Take it out then.'

Crosslinguistic outlook: Leopold (1949, 28) signals two stresses on the two constituents. Wieman (1976) excluded from her analysis those two-word utterances that had been identified by the listeners as bearing two equal stresses. This treatment gives indirect evidence for their being conceived of as “anomalous” output forms.

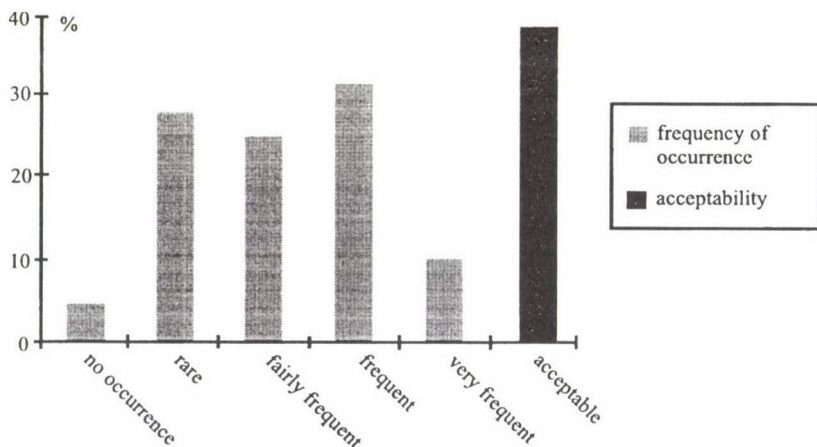
Multi-word utterances. — The variation is as follows:

– There are **more** stresses than required by the context (overstressing), e.g. *ITT VAN egy LYUK.* (2;7) “here is a hole” ‘There is a hole here’ instead of either *ITT van egy LYUK* or *Itt VAN egy LYUK.* The child seems to confound these two possible solutions. Further example: *Iderajzolak NEked VALamit.* (2;9) “here-draw-I to you something-acc” ‘I’m drawing you something here’.

– There are fewer stresses than required by the context, e.g. *GYEre Ide Lilike!* ‘Come here, Lilly’ where the utterance-final vocative should get stress.

– The number of stresses is **correct** but their placement is incorrect, e.g. *TE most idemész.* (2;7) “you now here-come” ‘You are coming here now’ instead of *Te most Idemész*; *EZ nagyon nehéz.* (2;6) “this very difficult” ‘This is very difficult’, instead of *Ez NAGYon nehéz.*

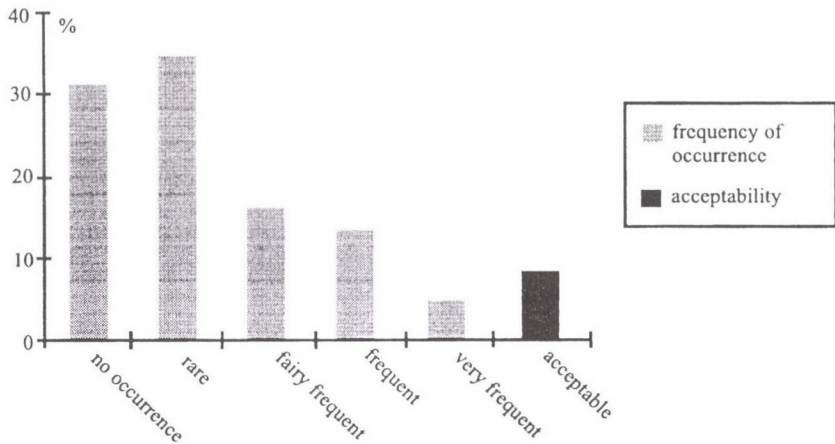
TE most idemész.



In all the multi-word utterance types it happens quite often that stress is assigned to definite and indefinite articles which, as is normal for clitic elements, do not receive any stress in adult language use, except for special contexts, e.g. curses or with the special meaning ‘uniqueness of reference’. An example: *NEM veszem a számba A láncot.* (2;6) “not put-I the mouth-my-into the necklace-acc” ‘I am not putting the

necklace in my mouth'. Another instance is the refutation of the partner's negative question by *de* 'intensified affirmation' which should, however, be stressless: [*NEM volt kicsi a kezed?* 'not was small the hand-your' 'Wasn't your hand small?'] *DE volt kicsi a kezem.* 'yes was small the hand-my' 'Yes, my hand was small' instead of the expected adult form: *De KICSi volt a kezem.*

DE volt kicsi a kezem.



Regarding stress quality, it is true for all the kinds of utterances I have discussed so far that if more than one stress is assigned to an utterance, the stresses may be equal or different in degree. In the latter case the strongest one could be interpreted as a sort of "primary stress".

By the end of the third year, with the exception of utterance-final stress which continues to flourish, particularly in Wh-questions starting with the primary stressed question word, deviations lose frequency in the child's speech and become occasional.

The question is then, what do these errors teach us about the child's competence?

In the one-word utterance stage, stressing of non-first syllables may be the consequence of the fact that the child has not yet discovered the rule concerning the place of word stress. As, however, shifting affects, in most cases, the last syllable, it is more likely that the child has already acquired the stress placement rule but this is overridden by some other factor, for instance an unconscious strategy to give the end of the utterance perceptual prominence. As to what is responsible for the presence of more than one stress per word and why some one-word utterances have as many stresses as they have syllables, one may perhaps forward the hypothesis that

the child correctly places stress but does not reliably know yet the extent of physical differences between stressed and unstressed syllables conventionally accepted by the members of the linguistic community, and thus fails to impose the proper linguistic constraints on the operation of the motor mechanism of syllable production as described by Stetson (1928/1951).

In utterances containing more than one word, the procedures adopted by the child may be assumed to reflect the following:

- Within the negative construction, the stressing of elements other than the negator reveals that the child is not yet aware of the rule that the stress of the negator deletes that of the element(s) in its scope.

- Stressing of both new and old information, or only the old information, can be seen as an illustration of the child's inability to properly decode the pragmatic roles from the linguistic and pragmatic context. This conclusion is well in accordance with research results on prosodic comprehension (cf. MacWhinney–Price 1980; MacWhinney–Pléh–Bates 1985; Holdgrafer–Campbell 1986; Cutler–Swinney 1987).

- A non-standard analysis of the syntactic and semantic scope of an element may also lead to deviant stress assignment, e.g. [*NEM* volt kicsi a kezed? ‘not was small the hand-your’ ‘Wasn't your hand small?'] *DE* volt kicsi a kezem. (2;7) ‘yes was small the hand-my’ ‘Yes, my hand was small’, where the child seems not to know the exact scope of the negation in the question addressed to her and thus answers with reference to the phonetic stress located on the negative particle, and not on the predicate it has scope over.

- She has not yet recognized that within phrases the leftmost constituent bears the stress for the entire phrase. Example: *Kicsi VAGY*. (2;4) ‘short are-you’ ‘You are short’ instead of *KI*c*si* *vagy*.

- Stressing of the articles, both definite and indefinite, suggests the child's intention to integrate the proclitic element with the following word by applying the canonical first-syllable stress rule.


Implication.—It is significant that within the corpus examined I found lexemes whose stressing was always standard. On closer examination it turned out that these lexemes are the ones which are either always stressed or never stressed in standard Hungarian (except in cases of contrastive stress). For instance, the negative particle *nem* ‘not’, when used non-contrastively, is always stressed by adults and it is by the child, too. On the other hand, the modifier *is* ‘too’ is always unstressed in adult speech and so it is in the child's utterances as well. We then hypothesize that the **less variation** there is in the stressability of a lexeme, the **shorter time** is required for the acquisition of its correct use. For those lexemes (nouns, verbs, adjectives, etc.) that can be both stressed and unstressed in the standard language depending on context, the following acquisitional trend might hold: **the more** the child gets **acquaint-**

ed with the syntactic and semantic roles of these elements, **the fewer errors** s/he makes in stressing them appropriately for the context.


3.3. Intonation patterning

In the one-word utterance stage emerging intonation serves to actualize abstract linguistic entities in different speech acts by signalling modalities (cf. Kassai 1988a; 1991). For yes/no questions, the basic distributional rule for the allotones described in section 2 seems to be acquired early and accurately, at least in F's individual case, for there are children, reported in personal communications, who fail to always realize the correct patterning. The point is that in multisyllabic one-word questions they produce the bisyllabic pattern, e. g.

(3)



 canonical pattern
 erroneous pattern



 K I a b á l ? "shouts-he" 'Is he shouting?'

as if they were uncertain as to the distributional criterion underlying the three allotones. These children are likely to hypothesize that somewhere at the end of a yes/no question there must be an intonational peak.

With respect to the two-word stage, Fónagy (1972) offers a "slow-motion film" about the genesis of a two-word declarative sentence as it emerges out of the gradual concatenation of two single-word utterances. The common characteristic of two-word declaratives is that their first word is always realized by a level contour while the second shows a falling contour. This intonation patterning seems to suit both the syntactic and semantic relations of the units well since the first element signals continuation while the second element warns us that the sentence is coming to an end. That is, intonation signals both modality and syntactic structure here.

In two-word and multiword yes/no intonation questions one can often detect intonational errors and these remain for quite a long time: it is customary to hear such errors in the speech of 6-year-old children. The most characteristic error consists of the child using an allotone, preferentially the bisyllabic one, which contradicts the topic-comment structure standardly signalled by one or several of the following factors: stress assignment, word order, nonverbal context. (For the developmental history of the different question types cf. Kassai 1987.)

Errors occurring in other sentence types are less “striking” to the ear as the sentence types themselves are less frequent.

The analysis of the erroneous utterances found in F’s corpus reveals, similarly to stress patterning, regularities in the seemingly chaotic data. Let us quote a few of them.

The holistic contours in (4a) and (4b) show the fact that the child has yet to identify the utterance-final vocatives and the utterance-initial interjections as separate constituents requiring, in the standard, an independent contour (post- and precontour, respectively).

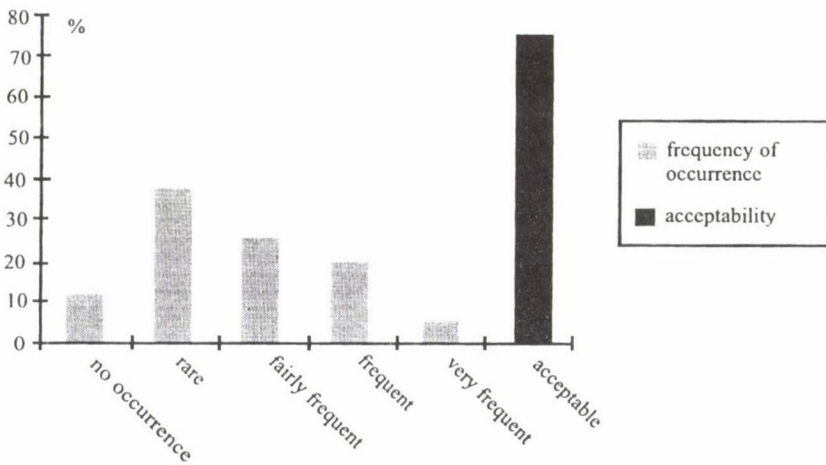
(4) (a)



MEGittad Mama? (2;4) “drank-you Mommy”

‘Did you drink it, Mommy?’ (The standard would be: **MEGittad**, **MA**ma?)

MEGittad Mama?



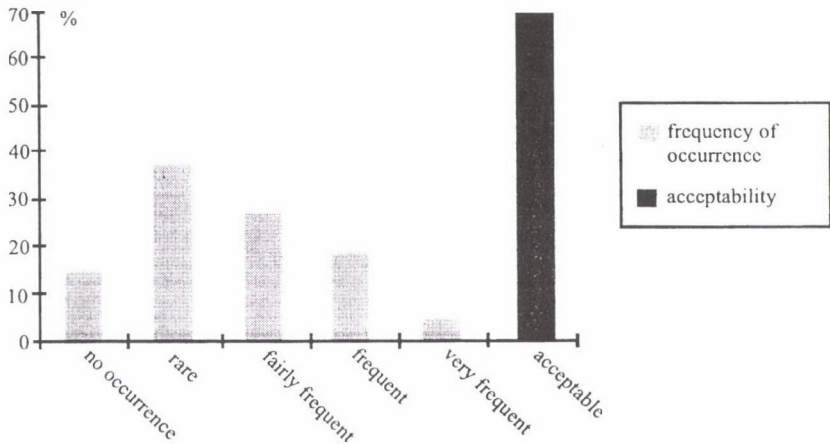
(b)



JAJ kiesett a pénz! (2;8) “oh no fell-out the money”

‘Oh, no, the money fell out!’ (The standard would be: **JAJ**, **KI**esett a **PÉN**Z!)

JAJ kiesett a pénz!



Questions in (5a), (5b) and (5c) illustrate the overgeneralization of a specific contour to different question types, regardless of their structure and function. (5a) is intended to be a repetitive question, which, normally, has the intonation pattern of yes/no questions, (5b) is an indirect question, in which the last primary stress falls on the matrix verb, which should start the intonation pattern of the yes/no question, with a peak on *szed*, and (5c) is a yes/no question with an utterance-initial tag, which, exceptionally, does not show the normal yes/no intonational pattern. This intonational over-generalization points to the fact that the specific contours of those questions are not available, probably due to the fact that the question functions themselves or these question forms are not psychologically real yet for the child.

(5) (a)



HOL is van a szatyor?
 “where again is the bag”
 ‘Where is the bag again?’



HOL is van? (2;4)
 “where again is”
 ‘Where is it?’

(b)



LE kell **SZED**ni.
 “down must take”
 ‘We have to take it down.’



TUdod?
 “know-you”



TUdod, (hogy) le kell szedni? (2;9)
 “know-you down must take”

‘You know? You know (that) we have to take it down?’

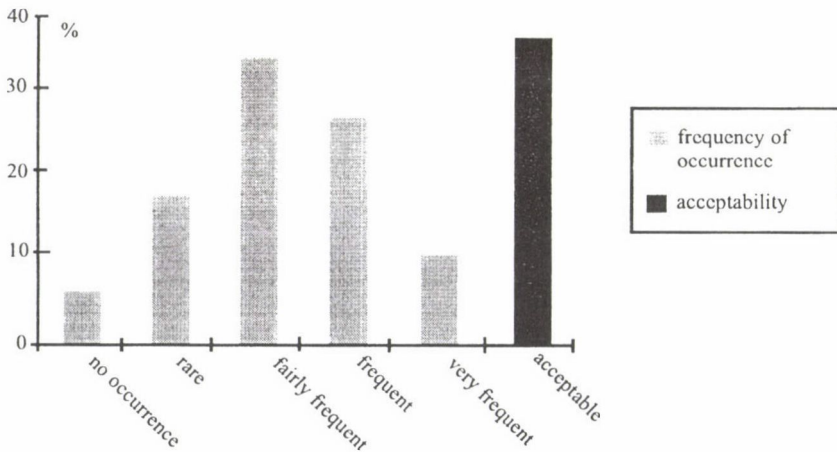
(c)



Ugye be kell csukni? (2;9) “isn’t-it-so perf. must close”
 ‘We have to close it, don’t we?’

(The standard would be: Ugye, **BE** kell **CSUK**ni.)

Ugye, be kell csukni?



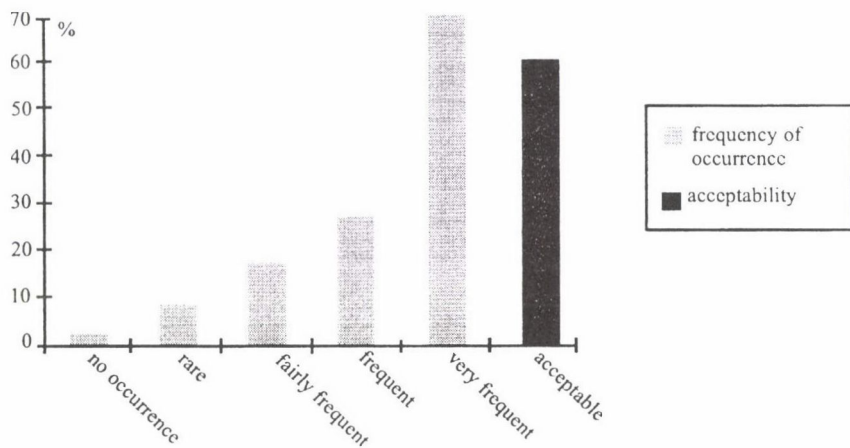
The example in (6) shows an attempt by the child to build up a subordinate question but she simply puts words together without adjusting them prosodically. The result is the repetition of the preceding direct question.

(6)



Ez **MI**? “this what” Tudod ez **MI**? “you know this what” (2;9)
 ‘What is this?’ ‘Do you know what this is?’
 (The standard would be: **TU**dod ez mi?)

Ez MI? Tudod ez MI?



The first question in (7) is likely to be the outcome of the nonstandard analysis of the syntactic and semantic function of the second element which, as a modifier, cannot receive any stress when not occurring on its own. The intonation error is then the consequence of misplaced stress. As, however, the second item represents self-correction, here the deviation is more an error of performance than that of competence.

(7)



Kérsz **MÉG**? Még **KÉRSZ**? (2;7)
 “want-you yet” “yet want-you”
 ‘Do you want some more?’

In (8a) and (8b) we guess we witness the conflict between stress placement and intonation peak, the latter being located by the child in function of the syllable number of the last **word** instead of the last **stress group** as is required in standard usage.

(8) (a)



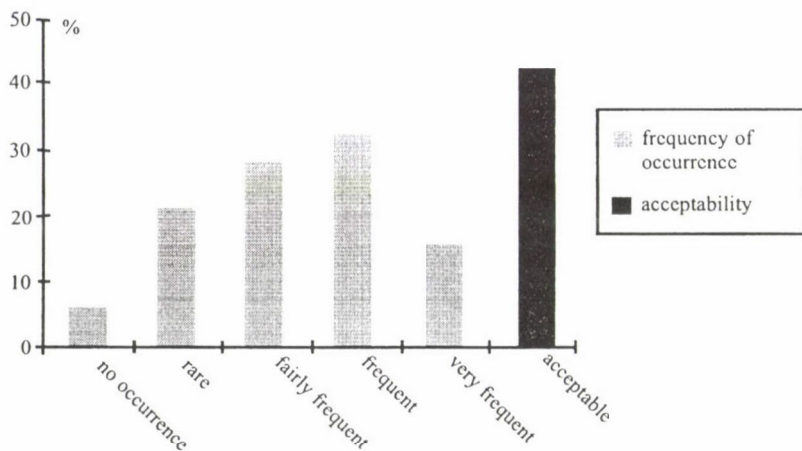
VARRSZ neki ruhát? (2;8)
 "sew-you to-him dress"
 'Are you sewing her a dress?'

(b)



NEM kérsz? (2;8)
 "not want-you"
 'Don't you want any more?'

VARRSZ neki ruhát?



In the case of (8b), however, an alternative explanation is offered by the operating principle formulated by Slobin for operators: "If a functor operates on a whole structure (phrase or clause), try to place it external to that structure, leaving the structure itself unchanged" (1985, 1240). By virtue of this principle the prosodic shape of the utterance might be taken as correct from the child's point of view.

The examples in (9) illustrate again performance errors coming, as evidenced by the last, self-corrected item, from the perseveration of the preceding contour in (9a) and from the late addition of the last element in (9b) which results in the lack of its integration into the F₀-contour.

(9) (a)



Ez **HOGY** van?
 “this how is?”
 ‘How is this?’



JÓ ez?
 “okay this”
 ‘Is this okey?’



JÓ ez? (2;4)
 “okay this”
 ‘Is this okey?’

(b)



NAniéz? (2;8)
 “Nani’s this” ‘Is this Nani’s?’

Lastly, (10) and (11) provide us with two of the enigmatic instances of the corpus that remain ambiguous for the interlocutor.

(10)



AZT mondta?
 “that said-he”

The actual realization mixes two equally possible readings. Its stressing leads to the meaning ‘Is that what he said?’ while its bisyllabic intonation pattern infers the meaning ‘Did he **SAY** that?’

(11)



TE vezetni fogsz?
 “you drive will”



(a) **TE** fogsz vezetni? “you will drive”
 ‘Are **YOU** going to drive?’



(b) Te **VE**zetni fogsz? “you drive will”
 ‘Are you going to **DRIVE**?’

In (11) one cannot determine whether the child assigned the stress properly but failed to apply the appropriate word order rule which requires the focus to be obligatorily followed by the unstressed verb as in (a), or whether she properly realized the intonation pattern called for by the intended stressed verb, but at the same time misplaced the stress.

Besides the instances discussed where intonation and stress deviations can be motivated in one way or another, there are utterances in which deviations are not readily explainable. To quote just one instance: *VAN zsebkendő? VAN?* (2;4) "is handkerchief is" "Is there a handkerchief? Is there one?" where the focus of the first question is evidenced by the second question and the syllable number of the second word cannot justify its bisyllabic pattern.

Anyway, whatever the trigger of the deviant forms, it often happens that the child corrects herself within the same discourse turn and produces either the appropriate prosodic solution as demonstrated in (9a) or the syntactic solution brought about by a word order change required by the prosodic shape as in (7). This procedure of self-correction suggests that prosodic development applies the same trial-and-error principle that operates in the acquisition of other layers of language. Of course, trial-and-error is considered here in the sense of proprioceptive stimulation, meaning that children are actively engaged in monitoring what they say and go through a process of matching their performance both with adult targets and with those structures and rules they have internalized in order to generate more developed utterances (cf. also Rogers 1978). Curiously enough, it also happens that the correct realization is followed by an erroneous one. This gives rise to the speculation that the child knows quite well the normative patterning but some more appealing or constraining moment of the discourse takes her out of her way or that this is another example of trial-and-error, namely "trying out two intonation patterns" to see which one 'sounds' better for the context.

4. Conclusion

The co-occurrence of correct and erroneous forms illustrates quite well that the Hungarian child under 3;0 is in the process of learning the complex rule-system governing the prosodic articulation on the one hand and the topic-comment articulation on the other hand. A close analysis of prosodic errors reveals that stress assignment and intonation patterning do not go hand in hand yet in the child's competence, rather they act separately, and both "suffer" from the child's shortcomings in adequately segmenting the surrounding reality. However, self-corrections and the marked tendency common to most erroneous items to make the last syllable prominent, either by

assigning an extra stress to it or by shifting the intonation peak to it, leads one to assume an unconscious endeavour on the part of the child to ensure continuity in discourse, in other words, to realize the universal pattern of climax (Bolinger 1978). On reflection, then, underlyingly we could assume competing strategies.

In the learning process, as yes/no question intonation exemplifies, overgeneralization seems to be a powerful principle since it operates both in formal and functional domains. In formal aspects, from among the three allotones the child overgeneralizes that pattern (bisyllabic) which does not differ markedly from the basic (trisyllabic) one, so it is readily recognizable and, at the same time, with its final syllable peak it is able to fulfil interactional (attention getting) requirements. This strategy could be conceived of as a predictable reduction in output variety. However, F's choice contradicts the operating principle that claims that a basic form is learned first before possible variation(s). In the domain of functions, F extends the yes/no intonation to questions of other types thus letting the principle claiming that meaning is more important than form prevail. At the base of the child's prosodic behaviour lies the remarkable diversity both formally (three allotones) and functionally (direct, indirect, repetitive and echo questions) of the adult language. In other words, the complexity of the system makes learning far more difficult.

If we want to evaluate the presented errors in terms of whether they are categorical or variable (Ochs' classification, see above) a first approximation suggests that stressing errors are rather variable while intonation errors are better considered categorical. To mention just two instances: soliciting, accusing adult Wh-questions have a strong stress on their last syllable with an F_0 difference of a musical third (cf. Fónagy–Magdics 1967) and this realization is strongly stigmatized; stressed articles do, however, occur only in special contexts (see above).

In sum, we may conclude that deviations in the child's stress assignment and intonation patterning are, in the majority of cases, readily explainable by syntactic, semantic, pragmatic and, possibly, other factors, and thus may be shown to be necessary, rather than random, phenomena of prosodic development.

Returning to the starting point, i.e. the dilemma whether prosody guides children in acquiring syntax or, just the opposite, syntax facilitates the acquisition of prosody: the limited evidence I have presented suggests that the process goes both ways, with prosody, however, having some priority over syntax.

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EARLY MORPHOLOGY OF SPATIAL EXPRESSIONS IN HUNGARIAN CHILDREN: A CHILDES STUDY*

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Abstract

The paper reports detailed analyses on five children code named in CHILDES as AND, GYU, ZOLI, MON and EVA. These are the only Hungarian observational data available in CHILDES up to now. They were collected by Brian MacWhinney. Altogether 15 samples of spontaneous speech between 1;5 and 2;9, representing 12.609 utterances were analysed, with an emphasis on locative expressions both on verbs and NPs. Concerning all spatial expressions, the well known tripartite division between static, goal dynamic and source dynamic was analysed, also differentiating between container and surface relations. There were 612 locatively marked NPs, most of them nouns but about 10% pronouns. Of all the space case markings two thirds were INSIDE, i.e., container relationships, 19 per cent SURFACE (or SUPPORT) and 12% BY relations. 80% of all markings were GOAL, 13% being STATIVE and 7 per cent only SOURCE. With CONTAINER relations the dominance of GOAL was much more expressed. CONTAINER as a cognitive category had more explanatory value (40%) for IN relationships than SURFACE for ON. GOAL relations with ON had much fewer SURFACE background. The paper also discusses some possible causes for the preferred usage and gives some speculations on the temporal unfolding of the system.

1. Background

The study of early use of spatial expressions has been quite central in studying language and cognition issues crosslinguistically. Both experimental studies (Johnston-Slobin 1978) and analysis of longitudinal data (Choi-Bowerman 1991; Sinha-Thorseng-Hayashi-Plunkett 1994) have recently been used to analyse issues like the role of universal cognitive development and language specific formal factors in the unfolding of the system.

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Our study is a pilot research using available recorded observational data on Hungarian children. MacWhinney (1976), summarizing earlier diary data and some of his observational files, presented a detailed picture of the emergence of locative expressions. His most interesting observation relates to the fact that in early usage there is a dominance of container relations, and 'from' type expressions are rather rare. He also made an interesting general observation: "Hungarian inflections differ little in terms of formal complexity. Thus, differences in their emergence can be attributed to semantic-pragmatic factors" (MacWhinney 1976, 409). This observation was the starting point for our analysis.

2. Methods

This study reports analyses on five children code named in CHILDES as AND, GYU, ZOLI, MON, EVA which are the only Hungarian observational data available in CHILDES up to now (MacWhinney 1995). Table 1 shows the age ranges of the samples we have used and the number of child utterances in each sample. The first two children are boys while the three others are girls.

Table 1
Some descriptive characteristics of the samples used

Child	Samples number of utterances (age)	All
ZOLI	15 (1;5), 1916 (1;8), 993 (1;10), 652 (2;0), 1417 (2;2)	4993
GYURI	1397 (2;3)	1397
ANDI	944 (2;1), 32 (2;8)	976
ÉVA	956 (2;7), 1482 (2;9), 2078 (2;9)	4516
MÓNI	85 (1;11), 119 (2;2), 101 (2;4), 422 (2;5)	727

Altogether 15 samples of spontaneous speech between 1;5 and 2;9 representing 12.609 utterances will be analysed with an emphasis on locative expressions both on verbs and in NPs. All the samples come from child-adult interaction in a nursery setting where sometimes other children than the target child also participated in the conversation. It is worth emphasizing that the child-adult interactions were mainly recorded between Brian MacWhinney and the target child. MacWhinney

was a visiting 'stranger' and at the same time a non-native speaker of the language. These two factors might have had a role in the relatively sophisticated language used by the children: talking to such a 'strange fellow' they had to give their best, using a more explicit language than usual.

Due to the limited age range, only a few simple questions could be raised and actual developmental trends could hardly be raised regarding the development of spatial expressions. We will concentrate more on the relative distribution of the various spatial expressions than on the acquisition patterns.

Our analysis concentrates on some basic issues:

(i) What is the relationship in the acquisition of Hungarian between the directionally dimensional system and the CONTAINER–SURFACE distinction? Are there any preferred spatial relationships that seem to appear earlier? Is there a relation between object prototypicality and use of cases?

(ii) How does acquisition of spatial case-marking relate to the unfolding of the entire nominal paradigm, i.e. how productive are early uses?

(iii) What is the relationship between the different systems used to code spatial reference in Hungarian, including the verbal prefix system, the case markers in the nominal paradigm, the postpositional system, and the adverbials?

3. The language of space in Hungarian

Two marking systems are used with noun phrases. Simple types of relations are expressed by agglutinated case suffixes (IN, ON, AT) while postpositions are used to code cognitively more complex relations (UNDER, AMONG, BEHIND, etc.). This system is multiplied by three for each relationship by taking into consideration the dynamic aspects of coding of the location and the path. There is a static LOCATIVE for each relationship, and two DYNAMIC forms: one where the coded location, i.e. the reference object (Jackendoff 1987), is the GOAL (the end of the path), and one where it is the SOURCE (the starting point of the path). Multiplied with the container, surface and neighborhood relationships, this results in a completely symmetrical two-dimensional system for spatial case markers as presented in Table 2. The table gives the allomorphs that are related to vowel harmony. For the postpositions there is a similar system but we do not present the details here.

Table 2
The two-dimensional system of Hungarian locative case markers

Relationship	Static	Goal	Source
Container IN	-ban/-ben	-ba/-be	-ból/-ből
Surface ON	-n	-ra/-re	-ról/-ről
Neighbourhood AT	-nál/-nél	-hoz/-hez/-höz, -ig	-től/-től

There is also an elaborate dimensional verb prefix system that supplements the use of nominal spatial expressions. Thus, as we shall see in connection with the results in Hungarian, a coordination has to be learned between the directionality of the prefix and the case marker. Directional prefixes cannot be combined with static case markers. Things like **bemegy a házban* 'in-goes the house-inessive' are excluded. There are also some preferential issues in the combination of prefixes with case markers: directional expressions where the prefix and the case marker code the same point of the path seem to be simpler. Thus *Bemegy a házba* 'in-goes the house-in' feels to be simpler than *Bemegy a házból* 'in-goes the house-from' where in the latter case two points are coded along the path.

4. Overall distribution of usage

Table 3 shows the overall distribution of all spatial case markers used by the children, both in absolute numbers and in row percentages (in brackets).

Table 3
Overall distribution of all the spatial case markers used by the children.
The numbers in parentheses are row percents, and in the last column total percentages

Relationship	Static	Goal	Source	All
IN	29 (9)	355 (86)	19 (5)	413 (68)
ON	27 (23)	86 (72)	6 (5)	119 (19)
AT	11 (14)	48 (60)	21 (26)	80 (13)
TOTAL	77 (13)	489 (80)	46 (7)	612

It is certainly of relevance concerning the relative cognitive and linguistic difficulty of case markers and postpositions in Hungarian that in the entire material only eight occurrences of postpositions were found compared to 612 case markers. In the following discussion we will only deal with the case markers. It is interesting to note that in a cross-linguistic study by Johnston and Slobin (1978) in English and Italian children UNDER belonged to the same cluster (which was the first to be acquired) as IN and ON. It seems to be the case that in spontaneous usage for Hungarian children case marking is easier to handle than postpositions are. In an elicited production task, however, UNDER seems to be the easiest postposition that is handled by Hungarian children already at 3 (Pléh 1994).

Spatial case marking occurred 612 times out of 12.609 utterances which means that about 5% of all utterances had locative noun phrases. A two-way analysis of variance used the repeated measures of the type of relationship and directionality. Both factors proved to be significant even with this small number of subjects. The locative relation type produced an $F(2,8)$ value of 5.02 ($p < 0.05$) while directionality had an F value of 4.94 ($p < 0.05$). The interaction $F(4,16)$ value was 5.03 ($p < 0.0081$). The effects indicate that, on the level of performance, children even at an early age have clear preferences concerning which relationships to code in a language where a quite sophisticated system is at their disposal. This is relevant to the language and cognition issue because in Hungarian the linguistic complexity of the nine spatial case markers is the same (while in English, for example, the dynamic relations require elaborated constructions like *out of*, *from over*, etc.).

Of all the spatial case markings, two-thirds were CONTAINER relationships. That is the basic meaning of the main effect. At the same time ON relations were more frequent than AT relations, the first occurring 19%, the second 13% of the time. If we compare the columns in Table 3, 80% of all markings were GOAL, 13% were STATIC and only 7% were SOURCE. Thus, the directionality main effect basically shows an overwhelming preference for coding the GOALS of intentional action.

Similar data on Danish and English children as reported by Sinha-Thorseng-Hayashi-Plunkett (1994) indicated that AT relations were relatively late to show up among the particles. However, in their study there was no clear preference for container over support and surface type of relations. Of course their study did not look for performance statistics. They were looking for reliable usage as a sign of acquisition and for temporal priority relations. As the authors also noted, an important factor might be the multiplicity of meanings. In the spatial domain IN type suffixes in Hungarian seem to have a more straightforward CONTAINER meaning while ON suffixes have many more meanings including, in the directional GOAL version, horizontal as well as vertical movement. This ambiguity might also be a reason for the

relatively fewer SURFACE markings. It is interesting to note that static ON relations are basically as frequent as static IN. That is related to the meaning ambiguity: static ON is clearly surface while the GOAL ON has the multiplicity problem just noted. Whether you go “back, forth, here, there, left, or right”, the locative constructions in Hungarian all carry the superessive suffix *-ra*.

Concerning the trajectorial preference (the overwhelming dominance of GOAL coding) it is remarkable to note that while the trajectorial problem has a central role in semantic discussions concerning spatial expressions (see Jackendoff 1987; 1992; 1994; Landau 1994; Landau–Jackendoff 1993) the available data do not tell us too much even about children’s differential usage of GOAL and STATIC relations. Sinha *et al.* (1994) remark that, in their English observational data, they were unable to code for goal–static differences say in the use of IN, and the GOAL over SOURCE difference in most of the languages studied could be due to the more complex expressions. In Hungarian all these markers are of a similar linguistic complexity and are already in the active repertoire of the children. However, the postulated universal goal directedness of human thought comes across very clearly. Thus we think that the distribution of GOAL and SOURCE reflects a cognitive preference towards coding GOALS rather than the SOURCES of intentional action. But the nature of this language allows us to see more clearly what is less transparent in the acquisition of other languages because their SOURCE codings are more periphrastic and complicated in their form as well. Here the forms are simple but they still hardly appear. This is true not only in child language performance but also in aspects of structure. In Hungarian (Kálmán 1996) goals are more available for incorporation and goal adverbials are the predominant sources of locative prefixes.

Though goal was the most frequently used perspective with all relationships, its proportion was not the same all over. The dominance of the GOAL form was most striking with IN relations. This might be related to the fact that in spoken Hungarian there is strong tendency to reduce *-ban* to *-ba* and *-ben* to *-be*. This is not only a phonetic issue, however. E.g. *-on* does not undergo this change. Probably there is a strong tendency to neutralize the GOAL–STATIC distinction in the case of containers (about this, see Pléh 1995). This implies that several of the uses of *-ba* might be what in normative grammar would be *-ban* forms, i.e. forms with inessive meaning. In the case of AT relations, the relative frequency of SOURCES slightly increased. This might be related to the fact that this suffix rather frequently appeared as a verb argument in constructions like ‘afraid of’. That is to say, the most frequent tokens of this particle were not spatial but rather mental.

In general, children made few mistakes and those were mainly with the most complex coordinated constructions where a prefix–verb–suffix combination is used.

5. How productively does the usage fit into the nominal paradigm?

A rather reasonable question is whether these forms were unanalysed rote units or were productively computed. One indicator for this might be how frequently they show up following other morphemes. The general structure of Hungarian nouns in this respect is Stem–Derivational Suffix–Personal-Plural Marker–Person Marker–Possession Marker. Of course we do not expect the entire paradigm to show up. We made a search for all the forms where the spatial case marker was preceded by a suffix. 65 occurrences were found out of the 612 relevant cases. There were two occasions of simple plurals, but the rest were possessively marked forms as Table 4 shows.

Table 4

Distribution of possessively marked forms preceding the spatial case markers

Person	Singular	Plural
1st	39	2
2nd	10	0
3rd	12	0

It seems that possessive marking that is pragmatically very clearly motivated (*in my pocket, in your mouth, in my hand, etc.*) provides an inroad for the child to the agglutinative paradigm. Most of the suffixed forms are body parts and pieces of clothing that might have been acquired as units. There is a strong preference for ego-involved constructions, second and third persons being much rarer. Most probably, the agglutinative system is not an all or none question for the Hungarian child but develops gradually. Possession marking seems to be motivated by clear psychological factors and might be a starting point in this process. It is noteworthy that simple plurals and plural possessions never appeared in combination with spatial case-markers. It is also important that no ordering mistakes were observed.

The issue of **vowel harmony** is worth mentioning in relation to this productivity question. With the IN relations no vowel harmony mistake appeared. With the ON relations there is a four-way alternation (*-on/en/ön/n*) but still no mistakes were observed here, either. With the most difficult AT relations there were two mistakes. One of them was **Bélusnél*. The child here seems to harmonize the suffix with the first syllable. Another mistake was **Moncsitől*. But there was a correct form,

Moncsitól as well from the same child. Here again what we have is a mixed form and the child makes the suffix harmonize either with the first or with the second syllable.

6. Some possible prototype effects

There are several remarks and data in the literature to the effect that the types of objects could somehow be connected to the acquisition of spatial expressions. Starting with the work of Eve Clark (1973), several studies have been concerned with the issue of whether the understanding of spatial expressions starts from a pair of non-linguistic hypotheses, the first one having precedence over the other.

Rule 1: If the object is a container, place the object inside it.

Rule 2: If the object has a horizontal surface, place the object on it.

To explore this, we performed a pilot study on object types, orientation and production. Anna Borgos (1994), a student of ours, investigated in nursery children the use of case markers and paraphrases for static relations. Prototypical surface and container reference objects (*table, cup*) as well as non-prototypical ones (*closet, book*) were used. She found that more simple case markers without object part reference were used with prototypical reference objects. Thus constructions like *On the table* and *On the top of the cup* were characteristic solutions to describe two arrays. There was a difference favouring containers over surfaces here as well. The largest difference (between 33 and 60% of simple case markers) was between non-prototypical surfaces and prototypical containers.

Tilting and other non-usual perspectives – similarly interventions as in the understanding studies by Sinha (1983) – resulted in more paraphrases for surfaces but had no impact on container expressions. Thus children never had trouble to describe the content of a tilted mug as being IN, but they would say things for a tilted surface like *The cube is on the bottom of the table*. All of this is trivial enough. It only shows how early on children can use sensitively the rich system provided by their language. By sensitive we mean how productively they use the options of the language system to their cognitive preferences.

We tried to look for similar preference relations in our CHILDES material. For the IN and ON type suffixes we tried to make a content analysis about the nouns deciding in the first case whether they were prototypical containers and in the second case whether they were prototypical surfaces. AS CONTAINERS the following types of things were counted: mouth, hand, pocket, room, bed. AS SURFACES things

like earth, floor, table were counted. As Table 5 shows, there was a much stronger alliance between CONTAINERS and IN suffixes than between SURFACES and ON suffixes. Of course, these differences in usage are not child specific factors: they most probably show up in adult performance, too.

Table 5
Percentage of prototypical containers (with IN relations)
and surfaces (with ON relations) compared to the overall number in the given cell

Relationship	Static	Goal	Source
IN	41	45	21
ON	41	10	0

In IN types of suffixes there is quite an elevated percentage of container specific usage. In the case of ON types of suffixes this is rather different. One should not have expected too much here, however, since dynamic ON goes as an argument with movement verbs of all directions (UP, DOWN, ACROSS etc.) that certainly do not imply surface. In the case of STATIC ON relations 41% was with a typical surface that shows that there is some extent of pragmatic motivation here but to a much lesser extent than with the container relations.

7. Relationships between predicates and case markers

There are several aspects involved in the relationship between predication and case marking. One is the general elaboration of the space coding on the verb, by the prefix, and on the noun phrase. Stated roughly:

- a directional movement verb requires a GOAL or a SOURCE case and excludes a STATIC one;
- a directional prefix usually agrees in direction with the case marker;
- a path can be coded both by the prefix and by the nominal case.

This is made more complicated by the use of some of the prefixes as adverb-like free forms and also by the fact that adverbs appear together with prefixes or even case markers. An extreme case would be *Bemegy oda a házba* 'IN-goes there the house-IN' "She goes into the house".

Table 6 shows the general distribution of the various combinations with the nine cells for the IN relations; Tables 7 and 8 present corresponding figures for ON and AT relations, respectively. The most frequent combination type is Case + Verb but the prefixed version comes close to it.

Table 6
Combined spatial constructions with IN relations

Spatial Structures	Static	Goal	Source
Case	6	145	10
Case + Verb	14	119	3
Case + Pref + Verb	2	81	6
Adv + V + Case	7	10	0

Table 7
Combined spatial constructions with ON relations

Spatial Structures	Static	Goal	Source
Case	2	42	0
Case + Verb	15	23	4
Case + Pref + Verb	4	19	3
Adv + V + Case	6	2	0

Table 8
Combined spatial constructions with AT relations

Spatial Structures	Static	Goal	Source
Case	7	31	19
Case + Verb	2	13	0
Case + Pref + Verb	0	3	2
Adv + V + Case	2	1	0

8. Some speculations on possible developmental patterns

Our children were well beyond the first stages of using spatial expressions. We still would like to suggest, as a conclusion, some speculations about possible developmental sequences in Hungarian spatial language

Our suggestion is that the sequence of acquisition is:

- (1) general adverbial use of particles (that later become prefixes and case markers) like *be* 'in', *fel* 'up'
- (2) use of case markers on nouns

Our subjects are well over these stages though the isolated case-marked noun is still very frequent.

- (3) the verb + case and prefix (or adverb) + case combinations as basic ones used for coding spatial relations
- (4) prefix + verb + case combinations

Our subjects are in transition into this later phase. It seems that the data also indicate two rather interesting aspects of the acquisition of spatial terminology. First, they clearly show a strong preference for coding goals and containers even when it seems to be the case that the child has already mastered the other spatial markers. Second, they also indicate that the well-motivated possessive marking in Hungarian might be a clue for the child to discover the productive rules of agglutination.

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MOTIVATIONAL FACTORS IN SECOND LANGUAGE ATTAINMENT: A REVIEW OF RESEARCH IN HUNGARY

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Abstract

This paper summarizes research conducted in Hungary on motivation to learn a second language (L2). First a brief historical overview of L2 motivation research is provided and a current shift in research direction is discussed. Afterwards, three models of motivation suggested by the author and his associates are presented, the last and most detailed one encompassing, by intention, all the major factors contributing to L2 motivation. The paper concludes by a description of potential directions of further studies; it is hoped that such research will bring together two research orientations which have been rather independent in the past: linguistics-based and psychology-based approaches to the study of L2 acquisition.

One direction in the psycholinguistic inquiry into second language (L2) attainment is to examine the psychological variables that significantly affect the process and outcome of language learning. One of the most important variables in this category is the motivation to learn a second language. L2 motivation provides the primary impetus to initiate the learning behaviour and later the driving force to sustain the long and often tedious learning process; that is, all the other factors involved in L2 acquisition presuppose motivation to some extent and, indeed, motivation is usually mentioned in explaining any L2 learning success or failure.

This paper summarizes the results of a series of motivation studies conducted among learners of English in Hungary, partly in cooperation with Canadian social psychologists. The period during which the data collection took place was between 1987-1990, that is, before the major political changes in Hungary. The introduction of a multiparty democracy in the country had important consequences on Hungarian foreign language education because in the 1989/90 academic year Russian ceased to be the compulsory first foreign language taught in Hungarian schools. However, the motivational patterns reported in this paper are assumed to have maintained their validity in the present context as well, as they are believed to reflect a general motivational construct typical of learning foreign languages as a school subject in European learning environments. The Hungarian research pro-

gramme has been part of a major shift in the conceptualisation of L2 motivation in the field of second language acquisition, and resulted in a comprehensive new theoretical model put forward by the author (Dörnyei 1994a).

1. Historical background of L2 motivation research

The study of motivation in L2 acquisition became a distinguished research topic after Gardner and Lambert (1972) published a comprehensive summary of the results of motivation studies conducted for over a decade (see Dörnyei 1987, for more details). The theory Gardner and his associates presented grounded motivation research in a social psychological framework (for summaries, see Gardner 1985; Gardner–Clément 1990; Gardner–MacIntyre 1993) and the Canadian researchers also established scientific research procedures and introduced standardised assessment techniques and instruments, thereby bringing L2 motivation research to maturity. The main Canadian finding was that success in language attainment was dependent on the learner’s affective predisposition toward the target linguistic-cultural group, thus adding a social dimension to the study of motivation to learn a L2. By combining motivation theory with a social psychological approach and the established practice of attitude measurement, the model of L2 motivation Gardner and Lambert (1972) developed was more elaborate and advanced than many contemporary mainstream psychological models of motivation in that it was empirically testable and did indeed explain a considerable amount of variance in student motivation and achievement.

Gardner and his associates conceptualised L2 motivation as the interplay of two components, **integrative** and **instrumental motivations**. The former is associated with a positive disposition toward the L2 group and the desire to interact with and even become similar to valued members of that community. It includes components such as “interest in foreign languages”, “desire to learn the target language”, “attitudes towards learning the target language”, “attitude toward the target language community”, and “attitude toward the learning situation” (Gardner 1985; for a critical analysis, see Dörnyei 1994b). Instrumental motivation is related to the potential pragmatic gains of L2 proficiency, such as getting a better job or a higher salary. Although this dichotomy was later abandoned because research showed that these two major motivational components were not antagonistic counterparts but were often positively related, and were, in fact, not even the only components of L2 motivation, it prevailed in the L2 literature rather consistently.

The first half of the 1990’s brought along a marked shift in thought on L2 motivation as researchers tried to reopen the research agenda in order to shed new light

on the subject (e.g., Brown 1990; 1994; Clément–Dörnyei–Noels 1994; Crookes–Schmidt 1991; Dörnyei 1994a; 1994b; Oxford–Shearin 1994; Skchan 1991). The main drive behind the reform attempts was twofold. Firstly, researchers were calling for a more pragmatic, education-centred approach to motivation research which would be consistent with the perceptions of practising teachers and which would be more readily applicable in a wide range of contexts. Secondly, Gardner and his associates' theory was founded in the 1970's whereas the last fifteen years have brought along a major change in mainstream psychological theories of motivation with cognitive approaches becoming dominant, and it was felt that this shift could and should be reflected in L2 motivation theories as well.

2. The dimensions of L2 motivation

The change of research direction does not mean that the social dimension of L2 motivation should be played down. Ethnolinguistic attitudes have always played a salient role in Central Europe (resulting in numerous ethnic conflicts), and therefore I have never questioned the relevance of a social psychological approach to understanding L2 motives. The fact that most nations in the world are multicultural and the majority of people in the world speak at least one second language, underscores the importance of the social dimension of L2 motivation. What I believe, however, is that this social dimension is not the only major constituent of L2 motivation: indeed, from an educational perspective, it may not even be the most important one. Motivation to learn a second language is a complex and eclectic psychological construct which involves several non-social factors as well. This is not surprising if we consider the following:

- (1) Motivation theories in general attempt to explain the fundamental question of why humans behave as they do, and therefore we cannot assume any simple and straightforward answer; in fact, every different psychological perspective of human behaviour will come up with a different theory of motivation, thus in general psychology it is not the lack but rather the abundance of motivation theories which confuses the scene.
- (2) Motivation to learn a L2 presents a unique situation even within motivational psychology due to the multifaceted nature and role of language. Language is at the same time: (a) a **communication coding system** that can be taught as a school subject, (b) an **integral part of the individual's identity** involved in almost all mental activities (just think of sentences like "This doesn't sound

like me”), and also (c) the most important **channel of social organisation** embedded in the culture of the community where it is used. Thus, if language serves all these purposes, then L2 motivation will also contain—besides the social dimension—an educational and a personal dimension. The main direction of recent research on motivation can be characterised by shifting the focus from the social dimension to these latter dimensions.

3. A summary of research in Hungary

In the mid-1980's I conducted research among Hungarian learners of English (Dörnyei 1990a) to investigate the difference between motivation in a foreign language learning and a second language acquisition environment, the former involving studying the language primarily in a school context, whereas the latter referring to more spontaneous acquisition taking place at least partly embedded in the host environment (e.g., learning English in the U.S.). This research was determined by a social psychological approach rooted in the Canadian tradition and although the emerging construct of L2 motivation showed some deviations from the model developed in Canada, these could be explained by contextual differences while still maintaining a social psychological perspective. Specifically, four main components of L2 motivation were suggested (see also Fig. 1):

- (1) **Instrumental Motivational Subsystem**, which is conceived as a set of extrinsic motives organised by the individual's future career striving, resulting in a fairly homogeneous subsystem.
- (2) **Integrative Motivational Subsystem**, which is composed of attitudes, orientations, and motives centred around the individual's L2-related affective predispositions. The subsystem is a multi-faceted dimension of motivation, consisting of four loosely related components: (a) interest in foreign languages, cultures, and people; (b) desire to broaden one's view and avoid provincialism; (c) desire for new stimuli and challenges; and (d) desire to integrate into a new community. This last component—whence the term “integrative” comes—is, in fact, partly instrumental and only partly integrative in foreign language learning contexts.
- (3) **Need for Achievement**, which involves the tendency to initiate achievement activities, to work with heightened intensity at these, and to be interested in excellence for its own sake. It was argued that because foreign language

learning takes place primarily in institutional/academic contexts, it can be characterized as a series of academic achievement situations and therefore need for achievement has a particularly marked role in such environments.

- (4) **Attributions about Past Failures**, drawing attention to the relevance of attribution theory (Weiner 1979) to L2 learning. This component was also assumed to play an important role in foreign language learning situations because in such contexts “learning failure” is a very common phenomenon.

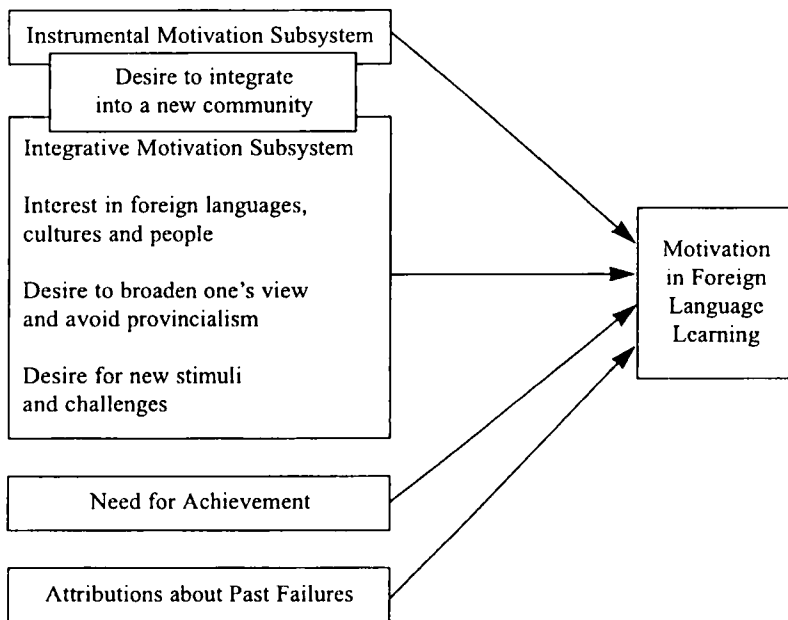


Fig. 1

Schematic representation of the conceptualised construct of motivation in foreign language learning (Dörnyei 1990a, 68)

The study described above was accompanied by an investigation aiming at determining the effect of the identified motivational components on L2 classroom learning behaviours (Dörnyei 1990b; 1991). Interestingly, it was the lack of some expected results in this follow-up research which proved to be particularly significant in the long run.

Table 1

Correlations between motivational components and four criterion measures: Course Achievement, Course Attendance, Further Enrolment, and Extracurricular Language Use (Dörnyei 1990b, 9- 10)

INSTRUMENTAL MOTIVATIONAL SUBSYSTEM

– Instrumental language use	–.04	–.04	.06	–.04
– Instrumentality	–.06	.06	.06	.15

Desire to integrate into a new community

– Desire to spend some time abroad	–.23*	.00	–.19*	.02
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INTEGRATIVE MOTIVATIONAL SUBSYSTEM

Interest in foreign languages, cultures, and people

– Passive sociocultural language use	.07	.05	.04	.18*
– Interest in foreign languages and cultures	.15	–.05	–.05	.42***

Desire to keep up-to-date and to avoid provincialism

– Reading for non-professional purposes	.02	–.19*	.05	.08
– Desire for knowledge and values associated with English	–.04	–.14	.10	–.05

Desire for challenge

– Active sociocultural language use	–.21*	–.17*	–.03	.24**
– Language learning is a new challenge	–.07	–.10	–.07	.00

NEED FOR ACHIEVEMENT

– Need for achievement	.18*	.06	.18*	.16
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ATTRIBUTIONS ABOUT PAST FAILURES

– Bad learning experiences	–.11	.01	–.05	.03
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*p < .05 **p < .01 ***p < .001

The follow-up study involved the correlation of the obtained motivational components with four classroom learning-specific criterion measures: **course achievement, further enrolment in the language course, course attendance, and extracurricular language use**. These criterion measures are undoubtedly key factors in the language learning process and still, as can be seen in Table 1, hardly any significant correlations emerged between them and the motivational factors found. Only extracurricular language use (that is, seeking contact with foreigners) showed a considerable positive relationship with some integrative motives (explaining why integrative motivation is very salient in second language acquisition contexts where the primary L2 learning behaviour is interaction with native speakers of the language). The remaining classroom-related measures simply did not appear to be related to the motives found.

What happened? Why did the motivational components identified in the research not affect learning behaviours observed with the same subjects? The likely answer was that these behaviours were closely connected to the classroom level of the learning process and must have been energised by motivational factors—particularly those related to the actual classroom milieu—that were simply not included in the original research paradigm and therefore could not show up in the factor analytical study. However, this was only an assumption, requiring further research to confirm.

To shed light on this puzzle, Richard Clément, Kim Noels and the author designed and carried out a second project in Hungary, in which we surveyed Hungarian secondary school learners of English (ages 17–18), using a significantly extended research paradigm, including scales focusing on some learner traits as well as the learners' perception of the classroom environment and the dynamics of the learner group (Clément–Dörnyei–Noels 1994). The study was carefully administered in order to obtain reliable data about sensitive issues such as the evaluation of the language teacher, and was accompanied by a teacher questionnaire in which we gathered information about the subjects to serve as criterion measures. The results produced evidence that motivation to learn a foreign language in a classroom environment entails more than a social and pragmatic aspect. As Fig. 2 shows, we identified three distinct dimensions:

- (1) **Integrative motivation**, which is the central component of the social dimension of L2 motivation. Learners who have more favourable attitudes toward the L2, the L2 speakers, the values the L2 conveys, and the knowledge of the L2, are likely to be more successful language learners than others with less favourable attitudes.

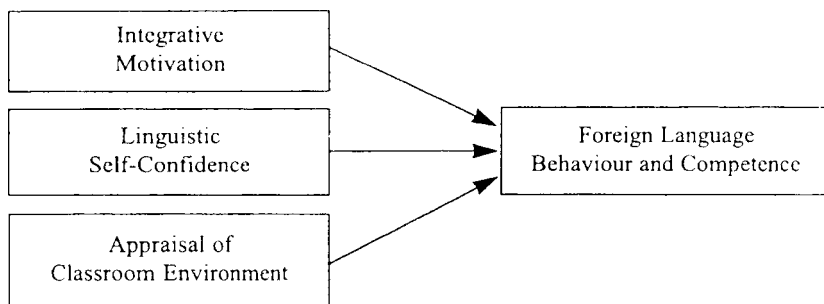


Fig. 2

Schematic representation of the tripartite construct of L2 motivation
(Clément–Dörnyei–Noels 1994, 441)

- (2) **Linguistic self-confidence**, including language anxiety, which is a central component in the personal dimension of motivation. Learners who are less anxious, have better previous experiences with using the L2, who evaluate their own proficiency more highly, and who consider the learning tasks less difficult—in short, who are more self-confident about their L2 learning and use—are more motivated to learn the L2 than those whose motivation is hindered by a lack of self-confidence.

It should be noted that the emergence of self-confidence as a distinct factor was not unexpected. Clément and his colleagues (Clément 1980; Clément–Kruidenier 1985; Labrie–Clément 1986) have produced sufficient evidence that self-confidence is a powerful motivational process in multi-ethnic, multilingual settings, and our study showed that self-confidence is also a major motivational subsystem in foreign language learning situations (that is, where there is no direct contact with members of the L2 community).

- (3) **Appraisal of the classroom environment**. The emergence of this dimension of L2 motivation was the most novel result of the study, and therefore a more detailed description follows.

It has been pointed out several times in the L2 literature that the difficulty of understanding the exact nature of classroom events lies to a large extent in the complexity of the classroom, that is, “the full range of variables present in educational settings” and “the lack of well-defined classroom processes to serve as variables” (Savignon 1990, 213). In our attempt to find a scientific construct that would cover

a large number of classroom phenomena, we applied a group dynamics-based approach. Three aspects of the students' perception of the classroom were assessed:

- * **group cohesion** (that is, how "together" the group is),
- * **evaluation of the English teacher** in terms of competence, rapport, motivation (i.e. enthusiasm and commitment), and teaching style/personality,
- * **evaluation of the English course** in terms of attractiveness, relevance, and difficulty.

Apart from course difficulty, which loaded on self-confidence, all the other classroom-related factors appeared to form a cluster centred around the appraisal of the classroom environment, and this cluster correlated significantly with foreign language behaviours and competence. Thus, our study confirmed language teachers' intuitive knowledge that what goes on in the classroom will considerably affect the learners' affective predisposition.

An interesting aspect of the results was the lack of a major motivational component, namely that of **instrumental motivation**. Instrumental orientation in our study clustered together with knowledge orientation, and this joint factor loaded onto the integrative motive. Why did this happen? I believe that instrumental motivation is a central component of motivation **where it is relevant**, that is, where relatively short-term pragmatic, utilitarian benefits are actually **available** for the learners. If by such benefits we mean job or salary-related motives, instrumental motivation is actually very often not too relevant to school kids. For the secondary school students in our study, pragmatic rewards appeared quite remote and the wish to prepare for a bright career was related to getting higher qualifications, and thus to obtaining knowledge.

4. A framework for L2 motivation

Based on the results of Dörnyei (1990a) and Clément *et al.* (1994), a broad framework of L2 motivation was suggested (see Fig. 3) trying to account for all the main sources of L2 motivation (Dörnyei 1994a). Three levels of motivation were distinguished: the **language level**, the **learner level**, and the **learning situation level**. The three levels coincide with the three basic constituents of the L2 learning process (the target language, the language learner, and the language learning environment), and also reflect the three different aspects of language mentioned earlier (the social dimension, the personal dimension, and the educational subject matter dimension).

The **language level** of motivation concerns ethnolinguistic, cultural-affective, intellectual, and pragmatic values and attitudes attached to the target language; these values and attitudes are, to a large extent, determined by the social milieu in which the learning takes place. A comprehensive way of describing the motivational processes at this level is by using the traditional concepts of integrative and instrumental motivation.

LANGUAGE LEVEL	Integrative Motivational Subsystem Instrumental Motivational Subsystem

LEARNER LEVEL	Need for Achievement Self-Confidence * Language Use Anxiety * Perceived L2 Competence * Causal Attributions * Self-Efficacy

LEARNING SITUATION LEVEL	
<i>Course-Specific Motivational Components</i>	Interest Relevance Expectancy Satisfaction
<i>Teacher-Specific Motivational Components</i>	Affiliative Drive Authority Type Direct Socialization of Motivation * Modelling * Task Presentation * Feedback
<i>Group-Specific Motivational Components</i>	Goal-orientedness Norm & Reward System Group Cohesion Classroom Goal Structure

Fig. 3

Components of foreign language learning motivation (Dörnyei 1994a, 280)

The **learner level** concerns various fairly stable personality traits that the learner has developed in the past. We can identify two motivational components underlying the motivational processes at this level, **need for achievement and self-confidence**, the latter encompassing various aspects of language anxiety, perceived L2 competence, attributions about past experiences, and self-efficacy.

The **learning situation level** is associated with situation-specific motives rooted in various aspects of language learning in a classroom setting. Within this level three main types of motivational sources can be separated:

- (1) Course-specific motivational components, which are related to the syllabus, the teaching materials, the teaching method, and the learning tasks. These are best described by the framework of four motivational conditions proposed by Keller (1983) and subsequently by Crookes and Schmidt (1991): **interest** (intrinsic motivation centred around the individuals' inherent curiosity and desire to know more about themselves and their environment), **relevance** (the extent to which the student feels that the instruction is connected to important personal needs, values, or goals), **expectancy** (perceived likelihood of success), and **satisfaction** (the outcome of an activity, referring to the combination of extrinsic rewards such as praise or good marks and to intrinsic rewards such as enjoyment and pride).
- (2) Teacher-specific motivational components, which are related to the teacher's behaviour, personality, and teaching style and include the **affiliative motive** to please the teacher, **authority type**, and **direct socialisation of student motivation** (modelling, task presentation, and feedback).
- (3) Group-specific motivational components, which are related to the group dynamics of the learner group and include **goal-orientedness**, the **norm and reward system**, and **classroom goal** structure (competitive, cooperative or individualistic).

The rationale for separating the three motivational levels is that they seem to have a vital effect on the overall motivation independently of each other; that is, by changing the parameters at one level and keeping the other two dimensions constant, the overall motivation might completely change. For example, the same learner in the same learning situation might show a strikingly different degree of motivation depending on what the target language is. Similarly, when the target language is the same, the same learner's motivation can show vast differences as the function of the learning situation, that is, the appraisal of the language classroom (just think of the potential effect of a bad or a good teacher). In other words, each of the three levels of motivation exert their influence independently of the others

and have enough power to nullify the effects of the motives associated with the other two levels.

5. Directions for future research

Since L2 motivation research has arrived at a crossroads, it may be interesting to list a number of directions for future research which are considered to be potentially fruitful.

1. **Specifying the new theories in sufficient detail to make them testable.** In order to achieve the required precision, all the constituent components of motivation must be explicitly defined and assumptions must be made about their interrelationships. Because recent motivational innovations have borrowed from a wide range of systems within various branches of psychology, only by conceptualizing constructs in concrete terms can we hope to integrate the various factors in one coherent framework.

2. **Deciding how new motivational concepts are related to established motivational factors** such as the integrative motive or linguistic self-confidence, and determining in what way the new constructs can offer more than the old paradigms.

3. **Focusing more on how to motivate language learners** and test the efficiency of motivating strategies suggested recently in the literature (Dörnyei 1994a; Oxford–Shearin 1994). Such research could, eventually, catalogue the motivational background of various language teaching methodological approaches, and could help us understand the affective foundation of the teaching process.

4. **Examining motivation as a function of time.** So far motivation research has primarily focused on describing motivation at a given point of time (that is, synchronically), and hardly any studies have investigated how motivation changes with time, or what patterns of motivational sequences can energize long-lasting learning processes.

5. **Exploring the relationships between motivation and cognitive mental operations.** Crookes and Schmidt (1991) highlighted the micro-level of motivational effects on L2 acquisition, pointing out the relationship between attention and motivation. In general psychology there have been a few studies examining the motivational correlates of 'deep' and 'superficial' learning, and this line of research would be particularly relevant to language studies.

6. Finally, I would like to describe the line of research I am currently most interested in, **the analysis of the motivation–behaviour–outcome chain by breaking up these components into sub-units.**

Figure 4 presents a schematic representation of the major components of the chain: **Motivation** leads to **learning behaviour**, which in turn results in **cognitive**

learning processes, which lead to **learning outcomes**, including language proficiency. Motivational studies in the past have either explicitly or implicitly relied on this conceptualisation when they correlated motivation with language proficiency measures.

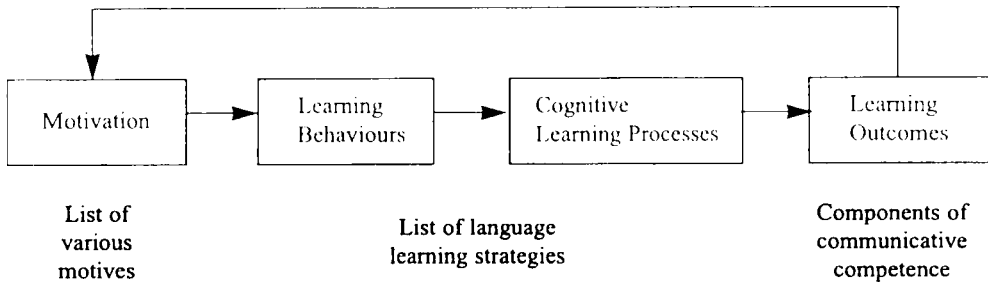


Fig. 4.
The motivation-learning-outcome chain

By now it has become obvious that none of the components in Fig. 4 are homogeneous. **Motivation** can be sub-divided into a range of motives, as was done in Fig. 3. **Language learning** is not a unified process either but involves a number of diverse behaviours and mental operations, ranging from paying attention in the language class and actively participating in role-play tasks, to grasping every opportunity to talk to native speakers of the target language or doing extensive reading to extend one's vocabulary. The behaviours and mental operations associated with language learning have recently been the focus of attention in learning strategy research (see O'Malley-Chamot 1994; Oxford 1993) and, indeed, a particularly fruitful direction of research could involve connecting motivation to learning strategies, perceiving the latter as examples of motivated learning behaviours. **Learning outcomes** can be divided into linguistic and non-linguistic outcomes, and the former can be further broken down into the various components of communicative competence (see Celce-Murcia-Dörnyei-Thurrell 1995).

Thus, instead of a straightforward causative relationship between a limited number of components, a more elaborate representation of the motivation-outcome chain is required, involving a minimum of three or four lists of variables. The relationship between these variables would be very complex: Some motives will energise certain behaviours but not others. Some learning behaviours will promote certain cognitive processes while leaving other processes unaffected. Some learning behaviours and processes will develop only certain aspects of one's communicative

competence. By examining these patterns of causal relationships, motivation research could be connected to other research areas such as research on learning strategies, communicative competence, or language teaching methodology, and thus motivation could be more organically integrated into mainstream L2 research.

6. Conclusion

As a summary, we can conclude that motivation research has gained new momentum in the last few years and has reached an interesting level of development. Let me highlight two aspects of this: (1) Motivation constructs suggested in the literature are about to reach a degree of elaboration which makes them sufficiently adaptable to make motivation assessment a potentially useful tool for both practitioners and researchers working in diverse learning environments pursuing diverse goals. (2) The emerging motivation theories allow for a more organic integration of motivation research into L2 research by combining motivation theory with research topics such as learning strategies, communicative competence, and teaching methodology. In the long run this could bring together two research orientations which have been rather independent in the past: linguistics-based and psychology-based approaches to the study of L2 acquisitions.

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ANALYSING SECOND LANGUAGE LEARNERS' COMMUNICATION STRATEGIES: CHINESE SPEAKERS OF HUNGARIAN*

JULIET LANGMAN

Abstract

This paper explores the nature of communication strategies among Chinese adult second language learners of Hungarian using natural language data collected in an interview setting. We define communication strategies as those strategies which speakers use to ensure communication when some difficulty appears. We analyse one type of communication strategy, namely appeals and offers of assistance within an interactional negotiation framework. Our analysis compares level of proficiency with general communicative style and with type of request for help strategy and finds a rough correspondence between style and goals of interaction and degree of explicitness in type of request for help.

Adult immigrants find themselves in the seemingly paradoxical position of having to learn the language in order to communicate, and of having to communicate, often in difficult circumstances, in order to learn the language (Perdue 1993, 9).

1. Communication strategies and foreigner discourse

Communication strategies are strategies which, conscious or not, the second language learner uses to overcome communication difficulties in interaction. A focus on surface forms allows researchers to examine "attempts to bridge the gap between the linguistic knowledge of the L2 learner and the linguistic knowledge of the learner's interlocutor in real communicative situations" (Ellis 1985, 181). Tarone (1977) provides a typology of communicative strategies, comprised of five types: (a) avoidance (topic avoidance, message abandonment); (b) paraphrase

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(approximation, word coinage, circumlocution); (c) conscious transfer (literal translation, language switch); (d) appeal for assistance; and (e) mime.¹

Among other aspects, the proficiency of the speaker has been suggested as a determining factor in the specific types of communication strategies that the learner will use (cf. Tarone 1977; Bialystok 1983; Paribakht 1985). If we assume that the learner's language is essentially systematic (Perdue 1993, 3), we can assume that the learner, as her knowledge increases, begins to use different and more elaborate strategies and/or extends the range of functions for which she employs various strategies. Faerch and Kasper (1980) distinguish between reduction (Tarone's avoidance) and achievement strategies, suggesting that achievement strategies can only be used when a certain level of proficiency has been reached.

To date there is no clear agreement, however, on how determining level of proficiency is. An alternative view suggests that the personality of the second language speaker will lead to a characteristic set of communication strategies (cf. Tarone 1977; Beebe 1983).

To get a complete view of communication, one must look not only at the second language learner's strategies, but also at those of the native speaker, or communicative partner. Research on foreigner talk, beginning with Ferguson's (1971) characterisation of foreigner talk (FT) has focused on native speaker strategies with a focus on simplification. Subsequently, researchers have focused on how affect-enriching strategies of foreigner discourse also enhance communicative success since they serve as a sign of solidarity and involvement (Wesche 1994, 224). Hatch (1983) suggests that the most plausible explanation of how interaction succeeds entails seeing it as negotiation that rests on the feedback interlocutors provide one another, feedback, both of structural and affective nature.

Bremer *et al.* (1993) discuss the mechanics of the joint negotiation of meaning, and the ways in which the interlocutors must work to "create conditions that make shared interpretation possible" (180). They suggest that the native speaker, in negotiation with the language learner, can set up a learning environment by bringing the learner to the "zone of proximal development" (cf. Vygotsky 1978). Hence, each interaction can be seen as a potential language learning instance in addition to a communicative situation, dependent on how the interlocutors respond to one another's feedback.

In this paper, we will examine the nature of one type of negotiation, namely appeals and offers of assistance, and examine the manner in which this strategy

¹ Several other typologies have been suggested by other researchers (see for example Varadi 1980, Faerch-Kasper 1983) all of which are quite similar in terms of the types of strategies they uncover. For a good review discussion of communication strategies see Bialystok 1990.

matches with level of proficiency in the language. We will further examine the ways in which appeals for assistance also serve as language learning strategies in addition to communication strategies.

2. The research

2.1. Subjects

Subjects for this study consist of 7 Chinese learners of Hungarian living and working in Hungary. The Chinese in Hungary belong almost exclusively to a group of recent immigrants from mainland China. Between 1989 and 1991 a significant number of Chinese decided to come to Hungary for specific social and economic reasons. Hungary at that time, was perceived as politically and economically promising. Moreover, it was legally possible to travel to Hungary without an entrance visa, during the very short period when the Hungarian government was undergoing democratisation. In mid-1991, according to estimates, there were 40–50 thousand Chinese in Hungary (Nyíri 1994, 53). Following legal changes backed by police actions, including forced deportation, however, the population decreased to 7–10 thousand. New laws have made it increasingly difficult for Chinese to stay in Hungary; the majority must now renew their visas on a monthly basis (Nyíri 1994, 53).

The limited and insecure time perspective is a defining characteristic of life in Hungary for the majority of the Chinese. One consequence of these restrictions is that the Chinese devote all of their time to work, and rarely if ever learn Hungarian in classroom situations; rather theirs is classic adult immigrant acquisition, in the context of the marketplace where the majority of them work.

The 7 subjects in this paper are drawn from a larger set. All arrived in Hungary in 1991, and with the exception of KIN7 that was their first visit to Hungary. The subjects' knowledge of Hungarian ranges from beginning to intermediate. A number of potential subjects were not interviewed as they considered their Hungarian inadequate, or did not understand what we wanted from them; that is, no initial communication and understanding could be established. The second group we have excluded from this paper consists of those Chinese who have been in Hungary for a longer amount of time and who have had formal training in Hungarian.

For all of the subjects, the primary and often only exposure to Hungarian is in the context of work in the markets, or in interactions with neighbours. At the time of the research, one subject, KIN6, had begun formal language instruction and had had five lessons at the time of the interview. In addition to knowledge of Hungarian, a substantial number of the subjects spoke some English and used this in the course

of the interview. The use of English as a communication strategy was claimed by a number of the subjects.²

2.2. Interview setting

Interviews were conducted in March and April of 1994 at the office of a Chinese-run accounting firm in Hungary that serves the accounting needs of over 500 small Chinese businesses. All subjects are engaged in business either selling in various open markets, or working as wholesalers for these small merchants. We received permission to conduct interviews with clients in the waiting room, where often they needed to wait one hour or more to talk with the accountants. For the most part the interviewers were alone with the clients, although on occasion others came in to wait for the accountant.

The data are drawn from open-ended interviews focusing on the subject's arrival and experiences. The interviewers in this study consisted of the author, JUL, and two assistants, ZSU and VIK. While ZSU and VIK are native speakers of Hungarian with beginning knowledge of English, JUL is a native speaker of English with intermediate knowledge of Hungarian. The stated aim of the interview was to gather knowledge about the subjects' knowledge of Hungarian, and experiences in Hungary. On the basis of an interview schedule informal conversations lasting about 30–60 minutes each were recorded. Table 1 provides a list of the subjects and other participants in each of the interviews.

Table 1
List of participants in interviews

Subjects	DOB	Interviewer(s)
KIN1 - male	1956	ZSU, JUL
KIN3 - female	1955	ZSU
KIN4 - female	1968	ZSU
KIN6 - female	1959	VIK, JUL
KIN7 - male	1962	VIK, JUL
KIN8 - male	1961	VIK
KIN9 - female	1964	VIK

² The use of English as a strategy in interaction is prevalent in many immigrant communities particularly in those areas where the language of the majority is not a widely-known language (see Langman 1989 for a discussion of the use of English among "Yugoslav" immigrants in the Netherlands). See also Langman (1995–6) for a discussion of code-switching as a communication strategy among these subjects.

Questions that guided the interview included:

- how, when and by what means the subject came to Hungary
- current situation in Hungary: where and with whom they live and work
- how a normal day is spent
- the best and the worst experiences in Hungary
- the best and the worst aspects of life in Hungary
- comparisons of life in Hungary with life in China
- how and when the subject learned Hungarian
- how well the subject speaks, reads, writes Hungarian
- future plans: staying in Hungary, returning to China, or moving on.

While the interviewer by and large determined the topics of conversation, a number of topics were familiar and also easier for the subjects and generated more talk. One of the central themes, that emerged in response to the question, what is good and what is bad in Hungary centered on visa problems, other common topics focused on interactions with the police, what markets provide the best goods and prices, and discussions of food and weather.

Wong Fillmore (1991) emphasises social strategies as crucial to the acquisition of a second language; social strategies that relate both to the nature of the social setting and to the nature of the relationship between interlocutors. Such strategies can be seen as ways in which the learner becomes a member of a cultural or social community as well as an interlocutor who can exchange information. Within the interview setting, two goals operated simultaneously, thus affecting the nature of the overall interaction; the first was to gather a sample of Hungarian language use and the second, more basic goal was to establish rapport between the interlocutors. A third goal, operating for some of the subjects emerged as the use of the interaction as a language learning occasion.

The informal nature of the interviews as well as the everyday topics chosen were designed to collect a sample of what might closely approximate everyday speech for the subjects. The addition of a few more difficult questions, and less common topics, was moreover designed to push the subjects to express themselves.

Two aspects of the interviews resulted in different types of interaction. The first was whether there were one or two interviewers; the second was the degree of English used in the interactions.³ In most of the interviews there was some use of English, both on the part of the interviewer(s) and on the part of the subjects. Switching to

³ Where JUL was present additional elements having to do with how to conduct the interview, and how to distribute turns at talk were present in addition to the interviewer – interviewee dynamic.

English showed the interplay between the two goals of gathering Hungarian language data and maintaining rapport.

2.3. Data transcription

The recorded interviews were transcribed following the guidelines and using the CHILDES transcription and analysis system.⁴ In particular, analyses of the lexicon, errors in morphology and frequency of use were conducted. Close attention was paid to the transcription of pauses, overlaps and retracings. Once a basic transcript was completed for each subject, the transcripts were coded for instances of communication problems and types of appeals for and offers of help.

3. Analyses

3.1. Level of grammatical competence

Level of grammatical competence was calculated on the basis of verbal morphology.⁵ The morphological measures examine the number of correct and incorrect uses of number, person, and tense, as well as the use of definite versus indefinite forms of the verb. Verbal morphology was analysed on the basis of repeated versus spontaneous use. As expected the degree of appropriate use was substantially lower in spontaneous use. Many correct forms were found in the use of routines and set expressions such as *nem tudom* 'I don't know', *értem* 'I see, I understand', *hát szeretem* 'well, I like it'.⁶

The subjects were grouped at four levels according to the following criteria, drawn from the examination of their interactions, as well as from measures of morphological complexity. This development of levels is based on a combination of simplicity, salience and frequency of the particular verbal forms. It is a working model developed on the basis of Chinese second language speakers of Hungarian, and is currently being tested on other second language as well as first language acquisition data. Each level encompasses all of the aspects of the previous level as well as the new elements listed:⁷

⁴ We have used the CHILDES (Child Language Data Exchange System) programs and transcription system. The programs: CLAN (Child Language Analysis) are written by Leonid Spektor at Carnegie Mellon University with design assistance from Brian MacWhinney. See MacWhinney (1991).

⁵ See Kálmán (1985) for a discussion of the Hungarian morphology system.

⁶ The use of routines as a strategy for second language communication falls beyond the scope of the present paper. However, there is ample evidence in the data for the extensive use of routines, formulaic speech, and scripts. (See Lyons 1968, Ellis 1984 for a discussion of routines.)

⁷ While each of the subjects does not use all of the criteria, their system as a whole matches that of the criteria outlined (see Ellis 1985 for a discussion of determining a developmental sequence).

- Level 1: – use of base form (based on 3sg for all persons)
 – use of *van* 'is'
 – use of 1sg in frequent, set expressions, e.g. *tudom* 'I know'
- Level 2: – use of infinitive
 – systematic use of idiosyncratic morphological endings attached to base in the form of base + vowel (-i, -e, -o).⁸
 – use of past tense of 'to be' and in set expressions; *mondtam* 'I said' *szoktam* 'I used to, it's my habit to'
- Level 3: – productive use of some other forms (e.g. 1sg, 1pl, 3pl)
 – productive use of definite and indefinite forms in first and third person singular
- Level 4: – productive use of other endings that match the target form
 – productive use of past
 – use of verbal prefixes, also in separable form

On the basis of these criteria, the subjects are placed in the following levels:

Level 1: KIN8

Level 2: KIN3, KIN6

Level 3: KIN1, KIN4, KIN9

Level 4: KIN7

Table 2 shows the distribution of use of verbal morphology (see next page).

KIN8 uses 1sg only in set expressions with 3 verbs, in addition, his one infinitive is a German borrowing, *kuken* 'to look'. He generally has only one or maybe two forms for each verb and uses them quite frequently, particularly in set expressions. He uses a total of 18 verbs.

At Level 2, KIN3 uses 1sg spontaneously perhaps once, and also makes use of the infinitive as well as 3sg, this as a base or 'unmarked' form. Moreover she uses a past tense form although only as a set expression. She uses 19 different verbs. KIN6 uses 1sg only in set expressions, but does use the infinitive appropriately at times. In addition, she uses one past tense as a repetition, and one verbal prefix in a set expression. Both KIN3 and KIN6 use 1sg only with three verbs, just like KIN8.

⁸ In the case of *-i* the result matches the indefinite form of third person singular of regular verbs, although it does not function consistently in this way.

Table 2
 Correct and incorrect use of verbal morphology: 1sg, 3sg, infinitive. Note that the definite and indefinite forms have been combined in the table. Note, however, that errors of the type involving the use of DEF for IND or vice versa have been counted as errors.

Subject	Level	verbs	correct		1sg form		correct		3sg form		correct		INF form		INF form	
			t/t*	lsg expectedly	used incorrectly	3sg expectedly	t/t	used incorrectly	used incorrectly	used incorrectly	used incorrectly	used incorrectly	used incorrectly			
KIN8	1	13/105	3/26	11	-	6/24	12	7	1/5	8	-					
KIN3	2	17/87	2/7	17	-	2/2	1	21	3/3	5	3					
KIN6	2	23/51	3/13	2	2	3/3	-	11	7/7	3	4					
KIN9	3	20/90	7/16	24	4	2/3	-	7	4/4	1	4					
KIN4	3	20/100	4/26	17	8	3/3	1	2	6/10	-	8					
KIN1	3	22/108	4/15	3	3	3/3	1	7	7/10	8	1					
KIN7	4	57/403	14/27	-	51	31/148	-	25	19/33	-	20					

*t/t = types/tokens

γ This column includes those instances in which a different verb form was used in the place of that expected. It does not count those instances in which no verb at all was present where one was expected.

At Level 3 KIN9 uses 1sg productively and with more verbs. In addition, she makes a distinction between the definite and indefinite forms of 3sg, although far from consistently. She uses a number of different forms, but incorrectly and generally as a result of direct imitation, however, she also uses some forms correctly. KIN9 seems to be at the stage of experimenting with forms. She imitates two forms of the imperative, but then also produces spontaneously in the same utterance one other possible imperative form: *próbáljam* 'I try'.

KIN4 also uses 1sg productively. She uses a mixed set of endings, but generally only one form per verb, several forms for the basic, frequent verbs, 'like', 'know', 'say', and one past tense set expression: *szoktam*. Moreover, she has extensive use of *tudo* for *tudod* 'you know' used as a tag question. KIN4 knows and uses by and large correctly the difference between definite and indefinite verb endings, although for a very limited number of verbs.

KIN1 in addition to the above also uses verbal prefixes, although no past tense forms. KIN1 uses several forms of various verbs, and in contrast to KIN9 generally uses the limited set of endings he has correctly.

KIN7, the most advanced by far, placed at Level 4, uses the past tense and verbal prefixes productively. He also uses a wide range of different endings including self-invented forms: *jösszön* 'I come' drawn from *jönni* 'to come' and an invented ending *-ön* which follows the rules of vowel harmony. Many of his verb forms are incorrect as can be seen from Table 2, but he uses many forms productively and correctly.

As can be seen from the above description as well as Table 2, the subjects, even at the same level use different strategies in terms of the verbs they use, some favouring the 3sg forms and others the infinitive. Even at these early stages, we can also see differences in the degree to which they make errors, versus perhaps avoiding forms they do not know. In terms of level of proficiency, a broader characterisation would be one distinguishing the true beginners with an over-abundance of base forms (3sg and 1sg forms in routines) from those who are using both 1sg and the infinitive as well as 3sg productively. In this view, we distinguish KIN8 and KIN3 from the others at the low end.

4. Communication strategies

In analysing communication strategies that constitute appeals or offers for help, we began by dividing them in terms of the form as well as the function (i.e. the manner in which they indicated the need for help).

We take an approach to the definition of appeal for help, that starts with the concept of interaction between interlocutors and the way in which they negotiate understanding together. We base our coding for appeal for help on the assumption that the interlocutors want to interact, although the burden of achieving such interaction may not lay equally on both partners. On the basis of this concept we coded appeals for help by the subject in seven categories:

(a) silence followed by a repeated or rephrased question, as the first type of appeal for help;

(b) minimal response in particular 'hm?' followed by a repeated or rephrased question;

(c) *nem értem* 'I don't understand' and pragmatically appropriate items such as *tessék* 'please' as explicit comments on understanding;

(d) *nem tudom magyarul* 'I don't know (that) in Hungarian' suggests a different type of difficulty, namely not in understanding, but rather in how to produce an appropriate response;

(e) key word repetition, in which the subject chooses a word from the utterance heard and repeats it. We perceive of this as an appeal for help in so far as the subject focuses on the problem item, and/or the item to which he assumes a response is required;

(f) *én?* 'I?' is a direct request for additional help, namely in specifying the subject to whom a question refers. This is a logical although non-standard question, in that the formal 2sg and 3sg have the same verbal form, which can cause ambiguity;

(g) *hogy monda* 'how do you say'⁹ shifts the request for help in understanding to help in formulating an appropriate response. It is a specific request for language learning help as well as for achieving understanding.

We see these different types of requests for help as lying on a scale of sorts in terms of which interlocutor bears the weight of providing versus requesting help, as well as the degree of explicitness of the type of help requested. Table 3 summarises the types of appeals for help that occurred in the interactions, as well as the number of turns that each subject took. This last gives a rough approximation of how frequently appeals for help occurred within the interaction.

From Table 3 we see that with the exception of KIN7, the most advanced speaker and an interview in which JUL is also present, the number of appeals for help in the interactions with VIK are twice as frequent as those interactions with ZSU. In terms of types of help requested or offered we see that KIN3 and KIN6 give no response and/or minimal responses far more than the other subjects, even more so than KIN8 the least advanced.

⁹ Note that this is an idiosyncratic form of *hogy kell mondani*.

Table 3
Types of requests for help in the interactions

	INT	Total	a	b	c	d	e	f	g	turns
KIN8	VIK	26	5	2	4	3	8	3	1	151
KIN3	ZSU	15	7	7	-	-	1	-	-	149
KIN6	V/J	31	10	7	5	4	4	-	1	99
KIN9	VIK	34	1	3	7	2	10	3	8	194
KIN4	ZSU	11	3	-	-	3	1	4	-	118
KIN1	Z/J	12	3	3	2	-	-	-	4	319
KIN7	V/J	8	1	1	1	1	2	2	-	248

- a. no response – repeated question
- b. minimal response – rephrased question
- c. I don't understand
- d. I don't know (that) in Hungarian
- e. key word repetition
- f. *én?* 'I?'
- g. how do you say...

KIN8 uses a high number and the full range of appeals for help, while KIN9 seems to prefer more explicit appeals for help, and in particular those with a secondary goal of language learning. KIN1, KIN4 and KIN7, among the more advanced are similar to one another in number of appeals although not in type. One might say that based on the number and type of appeals, KIN3 relies on the interlocutors to provide help while the others are actively engaged in requesting help.

There does not appear to be any direct relationship between the level of the speaker and the type or number of appeals for help made, with the exception that the more advanced speakers do make fewer appeals for help. Among the less advanced we see clear differences in the degree to which they actively seek help in understanding and in formulating responses.

In examining the interactions in a qualitative fashion, we can get a broader understanding of the nature of the interactions and the types of strategies the interlocutors use to achieve understanding. In the following section we will look at typical types of negotiations in which the subjects and their interlocutors achieve meaning, beginning with the subjects of most limited Hungarian competence.

4.1. KIN8

KIN8 has the most limited knowledge of Hungarian. His talk is, moreover, characterised by a high number of set expressions including code-switched utterances. In his interaction with VIK, we see that he makes appeals for help and explains that he cannot say what he wants in Hungarian, *nem tudok beszél* 'not can+1sg speak+3sg – I can't speak'. (Here *beszél* should appear in the infinitive form *beszél-ni*.) His appeals for help range from minimal responses such as 'hm?' to more direct requests, which can also be seen as strategies of checking understanding. He frequently uses the question *én?* 'I?' to check if the question refers to himself.

While KIN8 uses the full range of appeals for help that we have outlined, his most frequent is the use of the key word strategy. In (1) we see KIN8 first responding with a minimal response followed by an attempt at repeating the key word in the repeated question, *fogla*. He follows this with a direct question *Mi? Mi?* 'What? What?' VIK for his part, first repeats his question, then moves to repetition of the key word, and finally switches to English, leading KIN8 to return to his key word strategy with *occu*. (See Appendix for transcription conventions.)

- | | |
|--|----|
| (1) *VIK: és mért mért jött Magyarországra? | 1 |
| %eng: and why, why did you come to Hungary? | |
| *KIN: mm. | 2 |
| *VIK: mit csinált Pekingbe, mielőtt Magyarországra jött volna, mivel foglalkozott? | 3 |
| %eng: what did you do in Peking, before you came to Hungary, what did you do? | |
| *KIN: &fogla+... | 4 |
| %eng: occu+... | |
| *VIK: foglalkozott. | 5 |
| %eng: occupied with. | |
| *KIN: &foglal mi mi? | 6 |
| %eng: occu what what? | |
| *VIK: occupation. | 7 |
| *KIN: &occu+... | 8 |
| *VIK: occupy, to occupy, your work. | 9 |
| *KIN: I worker, I worker in the +/-. | 10 |

4.2. KIN6

Like KIN8, KIN6 uses the full range of appeals for assistance. For her, however, the most frequent are no response, use of minimal responses as well as the more explicit expressions such as that she does not know how to say something in Hungarian, for example in response to the question of what her job was in China,

she says: *Nem tudom magyarul. Aszem chemical engineer. Mérnök.* 'I don't know in Hungarian. I think chemical engineer. Engineer.'¹⁰ Notice here that there is no request or need for help in this exchange, as she is able to access the word in Hungarian herself. KIN6 in fact uses the highest number of pragmatically appropriate requests for repetition, such as *tessék?* 'please'.

(2) begins with the last of JUL and VIK's combined questions about where KIN6 is from. Here after JUL gets a minimal response from KIN6, she repeats the question one more time, and gets an information response, "Peking". Thereafter we see another characteristic of KIN6's interaction style, self-correction and thus language practice in the context of the interview.

(2) *JUL: és honnan?	1
%eng: and from where?	
*KIN: aha.	2
*JUL: honnan jöttél?	3
%eng: where did you come from?	
*KIN: Peking.	4
*VIK: <Pekingből?> [>]	5
%eng: (from) Peking+ELAT	
*KIN: <Kína> [<] Peking, mhm. Kínából Pekingbe mhm.	6
%eng: China Peking, mhm. China+ELAT Peking+ILL mhm.	

4.3. KIN3

KIN3 also has very limited Hungarian, and uses English as a strategy although she does not generally mix both codes in one utterance. KIN3's talk can be characterised by its high degree of repetition and by its 'telegraphic' character. When there are difficulties in communication, KIN3 uses telegraphic speech and repetition of ZSU's words. Unlike the preceding two interactions, however, there is a very small number of assistance interactions, but they tend to be rather long and the majority of those are ones in which ZSU does the bulk of the work, with KIN3 offering minimal responses or one word responses. In (3) we see ZSU drawing out a "contentful" response from KIN3.

¹⁰ The use of *aszem*, the colloquial version of *azt hiszem* further shows the pragmatically correct nature of her interaction.

- (3) *ZSU: és lát maga valamilyen különbséget a magyar és a kínai **brain** között? 1
 %eng: and do you see some kind of difference between the Hungarian and Chinese brain?
 *KIN: yes. 2
 *ZSU: van, az emberek között különbség?
 %eng: there is, difference between the people?
 *KIN: mm. 3
 *ZSU: **what's different uh.** 4
 *KIN: mhm. 5
 *ZSU: **do you see difference a the uh. xxx.** 6
 *KIN: ye(s), ah ye(s) ye(s) yes. 7
 *KIN: yes. 8
 *ZSU: **what is it?** 9
 *KIN: **I do not xxx, maybe the &co [//] culture is difference.** 10

Note that here it is unclear if the minimal responses are due to lack of understanding of the questions, or lack of desire to provide a longer response. This is also a possible strategy of avoidance in the face of limited language knowledge.

4.4. KIN4

What characterises the interaction between ZSU and KIN4 is the development of rapport across the length of the interview. The two young women match their language to one another's and both take turns leading the conversation. We see here, in spite of the fact that KIN4 has limited Hungarian, a very small number of appeals for assistance and the majority are ones in which KIN4 takes an active part.

In (4) we see how both ZSU and KIN4 ask for help and how KIN4 says she cannot help as she does not know the words she is searching for in Hungarian.

- (4) *ZSU: és van családja, férje? 1
 %eng: and do you have a family, a husband?
 *KIN: ah nincsen, polát [=barát] [=!laugh]. 2
 %eng: oh none, friend.
 *ZSU: polát, az mi +/- 3
 %eng: polát, that's what
 *KIN: polát [=barát]. 4
 %eng: friend.
 *ZSU: az mit jelent? 5
 %eng: what does that mean?
 *KIN: nem tudom magyar #polát [=barát] az ugyanaz. 6
 %eng: I don't know Hungarian, friend, it's the same thing.

*KIN: nem férj, polát [=barát].	7
%eng: not husband, friend.	
*ZSU: ja [!].	8
*KIN: polát [=barát], fiú.	9
%eng: friend, boy.	
*ZSU: aha ha.	10

Here the misunderstanding rests in the idiosyncratic phonology that KIN4 uses, which ZSU finally understands at 8.

KIN4 also uses a number of strategies to check understanding both on her part *én?* 'I?' and in contrast to the earlier subjects, also to check understanding on ZSU's part, through the use of tag questions, such as: *nagyon, mm három nap kínai., tudo nagyon sok, sok óra nem jó., tudo Kína nagyon sok* 'very, mm three days Chinese,, you know a lot a lot of hours not good,, you know, China a whole lot', in which she uses *tudo*, an idiosyncratic form of *tudod*, as a tag question twice. This use of tag questions adds to the pragmatic ease of KIN4's interactional style.

4.5. KIN9

KIN9 uses the strategies of checking understanding, directly asking for help and indirectly and directly asking for language learning. She uses the interview to a large extent as a language learning setting (like KIN6). Her most frequent types of calls for assistance are repetition of a key word and requests for Hungarian lexicon. VIK for his part offers lexical items in Hungarian, as well as the strategy of repeating and greatly simplifying his questions and sometimes switching to English.

In (5) KIN9 asks directly for language learning help in 1. In 6 she follows up with a repetition of a key word, which in 8 she repeats as a new lexical item.

(5) *KIN: a próbálja a új, I don't know azt opportunity	1
%eng: try+3sg the new that+ACC	
*VIK: új helyzetek.	2
%eng: new situations.	
*KIN: igen az.	3
%eng: yes that.	
*KIN: ok jó új egy új dolgozik új jó, ok nahát próbálja	4
%eng: ok good new a new work+3sg, new good, ok well, try+3sg	
*VIK: állás.	5
%eng: position	

*KIN: állás.	6
%eng: position	
*VIK: munka opportunity állás.	7
%eng: work, position	
*KIN: állás az a opportunity	8
%eng: position that (is) opportunity.	

Note that by the end of (5), however, KIN9 has not learned the correct word for 'opportunity', thus this exchange while successful in terms of achieving communication, does not provide effective language learning.

4.6 KIN1

KIN1 overwhelmingly uses the strategy of switching to English in the interaction; for him, the exchange of information is more important than the goal of speaking Hungarian. As with KIN4 there is very nice rapport between interlocutors and this is marked by repetitions and the reciprocal use of 'igen, mhm'.

The interaction is one with few problems of understanding. When there are problems, KIN1 also uses the explicit strategy of saying 'I don't understand' or 'I don't know how to say that'. When KIN1 asks for help, it often refers not to the fact that he doesn't understand the question, but rather to the fact that he doesn't know how to formulate an answer in Hungarian. He claims his Hungarian is not good, (he only understands 60–70 %) and uses the strategy of language switch when he wants to explain things.

When KIN1 hears a more complicated question the most frequent pattern is one in which either JUL or ZSU repeats the question in simplified form and KIN1 marks the point at which he understands with 'aha'. In (6) we see a nice interplay of how the three negotiate the interaction, with JUL and ZSU repeating each other, and KIN1 explicitly marking his lack of understanding.

(6) *ZSU: és mi volt az első benyomása Magyarországról?	1
%eng: and what was your first impression of Hungary?	
*KIN: ez <nem értem> [>1], ez <nem értem> [>2].	2
%eng: I don't understand that, I don't understand that.	
*JUL: <benyomás> [<1].	3
%eng: impression	
*ZSU: <az első> [<2].	4
%eng: the first	
*KIN: első+...	5
%eng: first	

*ZSU: első véleménye, amikor először jött, mit gondolt a magyar Magyarországról?	6
%eng: first opinion, when you first came, what did you think about Hungary?	
*KIN: what <the> [>] first impression?	7
*ZSU: <xxx jó volt> [<]?	8
%eng: was it good?	
*JUL: mhm. <benyomás, first impression > [>]	9
%eng: impression	
*KIN: < ah the first thing xxx > [<] aha .	10

At this point, KIN1 proceeds to give a long answer in English about the way in which the Hungarians were very friendly to the Chinese initially, but now with the increasing numbers the situation is changing.

To a certain extent KIN1 also uses the opportunity as a language learning occasion, as in (7) sometimes asking explicitly "how to say that" and sometimes indirectly through repetition of terms.

(7) *KIN: you know the # magazine, how to say that.	1
*JUL: mhm.	2
*ZSU: újság.	3
*JUL: újság.	4
*KIN: újság.	5
%eng: newspaper	

4.7. KIN7

KIN7 is our most advanced speaker. He states that he understands 80% of Hungarian but can only speak 30%. Characteristic of his colloquial Hungarian, he later says Hungarian grammar is *marha nehéz, ugye* 'frigging hard, isn't it'.

Some misunderstandings occur with respect to specific lexical items, where phonological problems coupled with social inferences make it difficult for the interviewers to understand. In (8) JUL and VIK have different opinions of what word and thus what profession KIN7 has practised in the past. KIN7 solves the misunderstanding with an explanation.

(8) *KIN: én, az a ## gépszakma,	1
%eng: I, that (is) machine trade.	
*VIK: gép?	2
%eng: machine	

*KIN: igen, géps, uh gép, igen.	3
%eng: yes, machine+s, machine, yes.	
*JUL: kép nem gép, kép.	4
%eng: picture, not machine, picture.	
*VIK: kép.	5
%eng: picture.	
*KIN: gép. Az de marós, esztergályos uh esztergép, uh köszörű xx.	6
%eng: machine. The miller, lathe operator, lathe (idio.), grinder xx.	
*VIK: mhm.	7
*KIN: az ilyen szakma.	8
%eng: that type of profession.	
*VIK: mégis csak gép lesz [=! nevet].	9
%eng: so it (really) is machine [=! laugh].	
*JUL: mhm.	10
*KIN: uh olyan szerszámkészülék.	11
%eng: such a tool set device.	
*VIK: mhm.	12
*JUL: ja igen.	13
%eng: oh yes.	

In this exchange, it is KIN7 who clears up the issue, expanding his answer by listing the types of “machines” he has worked with. At the end of this exchange JUL offers ‘yes, I see’ as a pragmatic marker, for she, in fact, does not understand any of the terms used by KIN7.

At other points, misunderstanding focus on fine points, where KIN7 has understood part of the question but not the ‘point’. In (9), KIN7 misses the exact meaning of the *gyakran* ‘often’ which JUL and VIK repeat three times (1, 7, 13). His lack of understanding is marked by his inappropriate responses. He does not, however, ask for clarification, only understanding when VIK substitutes *idő* ‘time’ for ‘how often’.

(9) *JUL: és milyen gyakran szokott beszélni vagy írni a felesége meg a gyerekekkel?	1
%eng: and how often do you talk or write your wife and child?	
*KIN: az kínai.	2
%eng: that (is) Chinese.	
*JUL: mhm.	3
*KIN: kínai írás.	4
%eng: Chinese writing	

*VIK: kínai írással?	5
%eng: with Chinese writing?	
*KIN: mhm.	6
*VIK: és milyen gyakran szokott.	7
%eng: and how often?	
*KIN: például mm.	8
%eng: for example	
*VIK: levelezni?	9
%eng: letter writing+INF?	
*KIN: levelez.	10
%eng: letter write+3sg	
*VIK: tehát levelet írni Kínába +/.	11
%eng: that is to write a letter to China	
*KIN: mhm.	12
*VIK: milyen gyakran.	13
%eng: how often	
*KIN: az kínaiul.	14
%eng: that's in Chinese	
*VIK: <Idő> [>], idő.	15
%eng: time, time	
*KIN: <aha> [<].	16
*KIN: egy uh egy uh egy hónap egyszer.	17
%eng: one one one month one time.	
*VIK: mhm.	18

5. Discussion

In examining the types of offers and appeals for assistance in our data we do not find any particular link between level of proficiency and type of strategy preferred. What we find instead is a manner or style of communication that serves communicative and in some cases language learning goals as well. As our data is not longitudinal, however, we can only speculate on the way in which communication strategies may vary over time, and across interlocutor and communication setting. Moreover, we also find some link between type and frequency of request for help, conversational style, and general rapport between the interlocutors. Simply, an attentive interlocutor foresees difficulties and repeats and rephrases questions when an appropriate answer is not forthcoming. Conversely, an inattentive or ineffective interlocutor adds to the communicative difficulties.

Four broad types of strategies occur in all of the interactions: requests for help, offers of help, checks of understanding, and marks of understanding. While with the most beginning speakers of Hungarian, KIN3, KIN6 and KIN8 the primary goal of the interaction was to achieve minimal understanding in order to allow interaction to continue, the interactions with the more advanced speakers contain long stretches of relatively trouble-free interaction. Note that even with our most advanced subject, a minimum of Hungarian morphology is being used appropriately.

The form and the frequency of the strategies varies across the speakers, in particular in terms of the degree of explicitness in the strategy, moving from a minimal response such as 'hm?' to explicit pragmatically appropriate markers such as *tessék?* 'please?' and *nem értem* 'I don't understand' to the repetition of a key word or part of a key word, such as *&foglal*.

One particular set of strategies found among some of our informants shows how they use the interview situation for the specific purposes of language learning in addition to, or even in place of information exchange. KIN1 and KIN9 ask several times 'how to say X'. KIN9 even explicitly tells her interlocutor, VIK: *Jó magyarul de nem tudom hogy mit mond a magyar. Please try to to to teach one or two word I can maybe use make a sentence.* 'Ok in Hungarian, but I don't know what the Hungarians say'.

To analyse communication strategies we have seen that one needs to analyse not only the learner's strategies but also those of his or her interlocutor(s) in order to get a clear picture of how communication is achieved. It is the interplay between the two (native-speaker centered strategies or foreigner discourse and learner-centered strategies or communication strategies) that allow us to see the real potential for communication of the second language learner.

In our analysis we operated on the assumption that the relationship between language learning and communication is one that can be uncovered through examining ways in which adult learners use their general communication strategies as a bootstrap to language learning. The communicative strategies used by the subjects are, in our view, part of their overall communicative style. We assume that the learner as speaker uses all of his or her communicative resources in interaction and focuses on those aspects that fall within the "zone of proximal development" (Vygotsky 1978). Hence we see KIN8 "fishing" for vocabulary through the use of the key word strategy, while KIN5 and KIN9 use this same strategy for both vocabulary and morphology. For others, KIN3 and KIN4 for example, there is no clear evidence that they treat the interview as an opportunity for explicit language learning.

To what extent do the speakers have an individual style that can be traced and examined and to what extent does this style vary with the interlocutor and the situation? While we have seen the same types of basic communication strategies for all

of the speakers (with the addition of explanation for the more advanced), we can also see that each of the interactions was quite unique in character. Particularly noticeable is the telegraphic style of KIN3, the use of direct repetitions including morphology by KIN9, the use of switch to English for KIN1, and the use of explanations by KIN7 (who for example uses the word *például* 'for example' 12 times and the routine *van olyan* 'there is such' over 25 times as part of his explanation style in the interview).

Interaction, even in interview settings, consists of overlapping and sometimes competing goals. The first is the goal of maximum ability to share information which competes with the goal of speaking/gathering Hungarian language data. The second is the goal on the part of some of the subjects, in co-operation with their interlocutors, of using conversation as a language learning occasion. In fact, we found that at times the goals competed in such a way that no real understanding was achieved. This was particularly the case with KIN9 whose overwhelming goal of learning Hungarian was not fully understood by VIK (see (5)). In analysing communication strategies, thus, it is clear that a wide range of goals on the part of all of the interlocutors, both native speakers and learners, must be taken into account, if we are to get a clear picture of the interplay of communication and language learning in everyday interaction.

Appendix

Transcription conventions

Below is the basic set of transcription conventions used in the examples. They are drawn from MacWhinney (1991). For a more complete explanation of transcription conventions see MacWhinney (1991). The presentation of the examples has been modified; more than one utterance has been listed on a single line in some cases, and false starts that entail only partial words have been deleted. In addition, retracings has been removed. This results in a more fluid appearance to some of the utterances, but allows for ease of reading.

*XXX	marks the speaker
xx	unintelligible speech treated as word
xxx	unintelligible speech, not treated as word
&	phonological fragment
@e	marks the word as English in a Hungarian base
#	pause between words
<> [>]	overlapping speech follows

<> [<]	overlapping speech precedes
,,	tag question
%eng:	English translation
%com:	comment on the preceding line
%add:	addressee
[=]	explanation of preceding word
[=?]	alternative transcription
[?]	uncertain transcription
[=!]	paralinguistics, prosodics
+...	trailing off
+/.	interruption
+,	self-completion

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ONTOGENESIS OF THE HUNGARIAN WRITTEN LANGUAGE

ZSOLT LENGYEL

Abstract

This paper deals with the acquisition of the Hungarian written language. There are two levels of grapheme phoneme correspondence (GPC) rules governing Hungarian writing. The first level involves the rules concerning the writing of isolated morphemes. At this level the correspondence between phonemes and graphemes is roughly one-to-one. Morpheme combinations come into play at the second level where the "one-to-one" correspondence changes radically due to several phonetic changes on morpheme boundaries.

The writing of isolated morphemes follows the principles of shallow writing, while graphemes on the morpheme boundaries require the principles of deep writing. In other words, one and the same phoneme is represented by different graphemes depending on its place within the lexeme. For children the problem is switching from shallow to deep writing.

In Hungarian, being an agglutinative language with rich morpheme combinations, the two levels are equally important.

1. Introduction

An investigation was carried out among Hungarian children about the acquisition of writing. Such kind of an investigation is motivated by our insufficient knowledge about Hungarian written language acquisition from a psycholinguistic point of view.

1.1. On Hungarian writing

The Hungarian alphabet contains 40 letters, 14 for vowels and 26 for consonants. All the vowels and 17 consonants are represented by single letters, while 8 consonants consist of two and 1 consonant ("dzs") of three letters.

The 8 consonants consisting of two letters can be divided into two groups. The first group ("gy", "ly", "ny", "ty") gathers the graphemes whose second component is the letter "y", which does not have a sound value on its own.

The second group contains the graphemes “cs”, “dz”, “sz”, and “zs”. The peculiarity of these graphemes is that the sound values differ when pronounced individually or combined (i.e. “c” is pronounced as [ts], “s” as [ʃ], and “cs” as [tʃ]. This distribution is valid for “sz” and “zs”, too).

1.2. GPC rules in Hungarian

In isolated morphemes the correspondence between graphemes and phonemes (GPC) is mostly one-to-one. This is a characteristic feature of Hungarian script. However, the “one-to-one” relationship breaks down on morpheme boundaries due to new phoneme combinations not occurring in isolated morphemes. It happens very often because of the agglutinative character of the Hungarian language (for details of these changes, see Lotz 1972). As a result, Hungarian children have to learn the rules of Hungarian script in two respects. The first one means the acquisition of GPC rules in the case of isolated morphemes. The second one concerns the special GPC rules that apply on morpheme boundaries.

1.3. Some methodological remarks

1.3.1. 350 Hungarian 10-year-old children’s writings have been studied. The subjects had two types of tasks: a productive one (to write on their own), and a reproductive one (to copy from a book). The quality and quantity of errors did not differ from each other in a radical way, which corresponds with Slobin’s findings, i.e. the levels of imitative and spontaneous speech do not show radical differences (Slobin 1966; 1973).

A corpus was obtained containing about 1,000 errors out of 7,000 items (written lexemes). These 1,000 items are the objects of this analysis.

Before the analysis we must make a remark. The choice of 10-year-olds was an appropriate decision. The written work of this age group lacks the most elementary mistakes and errors. However, the various errors, mistakes, and peculiarities occurring in their written work may shed light on the written language acquisitional process.

1.3.2. For non-Hungarians to understand the data better, the erroneous part (i.e. letter or letters) of the Hungarian items will be underlined and the correct forms will be added in bold characters in brackets. No English glosses will be given since lexical meaning does not come into play in any way.

2. The data: Errors in the written language of 10-year-olds

2.1. The types of errors are grouped as follows (in an order of decreasing frequency of occurrence):

- (i) Exchange of letter(s): *tépében (tévében)*, etc. (32%)
- (ii) Wrong marking of quantity: *bácsi (bácsi)*; *halakal (halakkal)*, etc. (25%)
- (iii) Omission of letter(s): *mindet (mindent)* etc. (18%)
- (iv) Writing in one word instead of two: *Nemtudom (Nem tudom)*, etc. (11%)
- (v) Addition of letter(s): *ápolja (ápolja)*, etc. (4%)
- (vi) Wrong marking of sentence boundary: *Nem. _ itt játszik a szobában. (Nem. Itt játszik a szobában.)*, etc. (3%)
- (vii) Writing in two instead of one word: *el ment (element)*, etc. (2%)
- (viii) Wrong use of diacritics: *halkül (halkul)*, etc. (2%)
- (ix) Other errors not belonging to the above classes (2%)
- (x) Omission of syllable(s): *miba (moziba)*, etc. (1%).

The paper deals only with the first type of errors, i.e. with the exchange of letters, which represents about one third of the total number of errors.

2.2. Exchange of letters

There are four sub-classes of this type of error differing from each other in the reason that triggers the omission:

- (i) coarticulation of sounds in fluent speech (25%)
- (ii) errors of optical-visual perception (17%)
- (iii) various assimilation processes (23%)
- (iv) poor command of letter combinations (35%)

2.2.1. Errors caused by coarticulation

The exchanges connected with the motor execution of speech sequences mirrors various assimilation processes going on during speech.

- (1) Devoicing: *bisztos (biztos)*, *inté~~sz~~kedik (intézkedik)*, *harak~~sz~~ik (haragszik)*, etc.
- (2) Voicing: *megragd (megrakd)*, *ké~~h~~zeld (képzeld)*, etc.
- (3) Assimilation according to the place of articulation: *számtamból (szám~~tan~~ból)*

Errors (1–3) follow the principles of shallow writing; therefore, they reflect the phonetic changes going on during the pronunciation of sound clusters.

Consequently, the morpheme boundary fails to be indicated. Due to this fact, morphemes not existing in Hungarian may appear (*bisz-* **biz-**).

(4) Assimilation according to the manner of articulation: *metűje* (**betűje**)

In error (4) the exchange is caused by the hesitation due to the search for the appropriate GPC rule.

In letter exchanges below (5–7) consonants either in intervocalic or in word-edge positions are concerned.

(5) “k”–“g”, “g”–“k” exchanges: *mindik* (**mindig**), *csobok* (**csobog**), *nadrákom* (**nadrágom**), *inteket* (**integet**), etc.

(6) “g”–“t”: *hallagszik* (**hallatszik**)

(7) “p”–“k”: *putat* (**kutat**)

The phonemes /g/ and /k/ establish an archiphoneme, i.e. a minimal pair distinguished by voice. We must assume that this minimal pair is present together in the reduced articulation accompanying the writing process at the beginning stages. The exchanges of “g” and “k” are two-way and symmetrical, i.e. mutual and not depending on the phonetic environment.

The phonemes /g/ and /t/, /k/ and /p/ differ from each other not just in one but two phonetic features; therefore, these kinds of exchanges are rare.

(8) “p”–“b”, “b”–“p” exchanges: *kébzeld* (**képzeld**), *csopog* (**csobog**), etc.

The exchanges of “p”–“b” are also mutual, /p/–/b/ is also a minimal pair (archiphoneme).

(9) “t”–“d”, “d”–“t” exchanges: *dábla* (**tábla**), *csalát* (**család**), etc.

(10) *attak* (**adtak**), etc.

(11) *hidte* (**hitte**), etc.

(12) *zöltség* (**zöldség**), etc.

/t/-/d/ is also a minimal pair (9) and this is the reason for the exchange. Behind *attak* (10) is the principle of shallow writing, i.e. it mirrors the devoicing process in writing. *Hidte* (11) is a "good" error. It reflects the awareness that the long */t/* phoneme may be represented in writing with either the letters "tt" or "dt". The form in question is a hypercorrect one and shows the difficulties of transfer from shallow writing to deep.

The error in *zöltség* (12) developed in a similar way. The phoneme */tʃ/* very often appears as a grapheme consisting of two letters, either "ds" or "ts". The correct knowledge but the wrong application of the GPC rules results in this error.

(13) "r"–"l", "l"–"r" exchanges: *asztar* (**asztal**), *vilslit* (**virslit**), etc.

/r/ and */l/* are related with respect to sonority and this relation serves as a basis for errors involving them.

The last subgroup of these errors concerns the phoneme */v/*. It is a double faced phoneme, it can easily be replaced by other phonemes but, at the same time, it can also easily influence other phonemes which are phonetically close to it. The examples below reflect this situation.

(14) *aszfaltos* (**aszfaltos**), *fersenyző* (**versenyző**), *tépében* (**tévében**), *olyan* (**óiban**), etc.

/v/-/f/ is a minimal pair. Phonetic similarity explains the interaction between "v" and "p" or "b".

Summary of examples (1–14)

(i) One can assume that this type of letter exchanges is due to the phonemic system of the oral Hungarian language.

1. The interchanges between "k"–"g", "t"–"d", "p"–"b", "v"–"f", "m"–"b" and "r"–"l", respectively, are symmetric and mutual. The phoneme pairs standing behind these letter pairs are minimal pairs. The writing process, consequently, forces the children to find out in each case which member of a certain minimal pair has to be represented in the given lexeme.

2. There were some rare exchanges between the members of the letter pairs "g"–"t", "v"–"p" and "v"–"b". Phonemes standing behind them are also phonetically related but they do not constitute minimal pairs.

(ii) At the beginning of the writing process spoken language processes are closely followed, and children try to reflect in writing the devoicing/voicing effect, and several assimilations according to place or manner of articulation. This does not seem to be a very easy task either, because there is a "struggle" concerning

which member of a given minimal pair is to be chosen. The most fossilized remains of this process are the errors which are most strongly supported by the phonetic environment.

There are two prerequisites of the use of the appropriate letters: (1) the “struggle” must be successfully carried out between the members of a certain minimal pair in a relatively neutral phonetic environment (e.g. in word initial or final positions: *dábla* – **tábla**, *csalát* – **család**), (2) the “shadow” caused by phonetic changes going on in a given phonetic environment must be recognized.

In the course of learning the GPC rules, there is a certain order. The starting point of this learning process is when the phoneme and its sound realization are very close to each other (e.g. /p/ → [p] → “p”). The end of this process is when, due to the phonetic environment, there is a relatively big difference in the sound realization (e.g. /p/ → [b] → “p”).

2.2.2. Letter exchanges triggered by optical-visual factors develop from the under-extension of the optical-visual distinctive features or their configurations.

Letter exchanges among vowels:

(15) *kunyhában* (**konyhában**), *búlogat* (**bólogat**), *szivő* (**szívű**), etc.

The obvious reason for the above errors is the full or partial circle as an optical-visual feature of the letters “u”, “o”, “ü”, “ö”.

The consonant letters are generally built up of more features than vowel letters are, and the degree of feature variation is higher, too. There are more consonant letters than vowels. These facts make it understandable that the number of errors increases among the consonant letters.

Letter exchanges among consonants:

(16) “k”–“h”, “h”–“k” exchanges: *konykának* (**konyhának**), *kogy* (**hogy**), *hölti* (**költi**), *amelyih* (**amelyik**), etc.

(17) “d”–“g”, “g”–“d” exchanges: *uđat* (**ugat**), *kerđeti* (**kergeti**), *rágıó* (**rádió**), *felagatokat* (**feladatokat**), etc.

The exchanges in (16–17) are bidirectional and mutual because there is a high optical-visual similarity between the members of the letter pairs “k”–“h” and “d”–“g”, respectively. The exchanges in question may occur in any position within the lexemes (e.g. *kogy*, *uđat*, *amelyih*, etc.). This makes them different from the first type of letter exchanges where the environment played an important role.

In many cases correct and incorrect forms can occur together, e.g. *Ja aszt hitem kogy te (Ja, azt hitem, hogy te), A kutya ugat hangosan (A kutya ugat hangosan). Therefore this type of letter exchange looks more like a mistake than an error.*

The other two subgroups of letter exchanges caused by optical-visual reasons are asymmetrical. The first member of the pair stands for the second one and not vice versa.

(18) "n"–"m" exchange: *nen* (**nem**), *voltan* (**voltam**), *felm^ott* (**feln^ott**), etc.

(19) "l"–"b" exchange: *csol^ogása* (**csobogása**), *larna* (**barna**), etc.

The reason of the asymmetry, as is obvious, is the additional distinctive feature in "b" and "m". In some sentences right and wrong forms occur together, e.g. *Nem én voltan moziba* (**Nem én voltam moziban**).

The form of letters changes if one uses their small or capital forms. As a consequence, different exchanges may occur regarding one and the same letter in its small or capital forms.

(20) *Rita* (**Pista**)

i.e. there is no interaction between small "p" and "r", but capital "P" and "R" may be interchanged.

Summary of examples (15–20)

(i) The errors are caused either by inappropriate optical-visual perception or by incorrect grapho-motoric execution. In some cases it is possible to separate the two factors but in other cases they come into play together.

(ii) Letters differing from each other in one distinctive feature can be interchanged easily and mutually ("k"–"h", "d"–"g").

(iii) In some cases the exchange tends to be one-way ("n"–"m", "l"–"b"), that is, the simpler letter stands for the more complicated one.

(iv) These errors can occur anywhere within the lexemes and this makes them different from errors triggered by articulatory reasons.

2.2.3. The third type of letter exchanges are assimilations. They can be divided into two subclasses: assimilation from right to left, and assimilation from left to right. The two kinds of assimilation involve both the vowel and the consonant letters.

Assimilation from right to left:

Vowel letters

- (21) *paharat (poharat), repöllö (repülő), tetéjén (teteéjén), bárnára (barnara), etc.*

The letter triggering the exchange is generally in the neighbouring syllable and there is a great degree of similarity between the letters (“a”–“o”, “ö”–“ü”). The exchanges do not concern the vowel harmony of the lexemes (which is an important phonetic characteristic feature of the Hungarian language). This is the reason why there is no interaction between “u”–“ü”, “o”–“ö”, although they also differ from each other only in one optical-visual feature.

Consonant letters

- (22) *gergeti (kergeti), mett (ment), bezárutt (bezárult), nevetetlen (neveletlen), nevelenen (neveletlen), udvarianlan (udvariatlan), prólál (próbál), számtanlol (számtanból), lolint bólint), vízlől (vízből), pap (lap), fulolás (fuvolás), műror (műsor), halatat (halakat), rengeség (rendesség), zögség (zöldség), keketeség (kefeteség), szántanból (számtanból), mem (nem), írerte (ígerte), forít (fordít), járdás setál (járdán setál), hatodis sorban (hatodik sorban), etc.*

Among consonant letters these assimilations are more frequent (due to the simple reason that there are more consonant letters than vowel letters).

Assimilation is active within the frameworks of lexemes. The letters on the boundary either of a morpheme or a syllable are the initiators of the assimilation. The optical-visual or acoustic-articulatory similarities may contribute to the assimilation but they are not required criteria.

In the case of assimilation from right to left a forthcoming letter (still physically not represented) influences the letter being written. This means that the word before being written down has a mental representation. In this mental representation the letters of the word are highlighted in different ways. Letters on the boundary of a morpheme or a syllable are “brighter” and this difference is the source of assimilation. However, the “distinguished” letters (i.e. letters on the boundaries) are not objects of assimilation.

Assimilation from left to right:

Vowel letters

- (23) *delutun (delutan), hanam (hanem), vízis (vízes), kis kitya (kis kutya), a számszed (a számszed), etc.*

Assimilation from left to right occurs rarely but it steps over the morpheme boundary more often than the assimilation from right to left.

Consonant letters

- (24) *nanyobb* (**nagyobb**), *Jójka* (**Jóska**), *kerketi* (**kergeti**), *udvariatlál* (**udvariatlan**), *halkak* (**halkan**), *doldozik* (**dolgozik**), *abláb* (**ablak**), *zöldséd* (**zöldség**), *olvasottság* (**olvasottság**), *olvayottság* (**olvasottság**), *délden* (**délben**), etc.

Assimilation from left to right among consonant letters is also less frequent, which is understandable if we take into consideration that after writing a letter its "strength" decreases. The position of the letter initiating the assimilation is as in the former cases: letters in initial position impact on the others.

Summary of examples (21–24)

(i) In a strict sense these are not errors but slips of the pen. A small part of the cases can be described in terms of elementary perceptual processes (as underextension of optical-visual distinctive features and their configurations) but the larger part is beyond the scope of these processes. This latter type develops from the peculiarities of written language at a higher level; from the sequential character of the mental representation of written words. After certain experience in writing, the mental representation of the words (lexemes) is not simply a string of equally important letters. The representation becomes a structurally arranged sequence within which letters marking a certain boundary obtain more importance. This relative importance is the source and the driving force of the various assimilation processes.

(ii) Assimilation from left to right is more frequent than assimilation in the other direction, which is parallel with the natural direction of speaking and writing.

(iii) Assimilation does rarely step over the lexeme boundaries.

2.2.4. Letter exchanges concerning letter combinations:

- (25) Errors of "gy": *eg* (**egy**), *üges* (**ügyes**), *végzödik* (**végződik**), *hangyos* (**hangos**), *helység* (**hegység**), *nyorsan* (**gyorsan**), *hadjuk* (**hagyjuk**), *agya* (**adja**), *hagy* (**hadd**), *haggyál* (**hagyjál**), etc.

As seen from the errors, there is a course of development:

- (i) "g" and "gy" can mutually replace each other,
- (ii) instead of "gy", very rarely, "ly" or "ny" (i.e. letter combinations that are similar from the optical-visual and writing technical points of view) can appear,
- (iii) "gy" can stand instead of "dj" or "gyj" (i.e. letter combinations mirroring all the optical-visual, writing technical and phonetic similarities).

In some cases hypercorrect reanalysed forms may appear, i.e. where "dj" stands for "gyj". The reason of this change is the fact that both letter combinations in question can indicate the long phoneme /j:/.

- (27) Errors of "ly": *ráspoj* (**ráspoly**), *mejre* (**melyre**), *erejétől* (**erejétől**), *halyó* (**hajó**), *ruhálya* (**ruhája**), *számolya* (**számolja**), *helyesel* (**helyesel**), *hegyiségben* (**helyiségben**), etc.

At the beginning of the learning process "ly"–"j" may be confused both within lexical and grammatical morphemes (in "adult" writing "ly" does not occur in inflectional morphemes). In some cases the letter "j" may also stand as the second member of a grapheme. This means that for a short time there is a functional identity between "y" and "j" with respect to the visual-optical display of the phoneme /j/.

- (28) Errors of "ny": *növéneket* (**növényeket**), *villanggal* (**villannyal**), *menyen* (**menjen**), etc.

The number of errors decreases in comparison with the number of errors involving "gy" or "ly". Sometimes "n" and "ny" are confused.

- (29) Errors of "ty": *kúttá* (**kutya**), *kutaóiban* (**kutyaóiban**), *pettes* (**pettyes**), *kutga* (**kutya**), *kunya* (**kutya**), etc.

There are very few errors of this kind. The exchange between "t" and "ty" is not mutual: only "ty" is substituted by "t". It also occurs, although very infrequently, that "tg" is found instead of "ty".

Summary of examples (25–29)

- (i) These graphemes have a similar optical-visual structure. In the first position there is a letter having a sound value alone, too ("g", "l", "n", "t"), in the second place a letter ("y") ordinarily having no sound value. In spite of this fact, the learning process differs at some points.

1. "g"—"gy" frequently may be mutually replaced
2. "n"—"ny" rarely may be mutually replaced
3. "t" may substitute "ty" (but not vice versa)
4. there is no interaction between "l" and "ly"

This has two consequences. First, the pair "g"—"gy" serves as a prototype regarding the learning/acquisitional process of the grapheme type "g", "n", "t", "l" + "y". Second, one and the same acquisitional/learning process (see the graphemes in question) seems to be influenced by several linguistic factors, and this results in differences.

(ii) Sometimes "g" is substituted for "y". This is caused by the optical-visual and grapho-motoric similarities. It means that this substitution is triggered by written language peculiarities (oral language does not come into play).

The two-member graphemes not ending in a "y" are as follows: "cs", "sz", "zs". Members of these graphemes have their own sound values both separately and in combinations (e.g. "c" = [ts], "s" = [ʃ], "cs" = [tʃ], etc.).

- (30) Errors with "cs": *mac*kát (**macskát**), *bá*sci (**bácsi**), *ma*gska (**macska**), *ma*gyka (**macska**), *ma*szka (**macska**), etc.

The number of errors is not very large. Instead of "cs" one can find "c", "gy", "sz", "gs", "sc". Therefore we have to think that "cs" is not only one of the two-member graphemes not ending in "y", but it is also the prototype for them (as was the case above with "gy").

- (31) Errors connected with "s", "sz", "z", "zs": *sz*étál (**sétál**), *da*losz (**dalos**), *re*ndszég (**rendesség**), *re*ndesszég (**rendesség**), *me*gszeretné (**megszeretné**), *ze*m (**szemem**), *re*ndsz (**rendész**), *sz*ámos (**számos**), *sz*ereti (**szereti**), *go*dosza (**gondozza**), *vé*gsződik (**végződik**), *sz*enesz (**zenész**), *da*lhosz (**dalhoz**), *ta*lálkosztun (**találkoztunk**), *iz*szel (**ízzel**), *ig*azszat (**igazat**), *re*ndezszet-ség (**rendezettség**), *ze*mlszét (**zsemlét**), *mu*zikaszál (**muzsikál**), *sz*ebszfűrész (**zsebfűrész**)

As can be seen, on the one hand, there is a frequent and symmetrical interchange between "sz" and "s" and, on the other, a frequent but not symmetrical interaction between "sz" and "z". It reflects the double faced character of learning to write. Some difficulties may develop from the relationships of the oral language (/s/—/z/ is a minimal pair), some others may develop from the interrelationships among elements of the written language.

3. Conclusions

3.1. Children acquiring the oral form of their mother tongue have been characterized by various scholars as “little linguists” since they have the task of discovering the structural and semantic rules of their language. This task is not easier regarding the learning of the written form of the language, either. The linguist uses more than a hundred signs for the description of oral language and has many years of experience in using them. For children only a few dozens of letters are given and a maximum of 5–7 years of prior experience in the oral language.

The adequate optical-visual discrimination skills, the memorial retention of visual stimuli and a certain level of grapho-motoric skills are the most important prerequisites for the successful acquisition of written language.

The written language learning process develops an optical-visual perceptual and productional system which results in constructing a block containing new features and new feature combinations. At present we have insufficient knowledge (see Massaro 1975; Smith 1988; Goswami–Bryant 1990) concerning whether a general block functions or there are blocks differing from each other for the various language forms (written, oral, tactile) and, with the increase of experience, a cooperation develops gradually between the different blocks.

3.2. GPC rules in isolated morphemes (the development of shallow writing):

3.2.1. As it was mentioned earlier (see section 1.2) Hungarian children have to learn two kinds of GPC rules. The first set operates at the level of isolated morphemes, the second one at the level of morpheme combinations.

The starting point of the learning process in question is the acquisition of features and their configurations, the ending point is the command of writing isolated morphemes according to the principles of shallow writing. Children are capable of sufficient memorial retention of the visual sequence, and of phonetic and phonological transformation of the visual sequence.

Let us go into some details of these processes.

3.2.2. Sounds are numerous. From among their endless variations, children have to grab the invariant, which is a given configuration of acoustic and articulatory features. Thus writing at the same time initiates, requires and results in the ability to categorize oral language segments into the following classes: speech sounds, sound types, phonemes. Certain points of the sound system (minimal pairs, infrequent phonemes, etc.) may cause difficulties in the course of the learning process.

The validity of letters is checked by the features' configuration block. Insufficient command of configurations may lead to mutual or unidirectional exchanges. The configuration block contains a certain amount of sub-blocks with character sets of different shapes. The reality of sub-blocks is supported by the fact that different letter exchanges may appear depending on the form of the character (capital, small, etc.). The character sets are the registers of written language.

Exchanges between vowels and consonant did not occur. This means that the separation, on the one hand, of the two phoneme classes and the separation, on the other, of letters reflecting these phonemes is a relatively quick and easy process. The developmental history of the two types of letters (i.e. the learning process of vowels and consonants) is partly different, partly similar.

3.2.3. The first important stage in learning consonant letters is the division of the consonant phoneme set into separated members. While performing this task, children acquire some important skills.

(1) Children are able to distinguish each member of the consonant set. The last of the mohicans in this divisional process are the members of minimal pairs (archiphonemes).

(2) Segmentation of lexemes into phonemes results in morpheme constancy. Morpheme constancy has two consequences. Firstly, the allomorphs can be grouped around their morphs (a paradigmatic point of view). Secondly, the morpheme as the starting-point of a (lexical) derivational process becomes available (due to the transparency of morpheme boundaries). Linguistic entities become decontextualized.

(3) The processes described above follow a given order. They appear first at the very beginning of the lexeme, a little later at its end. This kind of importance of word initial position is justified by word identification and other related operations.

What is stated in (1–3) is not merely the developing stages of written language on its own. These changes reflect the influence of the writing learning process on the knowledge of the oral language but they are also necessary preconditions for an adequate writing learning process. Strangely enough, oral language without these changes is not an appropriate object of study. In other words, learning how to write does not mean that one and the same language system has to be transformed into different forms of manifestation. For the writing process a more detailed, structured and more deeply analysed oral language is needed: this is the only way speech can be transformed into a written form.

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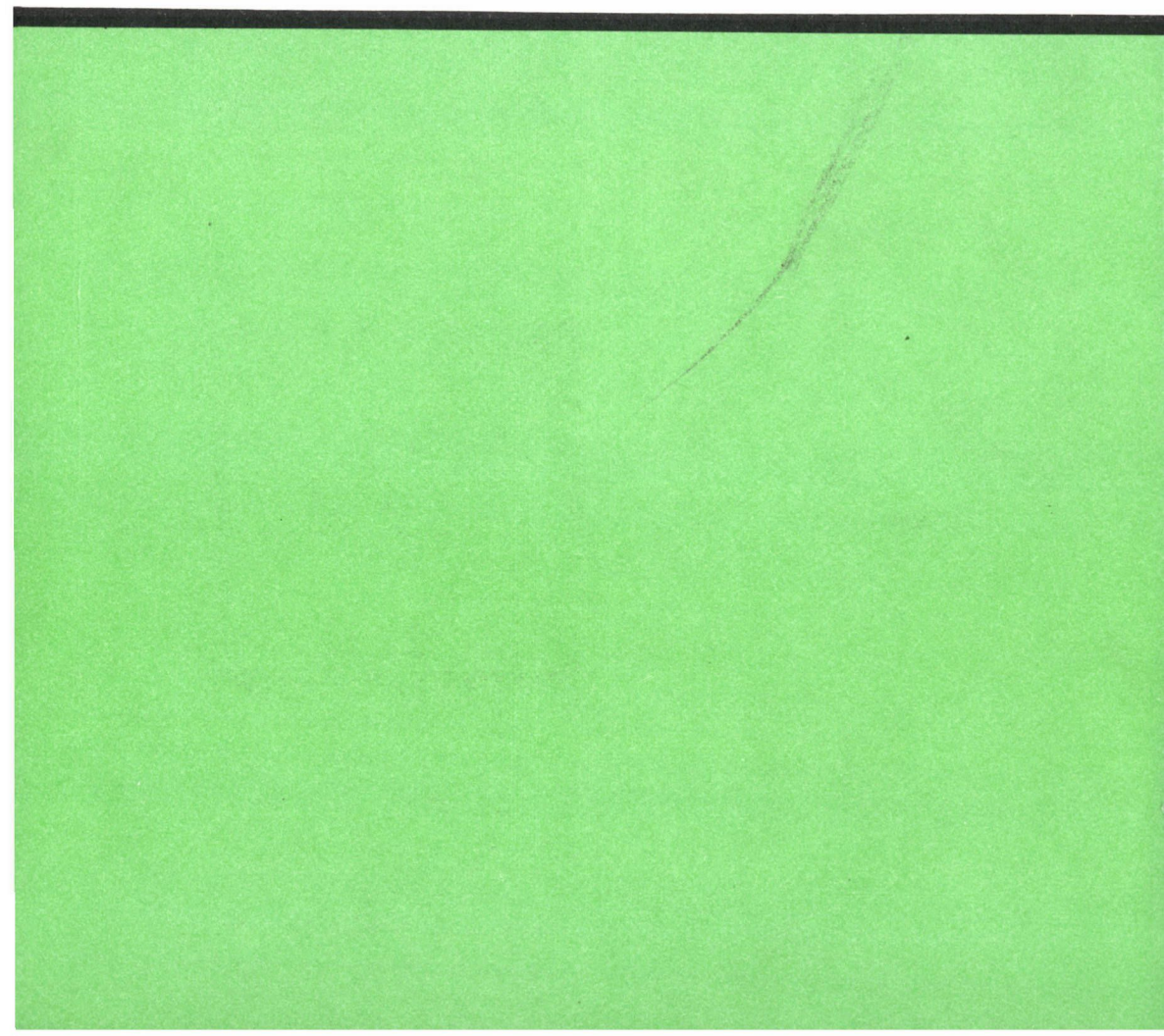
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- (1) (a) A sólymaid elszálltak
 the falcon-gen-pl-2sg away-flew-3pl
 'Your falcons have flown away.'

Examples can be referred to in the text as (1a), (1a-d), etc.

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GUEST EDITOR'S NOTE

This issue of *Acta Linguistica Hungarica* constitutes the first half of a collection of papers discussing theoretically relevant issues of Hungarian syntax in the generative framework. For technical reasons, the second half of the collection, consisting of papers discussing the left periphery of the Hungarian sentence, will be published separately, as volume 45(1–2) of this journal.

Object–verb agreement, i.e., accusative case checking in the AgrO projection, is an overt process in Hungarian. It is subject to interesting constraints, depending on the type of the specifiers/premodifiers of the nominal. Huba Bartos' paper derives the presence or absence of V–object agreement (traditionally called objective verb conjugation) from a noun phrase theory in which nominals may or may not project a DP—with consequences for their definiteness/specificity interpretation, and from the assumption that only DPs undergo case checking in SpecAgrO.

Unlike Bartos, Gábor Alberti assumes +/-specificity and referentiality to be semantic features of nominals, which determine their occurrence possibilities in various structural positions. Arguments in V' must be referential, whereas noun phrases in various specifier positions can also be legitimized as 'predicative'. Alberti uses checking theory to account for the distribution of different types of nominals across the sentence: various verbal and verb-related projections are associated with the syntactic features REF, +SPEC, or –SPEC, which must be satisfied by the corresponding Ref, +Spec, and –Spec features of nominals, respectively.

The non-referential, non-specific bare nominal + V combination, analyzed as instantiating a specifier–head relation by Alberti, is claimed by Farrel Ackerman and Gert Webelhuth to be a complex predicate formed in the lexicon. They argue for a relaxation of lexicalist assumptions standard in Lexical-Functional Grammar and Head-Driven Phrase Structure Grammar, allowing lexical representations to be expressed by combinations of words without joint morphological status—as a marked option.

Tibor Laczkó employs the framework of Lexical-Functional Grammar to analyze syntactic aspects of action nominalization on Hungarian material. He examines to what extent the argument structure of input predicates is retained, and how

it is mapped on grammatical functions. He argues for a semantically unrestricted POSSESSOR function, and for a POSS Condition (related to the Extended Projection Principle), which requires that every event nominal have a Possessor.

Piroska Kocsány describes pro-drop: a process which has been known for decades to have interesting syntactic, semantic and pragmatic conditions and consequences, a descriptively adequate analysis of which, however, has not been put forth yet. The phenomenon is theoretically especially interesting because its licensing conditions include textual conditions, for the handling of which generative theories do not seem to be prepared.

The papers of the volume are rich in descriptive detail; most of them also analyze facts so far not considered in the syntactic literature on Hungarian. At the same time, they all regard the description of Hungarian as a means of formulating, or testing, universal assumptions about human language.

Katalin É. Kiss

THE COMPOSITION OF (DIS)CONTINUOUS PREDICATES: LEXICAL OR SYNTACTIC?*

FARRELL ACKERMAN – GERT WEBELHUTH

Abstract

Recent lexicalist analyses of predicates expressed by syntactically independent elements, raise central questions concerning the domain in which such complex predicates are composed. Should they be composed in phrase structure or within the lexicon? We will argue that a demonstration of syntactic separability for pieces of complex predicates is independent of whether such predicates should be viewed as being composed in the lexicon or phrase structure. We examine Hungarian complex predicates consisting of a syntactically separable preverb, inflectable for person/number features, and a verbal stem. We suggest that the interpretation of the person/number features as oblique pronominals governed by the complex predicate provides an argument for the assumption that predicates expressed by several syntactically independent elements are better analysed as associated with lexical representations than as composed in phrase structure.

1. Pieces of predicates with syntactic independence

The past few years have witnessed increased attention within lexicalist frameworks such as Lexical Functional Grammar (LFG) and Head Driven Phrase Structure Grammar (HPSG) to the analysis of predicates expressed by syntactically independent pieces. The recognition of such phenomena, primarily represented in the literature by analytic or periphrastic causatives, raises central questions concerning the domain in which such complex predicates are composed. Given evidence for syntactic separability of the pieces of these predicates, is it compelling to assume that they must be formed in phrasal structure? If so, then the answer to the question posed in the title is that predicate composition is syntactic. Alternatively, are there reasons to argue that such compositions are still lexical, despite the obvious fact of surface independence for the pieces used to express these predicates? In related fashion, what would be the basis for a lexicalist perspective on such compositions and in what way would such a lexicalist approach differ from standard lexicalism?

* The authors have benefited greatly from collaboration with Phil LeSourd.

In order to understand the nature of these questions consider the following. It is well known that Russian contains morphological predicates consisting of a prefix and a verbal stem. These predicates are standardly analysed as morphophonologically integrated units representing atomic entities with respect to syntactic structure. We will refer to them as synthetic forms of predicates. An example is provided in (1), containing the prefix *ob* ‘around’: this prefix correlates with an increase in transitivity for the verbal stem yielding the direct object argument ‘lake’.

- (1) *guljajushie pary obxodjat ozero*
 strolling pairs around-go-3pl lake-acc
 ‘The strolling couples walk around the lake’

As is to be expected, given the morphological status of this word form, predicates such as these have clear derivatives, both nominal (2) and adjectival (3), related to them:

- (2) *obxod* N ‘round’ (as in ‘make the rounds’)
 (3) *obxodnyj* A ‘roundabout’

As in Russian, Hungarian has predicates where a preverbal (PV) element modifies certain lexical properties associated with the verbal stem. For example, in (4) we see an instance where the preverb *bele* ‘into’ correlates with an alteration of both the case government pattern and the meaning associated with the verbal stem *szól* ‘speak, say, talk’: whereas *szól* is a one-place predicate, *beleszól* is a two-place predicate which governs the illative case for its oblique complement.

- (4) *András beleszolt a vitába*
 András into spoke the dispute-ill
 ‘András intervened in the dispute’

Once again, as in Russian, the predicate appears to have a morphological status, serving as a base for derivational processes such as nominalization. In the present instance, the verb *beleszól* ‘intervene’ corresponds to the derived nominals *beleszólás* ‘intervention’ and *bele nem szólás* ‘non-intervention’.

These obvious parallelisms between the predicates in Russian and Hungarian clearly suggest a uniform analysis. Such an analysis would appear to be compatible with standard lexical treatments, since, as presented thus far, we seem to be deal-

ing with constructions that not only alter meaning, function assignments and determine case government,¹ but are similar from a morphological perspective as well, since the predicates in both languages appear to be complex morphological compositions. Lexicalist accounts are well-suited to address such alterations of functional-semantic information when they are encoded by morphological entities. On the other hand, there is a property characteristic of the Hungarian predicates that distinguishes them from their Russian analogues: in Hungarian the preverb and the verb can function as independent elements in phrase structure. This independence is exemplified in (5) where the presence of the sentential negation element *nem* 'no' immediately to the left of the verbal stem correlates with the postposing of the preverb:

- (5) András *nem* szólt **bele** a vitába
 András not spoke into the dispute-ill
 'András didn't intervene in the dispute'

Formations whose pieces exhibit this sort of syntactic independence are often referred to as phrasal predicates given their analytic or periphrastic expression.

Estonian, like Hungarian, possesses phrasal predicates. In (6) the preverb *ära* 'away' is associated with the predicate *ära ostma* 'corrupt, suborn'. This predicate is based on the simple verb stem *ostma* 'buy, purchase'. The preverb appears discontinuous from the verbal stem at the end of the clause in (6).

- (6) mees ostab ta sõbra ära
 man buy-3sg his friend-gen away
 'The man is bribing his friend'

Predicates consisting of a separable preverb and a verbal stem can serve as bases for derivational operations. The following deverbal adjectival and nominal forms related to *ära ostma* 'corrupt, suborn' typify this possibility:

- (7) äraostmatu A 'incorruptible' äraostmatus N 'incorruptibility'
 äraostetav A 'venal, corrupt' äraostetavus N 'venality'

¹ These properties will be collectively referred to as the 'lexical adicity' of predicates in section 2 of this paper.

Finally, the phrasal predicates of Hungarian and Estonian resemble in relevant ways one type of German predicate, namely, predicates containing so-called separable particles.² An example is provided below containing the predicate *abrufen* 'call up'.

(8) weil wir die Informationen jederzeit *ab-rufen* können
 because we the information always call-up can
 'because we can call up the information at any time'

(9) Wir *rufen* die Informationen jederzeit *ab*
 we call the information always up
 'We call up the information at any time'

As can be seen, the separable preverb *ab* appears at the end of the finite matrix clause in (9): the verbal stem and preverb are discontinuous in the syntax. As in Hungarian and Estonian, German phrasal predicates may serve as bases for derivational operations. This is exemplified by the possibility for a phrasal predicate to participate in adjective formation with the suffix *-bar* 'able' as in (10):

(10) weil die Informationen jederzeit *ab-ruf-bar* sind
 because the information always up-call-able are
 'because the information is obtainable at any time'

The predicates in Russian, Hungarian, Estonian, and German all: (i) exhibit lexical effects, i.e., the preverb-V may differ from the verb stem with respect to syntactic valence, semantics, case government (and grammatical functions), and (ii) exhibit morphological effects, i.e., the preverb and V together constitute a morphological base for derivational and inflectional operations. On the other hand, Hungarian, Estonian, and German differ from Russian in allowing the preverb and verb to exhibit syntactic independence. The existence of phrasal predicates with the profile exhibited by Hungarian, Estonian, and German is widespread cross-linguistically and has elicited the following characterisation by Watkins with respect to Indo-European (1964, 1037):

PV V compositions constitute "single semantic words", comparable to simple lexical items; yet they permit tmesis, or syntactic separation, suggesting that internal parts are independent syntactic entities.

² Of course, English particle verb constructions also exemplify this problem. For example, whereas it is possible to say 'the teacher dressed the boy down' the related nominal is preferably 'the teacher's dressing down of the boy', rather than 'the teacher's dressing of the boy down'.

Phrasal predicates represent an analytic paradox with respect to standard assumptions of lexicalism (cf. Nash 1982). In particular, their semantic and morphological unithood conflicts with their syntactic separability if the lexicon is interpreted as the source for words employed as syntactic atoms and the syntax as a system for combining and ordering them.

From a cross-linguistic perspective phrasal predicates of the sort illustrated above represent only one type of predicate whose pieces are expressed by syntactically independent elements. For example, there has been an enormous amount of research into causative constructions suggesting that causatives expressed by a single complex wordform, i.e., typified by the Hungarian morphological causative in (11), may exhibit essentially identical semantic effects, grammatical function assignments, case government patterns, etc., as causatives expressed by syntactically separate entities, i.e., typified by the Hungarian periphrastic causative in (12).

(11) a fiú elvonszoltatta Jánost (a hölgyel/a hölgy által)
 the boy away-drag-caus-3sg/def John-acc the lady-instr/the lady by
 'The boy had János dragged away (by the lady)'

(12) a fiú hagyta Jánost elvonszolni (a hölgy által)
 the boy let-past-3sg/def John-acc away=drag (the lady by)
 'The boy let János be dragged away (by the lady)'

Both (11) and (12) are arguably mono-clausal constructions containing identical causer arguments, i.e., 'the boy', patient arguments, i.e., 'John', and optional causee arguments, i.e., 'the lady'.

Recently there has been a move within lexicalist theories to explain such similarities by positing predicate composition operations which combine certain sorts of information associated with the syntactically separate pieces within phrase structure. This procedure, reminiscent in significant ways of proposals within Government and Binding theory such as Rosen (1990), Baker (1989) among others, is referred to as **predicate composition** by Alsina (1993) and Butt (1995) within the Lexical Functional Grammar framework. On this analysis, the a(-rgument) structures associated with each of the participating predicates combine to create a composite argument structure. This a-structure serves as the basis for assigning grammatical functions to arguments of the complex predicate.

It is important to note that this type of proposal represents a departure from certain long held assumptions concerning the locus for manipulations of lexical semantic information and grammatical function assignment within lexicalist theo-

ries. In particular, it departs from the common assumption that all meaning changing, function changing, valence changing and case-government altering operations are limited to the lexicon.

In section 2 we examine the nature of the assumptions at issue with respect to such a proposal and will offer an alternative interpretation of lexicalist assumptions. In section 3 we will demonstrate how this alternative conception of lexicalism appears to provide a theoretically satisfying account of Hungarian inflecting preverb and verb combinations, and one which we argue to be preferable to the syntactic composition accounts currently favoured among lexicalists.

In general, we will argue that a demonstration of syntactic separability for pieces of complex predicates is independent of whether such predicates should be viewed as being composed in the lexicon or phrase structure. The view of lexicalism defended here will assume, in fact, that predicates expressed by a single syntactic atom as well as predicates expressed by several such atoms are profitably associated with lexical representations. We will forego in the present paper a detailed implementation of these latter assumptions and refer the reader instead to the detailed exposition in Ackerman–Webelhuth (in press).

2. Conceptions of lexicalism

In our view lexicalism may be regarded as a cluster concept admitting of some gradient among different approaches. In this section we identify three central proto-concepts associated with lexicalism. This will help us to characterise the nature of lexicalism propounded by several different recent approaches depending on which of the principles are recognised in the particular theory. In addition, we can compare the views developed in the present article to these other conceptions of lexicalism. The table in (13) provides an overview of our comparison and the following text explains the meanings of the principles and the values that we have assigned to the cells:

(13) Overview of lexicalism

Theory	Lexical Adicity	Morphological Integrity	Morphological Expression
Classical LFG and HPSG	yes	yes	Principle
Recent LFG and HPSG	no	yes	Principle
This article	yes	yes	Preference

We will call the first lexicalist proto-principle **Lexical Adicity** since it relates to the locus for establishing a set of adicity structures for lexical items:

(14) Lexical Adicity

The adicity of a lexical item is lexically fully determined and cannot be altered by items of the syntactic context in which it appears.

Lexical adicity is intended to cover three different types of information associated with a lexical item: the number and type of its semantic arguments, the number and type of its functional arguments, and the number and grammatical categories of its phrase-structural dependents. For a verb such as the Hungarian predicate *vonszol* 'drag', lexical adicity would require that its semantic arguments "dragger" and "dragee", its functional arguments "subject" and "object", and its categorial arguments "NP[nom]" and "NP[acc]" already be specified in its lexical entry. The causative lexical entry (or predicate) in (11) based on *vonszol* 'drag', specifically *elvonszoltat* 'make drag', likewise would be lexically completely specified for semantic, functional, and categorial selection, because (14) reserves the power of specifying these selectional properties for the lexicon and expressly withholds this privilege from the mechanisms applying in the syntactic component.

As the table indicates, classical LFG and HPSG both incorporated lexical adicity. In the context of the theories presented in Bresnan (1982) or Pollard–Sag (1987) the selectional properties of lexical items were completely determined in the lexicon and all changers in the meaning of a predicate or its selectional properties were achieved in the lexicon (via lexical rules) and were independent of the syntactic context into which the lexical entry was inserted.

Recent LFG and HPSG analyses of complex predicate phenomena, however, extend the privilege of creating new argument structures from the lexicon to the syntax, in direct violation of **Lexical Adicity**. In the case of LFG, Alsina (1993, iv, v, 280) admits "partially specified predicates" whose adicity is only fixed in the syntactic component, as can be inferred from the two quotes below:³

The operations that affect the way that arguments are overtly expressed are assumed to be operations on the argument structure of a predicate and are treated as partially specified predicates that must compose with other predicates to yield fully specified predicates. Thus, predicate composition is responsible for operations such as passivization, causativization, applicativization, etc.

³ For a similar view, see Butt (1995, chapter 5 and elsewhere in her book).

Most work within LFG, and other lexicalist theories, has assumed that predicate composition, or the equivalent notion in each particular theory, can only take place in the lexicon. However, the evidence indicates that causative (and other) complex predicates in Romance are not derived in the lexicon because the two verbs that compose the complex predicates do not constitute a word. If the lexicon is the word formation module of the grammar and words are the terminal nodes of the c-structure, we have to conclude that causative constructions in Romance contain two words that jointly determine the predicate of the clause. This forces us to design a theory that allows predicate composition to result not only from combining morphemes in the lexicon, but also from combining words and phrases in the syntax. In what follows, I will first present evidence that the causative complex predicate in Romance does not correspond to one word (a morphological unit) or even one single X^0 or terminal node in the syntax, and that it is, therefore not formed in the lexicon; and I will then indicate the necessary assumptions for an LFG theory to allow predicate composition in the syntax.

Within HPSG, the highly influential proposal of Hinrichs–Nakazawa (1990) allows lexical entries to subcategorize for another lexical entry as a complement. As a consequence, the selecting lexical entry may inherit some or all of the selectional properties of that complement. This yields a configuration where a selector with an initially underspecified argument structure comes to have a fully specified argument structure. Thus, an auxiliary that selects for a main verb complement and inherits all of that complement's arguments will have a different number of arguments depending on whether the embedded complement has zero, one, two, or three arguments. Since the identity of the verb that serves as the complement to the auxiliary will only be known once the two verbs appear together in phrase structure, the argument structure of the auxiliary will be finally specified only in the syntactic component as a function of the syntactic context in which the auxiliary appears. This is in clear violation of the principle of **Lexical Adicity**.

LFG and HPSG thus have undergone a conceptual transformation in their recent history in that both theories have reset the boundaries between the applicability of lexical and syntactic mechanisms in favor of the syntax: whereas previous versions of both approaches gave certain analytical privileges to the lexicon and withheld them from the syntax, the recent versions of these theories allow the syntax to move further into the territory once held exclusively by the lexicon.

In this connection it is important to appreciate that the empirical motivation for this relative loss of distinction on the part of the lexicon is precisely the set of phenomena dealing with analytically expressed clausal heads (i.e. predicates). Alsina (1993), Butt (1995), and Hinrichs–Nakazawa (1990) all motivate the need for the creation of new argument structures in the syntax on the basis of constructions involving a combination of two verbs which jointly define the semantic, function-

al, and categorial properties of a clause, e.g. a combination of a causative verb and a main verb or a combination of an auxiliary and a main verb.

As the entry in the final row of table (13) indicates, the theory of predicates advanced in this article retains the strongly lexicalist position of classical LFG and HPSG: the lexicon and **only the lexicon** has the privilege of specifying the properties that make up the adicity of a phrase-projecting head. We believe that it is the wrong theoretical choice to weaken the influence of the lexicon relative to the syntax in the face of analytically expressed predicates and—as will be stated shortly—instead take the position that this problem is most effectively solved by realigning the relative influences of the lexicon and the syntax in the other direction. In other words, the type of theory assumed in the present article will force the syntax to cede some further analytical ground to the lexicon and hence in this respect is an even more strongly lexicalist theory than classical LFG and HPSG.

Our second proto-principle of lexicalism deals with the relationship between the lexical component and morphology:

(15) Morphological Integrity

Syntactic mechanisms neither make reference to the daughters of morphological words nor can they create new morphological words in constituent structure.

In the words of Di Sciullo–Williams (1987), Morphological Integrity creates a “bottle neck” represented by morphology of the root node of a morphological constituent structure tree. Syntax cannot “look” lower in the tree at the root’s daughter constituents. Bresnan–Mchombo (1995) present this point as follows (note that these authors prefer the term Lexical Integrity to the somewhat more specific Morphological Integrity):⁴

A fundamental generalization that morphologists have traditionally maintained is the lexical integrity principle, that words are built out of different structural elements and by different principles of composition than syntactic phrases. Specifically, the morphological constituents of words are lexical and sublexical categories—stems and affixes—while the syntactic constituents of phrases have words as the minimal, unanalyzable units; and syntactic ordering principles do not apply to morphemic structures... it has been hypothesized that the lexical integrity principle holds of the morphemic structure of words, independently of their prosodic or functional structure.

⁴ The view of lexical integrity proposed in Bresnan–Mchombo (1995), i.e., that the leaves of syntactic trees contain fully inflected and derived word forms and that morphological operations are prohibited from occurring in syntax, is also proposed in Ackerman–LeSourd (1997) with respect to Hungarian (written in 1993).

We take **Morphological Integrity** to mean that syntax and morphology are separate but interacting domains of grammar. Syntax, interpreted as phrasal structure, can neither “look into” morphological words to see internal structure nor can it create new morphological words. The lexicon is not subject to either of these two constraints and hence has a more privileged relation to morphology than the syntax.

Each of the theories compared in our overview table (13) claims this morphological privilege of the lexicon over the syntax and in so doing they all differ from other theories that do allow morphological and syntactic operations to be intermixed, e.g. many versions of Government and Binding Theory and classical Montague Grammar.

The third and final diagnostic entering into an explication of lexicalism will be referred to as **Morphological Expression**:

(16) Morphological Expression

Lexical expressions are uniformly expressed as single synthetic (syntactically atomic) word forms.

The concept of morphological expression, we believe, has been mistakenly conflated with morphological integrity as characterized above. Specifically, whereas morphological integrity constrains syntactic operations from creating morphological word forms, morphological expression concerns assumptions about the surface means by which lexical representations are expressed. LFG and HPSG have traditionally held the lexicon to the strict requirement that each lexical representation be expressed by at most one single morphophonologically integrated word form.⁵ This requirement privileges the syntax to create all collocations that consist of more than one morphological piece, even if the ensemble of morphological pieces behaves as one functional-semantic unit with one argument structure, e.g. the analytical causatives discussed in Alsina (1993) and the auxiliary-verb combinations discussed in Hinrichs–Nakazawa (1990). It is precisely this required connection between clausal heads inserted from the lexicon and single morphological surface forms that leads these authors to abandon the restriction against the formation of new argument structures in the syntax as was discussed in connection with the principle of **Lexical Adicity**.

There is thus conceptual tension between **Lexical Adicity** and **Morphological Expression**, and this tension becomes most obvious in the treatment of analytically expressed clausal heads. Classical LFG and HPSG maintained both principles but

⁵ We are, of course, ignoring multi-word idioms in this discussion, since they are generally acknowledged to be listed and do not fall within the purview of this assumption.

were unable to provide optimal analyses of these types of heads. Two types of responses are possible to this state of affairs and both involve a realignment of the relative privileges of the lexicon and the syntactic component, albeit in opposite directions. Either one considers it of paramount importance to retain the morphological restrictions of the lexicon vis-à-vis the syntax: then one is led to create analytically expressed clausal heads in the syntax by allowing phrase-structural operations to invade into the previously exclusively lexical domain of the formation of new argument structures. This leads to the departure from classical lexicalism that is represented by works such as Alsina (1993) and Hinrichs–Nakazawa (1990). Accordingly, lexicalism is in a weaker position relative to the syntax in recent LFG and HPSG compared to the classical versions of these theories (see the first and second rows in (14)).

Alternatively, if one considers **Lexical Adicity**, i.e. the exclusive privilege of the lexicon to create and manipulate the functional-semantic information associated with clausal heads, to be the conceptual core of lexicalism, one can still maintain a principled role for **Morphological Expression**: interpreting it as a markedness preference for the encoding of lexical representations strengthens the relative analytical role of the lexicon vis-à-vis the syntax. Whereas classical lexicalism allowed the syntax to deal with collocations without joint morphological status and withheld this option from the lexicon, **Morphological Expression** as a markedness principle makes the syntax only the preferred locus of composition for analytically expressed elements but extends this option to the lexicon as a marked choice. The unmarked choice of expression for a lexical item is, of course, the sort of integrated morphophonological entity which motivates **Lexical Integrity**.

To sum up our discussion of lexicalism as a cluster concept: this article takes the view that the data from predicates expressed by syntactically independent elements do not warrant abandoning what we take to be foundational principles of lexicalism, in particular the principle we called **Lexical Adicity** which prevents the syntactic component from creating new argument structures. The argument developed in this article is guided by the conviction that this functional-semantic component of lexicalism should only be abandoned if the puzzles created by (complex) predicates prove to be thoroughly incommensurable with all defensible implementations of this view. From a more positive perspective, we will demonstrate that adherence to these functional-semantic principles raises important questions and yields important results. Accordingly, our overall view can perhaps best be characterized as follows:

(17) The primacy of function over form

Lexicalism is first and foremost a hypothesis about functional-semantic information and secondarily a hypothesis about form.

Given this general perspective on lexicalism, we are led to postulate the profile of principles in the last line of the overview table of lexicalism. This proposal can be summed up for easy reference as follows:

(18) Assumptions of the present article

- Only lexical but not syntactic rules can create new argument structures (**Lexical Adicity**).
- Only lexical but not syntactic rules can create or analyze morphological words (**Morphological Integrity**).
- Lexical representations are preferably expressed by single synthetic word forms but can also be expressed by combinations of words without joint morphological status (**Morphological Expression**).⁶

In effect these assumptions lead to two contending interpretations of predicates whose pieces exhibit syntactic independence. On the prevailing account, the pieces only interact with one another when they co-occur in phrase structure: information associated with the pieces can only be composed when these pieces co-occur. The alternative argued for below is to jointly associate the independent pieces with a single lexical representation. In section 3 we will explore a domain in which it appears useful to be able to appeal to lexical representations associated with syntactically independent elements.

3. Morphological Blocking vs. Lexical Blocking

As observed in Poser (1992), a phenomenon called blocking has been a traditional source of explanation within morphology. He characterizes this phenomenon in the following way: “the existence of one form prevents the creation and use of another form that would otherwise be expected to occur” (Poser 1992, 11). For example, Aronoff (1976) appeals to blocking in order to account for certain restrictions on nominalization in English: whereas adjectives bearing the suffix *-ous* typically have nominal counterparts with the suffix *-ity*, e.g. *curious* and *curiosity*, adjectives without such nominal counterparts appear related to nominals that are listed and

⁶ Familiar accounts of “lexical insertion” deal only with synthetically expressed predicates. On our alternative view the question arises how the parts of an analytic predicate are associated with positions in syntactic structure; cf. Jackendoff (1995, 1997) for similar considerations concerning lexical entities and lexical insertion. The details of our proposal are presented elsewhere. It provides lexical representations for several sorts of predicates in a unification-based type-theoretic formalism which also addresses the syntactic realization of potentially discontinuous pieces of predicates.

thereby 'block' the formation of the derived and expected form, e.g. *glorious* and *glory*, but not **gloriosity*.

Similarly, analyses formulated within lexical phonology/morphology as developed in Kiparsky (1982) and Mohanan (1993) have employed blocking to account for numerous phenomena. For example, Gordan (1985) has appealed to level ordering within lexical morphology in order to explain the apparent predisposition of children acquiring English to permit irregular plural forms as left members of synthetic compounds. In particular, he observed that children are prone to produce (in experimental settings) compounds such as *teeth-eater* containing the irregular plural *teeth*. In contrast they produce such forms as *head-eater* rather than **beads-eater*: these compounds contain left members which have regular plural forms. Given the level ordered assumptions that irregulars are present at a level prior to compounding and regular forms are present at a level after compounding, the observed behaviours are argued to follow: the irregular forms can feed compounding and therefore are possible as left members of compounds, while regular forms cannot feed compounding since they follow this operation. In sum, the organization of the morphological component into levels where irregular forms serve to block regular ones can be used to explain certain subtle constraints on compounding.

Noting that 'blocking' has been restricted to relations between 'lexical items' and interpreting 'lexical items' in conformity with Morphological Integrity and Morphological Expression as previously discussed, Poser (1992) presents several phenomena where 'lexical items' appear to block certain phrasal constructs. We will discuss one of the phenomena mentioned by Poser since it is particularly relevant to the central issue of this paper: periphrastic verbs in Japanese.

We will see that if lexical representations of predicates are separated from their morphological expressions, as argued for in the present work, then we are confronted by what can be referred to as 'lexical blocking'. That is, one lexical representation blocks the appearance of another lexical representation and does so in accordance with the markedness principle of expression for lexical representations previously discussed. In other words, the approach to predicates offered in the present work extends to account in a straightforward way for instances where single morphological objects can block ensembles of morphological objects, because both sorts of entities are hypothesized to be expressions of lexical representations.

We begin by discussing Poser's example and then turn to two other similar phenomena, specifically, verbal inflection in Irish (following Andrews 1990) and oblique inflection on preverbs in Hungarian (following Ackerman 1987).

3.1. "Phrasal" blocking

Poser (1992) observes that Japanese contains minimal pairs of periphrastic verb forms which are commonly thought of as unincorporated predicates as in (19a) vs. incorporated predicates as in (19b).

- (19) (a) Eigo-no benkyoo-o site-iru
 English-gen study-acc doing-be
 ‘(He) is studying English’
- (b) Eigo-o benkyoo site-iru
 English-acc study doing-be
 ‘(He) is studying English’

Both (19a) and (19b) contain the verbal element *suru* ‘do’. On the other hand, this verb is preceded by an accusatively marked nominal object in the unincorporated variant, but in the incorporated variant it is preceded by an unmarked nominal. Poser argues that despite the fact that the incorporated variant is frequently treated as a single word form, there is evidence to suggest that it is actually phrasal, like the unincorporated type. He provides the following evidence in support of this claim (1992, 112):

- (a) Periphrastic verbs are accented like phrases rather than like any other sort of verb,
- (b) Reduplication affects only the *suru* component of the periphrastic,
- (c) Periphrastic verbs do not undergo even highly productive lexical nominalizations,
- (d) Sentence-internally periphrastics are analyzable into the nominal verbal portions, in that the nominal may be omitted in *whether* constructions, which require repetition of the verb,
- (e) It is possible to Right Node Raise the *suru* portion alone,
- (f) It is possible to delete the verbal noun in the second conjunct of a pair of conjoined sentences,
- (g) Periphrastics are analyzable across sentence-boundary in that the nominal part may be omitted in *too*-clauses, in which the verb of the first sentence is repeated in the second sentence,
- (h) Periphrastic verbs are analyzable at the discourse level across speakers into the nominal and *suru*, in that the nominal part may be omitted in responses to yes-no questions.

Having demonstrated that the incorporated type of periphrastic verb is phrasal, Poser then goes on to show that these forms are blocked by simple verb forms. This argument is based on the interaction of deverbal noun formation and periphrastic predicate formation. In particular, he notes that Japanese possesses a productive deverbal noun formation process yielding nominals such as *iri* ‘parching’ and *mamori* ‘protecting’ from *ir* ‘parch’ and *mamor* ‘protect’. However, despite the fact that it is possible to create these deverbal nouns, the language does not permit them to be used in periphrastic predicate formation, i.e. **iri suru* ‘parch’ or **mamori*

síurú 'protect'. Following Kageyama (1982), he suggests that the prohibition against such periphrastic forms is directly related to the existence of simple verbs which block them, i.e. *ir* 'parch' and *mamór* 'protect'. He concludes that "... this seems to be a case in which lexical items block a phrasal construction" (1992, 119).

As suggested previously, a lexical representation of predicates which allows for several sorts of expression types renders possible precisely the sort of analysis which makes sense of such effects. On the account developed here we are confronted with "lexical" blocking, where the blocking of synthetic morphological objects by synthetic morphological objects is simply one common type of blocking. Since, by hypothesis, there are other expression types for lexical representations, specifically phrasal expressions, it is to be expected that certain synthetic expressions might block certain phrasal expressions as long as each is associated with a lexical representation. That is, a lexical representation with a certain information content and synthetic expression tends to block the use of an analytic expression of a lexical representation which could convey the same information. Andrews (1990) represents a particularly perspicuous formulation of this effect which he calls The Morphological Blocking Principle.

3.2. The morphological blocking principle

Andrews (1990) proposes a morphological blocking principle (MBP) in order to explain, among other phenomena, the following sort of distributions in Irish verbal inflection:

- (20) (a) Chuirfínn isteach ar an phost sin
 put-condit-1sg in on the job that
 'I would apply for that job'
- (b) *Chuirfeadh mé isteach ar an phost sin
 put-condit I in on the job that
 'I would apply for that job'

The verb in (20a) is an inflected form which specifies features for the subject argument of the verb meaning 'apply': in particular, it bears first person singular features. In contrast, the verb in (20b) is uninflected and therefore does not morphologically express any features of the subject: the subject features of the predicate meaning 'apply' are supplied by the independent first person subject pronoun appearing in constituent structure. The ungrammaticality of (20b) suggests that though in principle one might think it possible for an independent pronoun to satisfy the subject complement requirement of the predicate, it turns out it cannot.

Andrews, following an observation by McCloskey–Hale (1984), develops the hypothesis that, for purposes of satisfying the functional requirements of predicators, uninflected verbal forms (i.e. the verbal form in (20b)) are dispreferred when inflected forms are available. He formalizes this hypothesis as the Morphological Blocking Principle:

Suppose that the structure *S* has a preterminal node *P* occupied by a lexical item l_1 , and there is another lexical item l_2 such that the *f*-structure determined by the lexical entry of l_1 properly subsumes that determined by the lexical entry of l_2 , and that of l_2 subsumes the *f*-structure associated with *P* in *S* (the complete structure, after all unifications have been carried out). Then *S* is blocked.

The effect of this principle is as follows: when there are alternative ways of satisfying some requirement of a lexical item, e.g. finding a value for a grammatical function such as SUBJ, then satisfaction via an inflected form specifying the relevant value is to be preferred over a form which does not have such a specification and which would, consequently, require satisfaction of the requirement in constituent structure. As applied to the examples in (20), this means that the verb ‘apply’ requires a value for its subject argument: since there is an inflected form which can determine a value for this function, it is to be preferred over the uninflected form in (20b) which could only determine a value for this function by an independent pronoun in constituent structure. Note that MBP is formulated in terms of the relative content of related lexical items, the basic idea being that an item specified for some property blocks the use of a related item not specified for that property.

On the assumption that the MBP is a principled way to distinguish between alternative expressions of related lexical items, it yields empirical predictions that can help to distinguish between two views of predicate composition: specifically, it can help to distinguish between the view that predicates consisting of demonstrably independent syntactic elements are composed in the syntax—the view currently adopted in one form or another among practitioners of LFG and HPSG, as outlined in section 2—in contrast to the view developed here, namely, that predicate composition is an operation among lexical representations associable with different expression types.

On a syntactic composition account, if a language contains predicates with demonstrably separate syntactic pieces, then the pieces should not jointly exhibit a lexical blocking effect: this prediction follows since on the syntactic account predicate composition is between two independent elements in constituent structure. From the perspective of the Irish data presented previously, there would be, in effect, two syntactic ways of satisfying the requirements of the predicate: MBP,

however, does not account for preferred options among two alternative syntactic ways of satisfying predicate requirements. In contrast, if surface expression is separated from the lexical status of predicates, as on the present account, then such data is precisely what is to be expected: syntactically independent pieces of a predicate could exhibit blocking effects, since they are simply a particular expression type of lexical representations and illustrate the operations of MBP interpreted as a Lexical Blocking Principle (LBP). Accordingly, a more specified lexical representation blocks the use of a less specified related lexical representation. In the next section we examine one type of phenomenon from Hungarian which bears on this prediction.

3.3. Against predicate composition in syntax

Our interpretation of Andrew's MPB as a lexical blocking principle as presented above restricts a less highly specified lexical entity from satisfying the requirements of a predicate if there is a more highly specified synthetically expressed lexical entity which expresses the requisite information. In Irish we saw that both the inflected (i.e. more highly specified) form and the uninflected (i.e. less specified) form were synthetic morphological objects: that is, both of the relevant forms were syntactic atoms. They differed with respect to whether an independent element in constituent structure could satisfy the requirements of predicate: the issue was not whether the predicate itself is expressed synthetically or analytically/periphrastically, but rather whether its requirements are satisfiable internal to the synthetic form or external to it. In contrast to the Irish examples, the Japanese data exemplify instances where a synthetic verbal form blocks the existence (or use) of an analytic verbal form: here blocking concerns the preference for synthetic verbal expressions over analytic ones, but argument satisfaction is not at issue.

In the present section we examine an instance where the predicate can be expressed by syntactically independent elements, thus analogous to the sorts of periphrastic predicates in Japanese, while also showing the sorts of argument satisfaction properties reminiscent of Irish. We argue that the phenomenon of oblique argument incorporation in Hungarian is one instance of empirical data which serves to distinguish lexical vs. syntactic composition of predicates, thereby bearing on the general prediction described above.

Consider the following data from Hungarian containing the transitive predicate *szeret* 'love' in (21) and the related two place non-transitive predicate *beleszeret* 'fall in love' composed of the verbal stem *szeret* 'love' and the preverb *bele* 'into' in (22).

(21) a fiú szerette a lányt/*lányba
 the boy loved the girl-acc/girl-ill
 'The boy loved the girl'

(22) a fiú bele szeretett a *lányt/lányba
 the boy pv loved the girl-acc/girl-ill
 'The boy fell in love with the girl'

The predicate containing the preverb *bele* and a verbal stem in (21) is representative of a class of predicates which differ from the simple verbal stem with respect to meaning, the grammatical function status of arguments and case government. In addition, the preverb and the verbal stem are separable under certain syntactic conditions. For example, preverbs are postposed in contexts of sentential negation as illustrated in (22) where the negative element *nem* immediately precedes the verbal stem:

(23) a fiú **nem** szeretett **bele** a *lányt/lányba
 the boy not loved pv the girl-acc/girl-ill
 'The boy didn't fall in love with the girl'

The syntactic independence of the verbal stem and the preverbal element in conjunction with the clear differences concerning function assignment, etc. viz. the simple predicate makes such constructions natural candidates for an analysis in terms of syntactic composition. In this connection it is important to consider the manner in which the oblique argument requirement of the complex predicate can and cannot be satisfied for pronominals (for detailed discussion see Ackerman (1987; 1990) as well as an alternative account in É. Kiss (forthcoming)). This contrast is illustrated in (24).

- (24) (a) a fiú belé(je) szeretett
 the boy pv-3sg loved
 'The boy fell in love with him/her'
- (b) *a fiú bele szeretett beléje
 the boy pv loved 3sg-ill
 'The boy fell in love with him/her'
- (c) *a fiú beléje szeretett a lányba
 the boy pv-3sg loved the girl-ill
 'The boy fell in love with the girl'

In (24a) the preverb bears a marker from the possessive paradigm which functions as an oblique pronominal, while the uninflected preverb in (24b) cannot co-occur with an independent pronominal in the appropriately case governed form. Finally, the inflected preverb in (24c) cannot co-occur with the lexical NP. In general this is the pattern for pronominal satisfaction for this subtype of predicate: the preverb bears a marker from the possessive paradigm indicating the person/number features of the pronominal argument, while an uninflected preverb co-occurs with an independent lexical NP in order to satisfy the oblique requirement non-pronominally (see example (22)).⁷ This distribution, accordingly, recalls the Irish facts account-

⁷ It is worth noting that the base form of inflectable preverbs, as in (22), corresponds to one of the variants of the inflected form for 3sg: this can be seen in the optionality of the 3sg marker indicated in (24a). There are a few reasons why it is probably preferable to assume that the prefix *bele* when governing a lexical NP is unmarked, rather than construed as paradigmatic gap for 3sg. First, the absence of an oblique governed argument of predicates containing uninflectable preverbs also is interpretable as conveying a missing 3rd person referent unspecified for number. For example, the predicate *bement* 'into go' containing the uninflectable preverb *be* can function as a clause meaning 'S he went in (to some known place(s))'. In other words, the interpretation of a missing 3sg argument in (24a) is not dependent on the presence of an unexpressed 3sg possessive marker, but is rather a typical instance of a null complement established by a governing (complex) predicate. Second, and conversely, if the preverb *bele* were construed as containing a 3sg possessive marker, we would have no explanation for the acceptability of (22) and the unacceptability of (24c), since an expressed pronominal element cannot co-occur with a lexical NP in the latter instance. Finally, if the base form were construed as an optionally expressed 3sg element, it is not clear how one would explain, in a non-circular manner, how the uninflected form could co-occur with plural lexical NPs as in (i):

- (i) *a fiú belé(*je)szertett a lányokba
 the boy pv-3sg loved the girl-pl-ill
 'The boy fell in love with the girls'

In sum, it is reasonable to assume that the uninflected form in (22) is interpretable as not representing a paradigmatic gap.

In connection with the distributions associated with (24), a reviewer observes that the quantifier *mindannyi* 'all' can occur with either a non-inflected or inflected form of the preverb:

- (ii) a fiú mindannyiunkba bele/belénk szertett
 the boy all-1pl-ill pv-3sg loved
 'The boy fell in love with each of us'

This example contrasts with (24c) where the inflected preverb is incompatible with a case-governed lexical NP. Though such an example requires further thought it might be argued that the variant of (ii) with an uninflected preverb and co-occurring quantifier represents an instance where the quantifier is simply an argument of the complex predicate. In contrast, the variant with the inflected preverb might be interpreted as an instance where the quantifier is an adjunct which bears some discourse role to the argument represented by the inflection on the preverb. This second paradigm raises numerous issues concerning how to treat double marking which we cannot address here (see É. Kiss (forthcoming) for some related worries with respect to the present treatment of inflectable preverb constructions).

ed for by the MBP. However, there is a salient difference between Hungarian oblique incorporated pronouns and their Irish subject function analogs: whereas the Irish data involved inflected vs. uninflected forms of synthetic predicates, the Hungarian data involve inflected vs. uninflected syntactically independent pieces of a predicate.

The obvious question is this: if the Hungarian predicate is composed in the syntax, how could it exhibit the observed blocking effects? On the assumption that predicate composition is syntactic and that the satisfaction of argument requirements by an independent pronoun is syntactic, it would seem that a syntactic operation, i.e. predicate composition, blocks the syntactic satisfaction of an argument requirement. In what sense could the observed blocking facts be assimilated to the class of effects which the MBP (in our view, better construed as LBP) was designed to explain?

One way of answering this question goes as follows. In lexicalist frameworks where syntactic composition is advanced the lexicon contains fully inflected forms. Given this, the inflected form could be taken directly from the lexicon (see, for example, Niño 1995, Nordlinger 1995). Obviously, the inflected form of the preverb contains more information than the uninflected form of the same preverb. In this sense there is potential competition concerning argument satisfaction between a morphologically more marked form and a less marked form. If the inflected form, i.e. the more highly specified form, is preferred over the uninflected form, i.e. the less specified form, in order to satisfy argument requirements of the predicate, then this would conform to the expectations of the MBP. In other words, a syntactic composition account might achieve the MPB effects by positing a lexically provided contrast between inflected vs. uninflected forms. In sum, one might argue that the inflected preverb itself is more highly specified than its uninflected form and that, given a pronominal interpretation of the inflected form, the MBP applies to the paradigmatic contrast represented by these lexical forms.

An analysis of the preceding type is based on the assumption that the inflected preverb satisfies the argument requirements of a co-occurring predicates. Now the question arises, of course, as to what predicate is being satisfied such that the inflected preverb can serve to satisfy it. Recall that in example (21) the verb *szerez* means 'love' and requires a subject and an object argument. The inflected preverb cannot be satisfying the requirement of this verb, since this verb does not permit, let alone require, an oblique argument: this is evident by the fact that the variant of (21) with an ILLATIVE complement is ungrammatical. Neither a lexical NP in the ILLATIVE case nor an inflected preverb can co-occur with the simple predicate. Rather the inflected form is satisfying the argument requirements of the predicate *beleszeret* 'fall in love' consisting of a separable preverb and a verbal stem. An

inflected form can only be taken from the lexicon if it is assumed that the relevant predicate is e.g. *beleszeret*. This is evident from the distributions in (22) and (24).

In other words, a solution that posits that an oblique co-occurs with the simple verbal stem is poorly motivated, though of course it is possible to stipulate that when an inflected preverb co-occurs with certain verbal stems the two should be interpreted as a complex predicate, i.e. that syntactic composition is obligatory. Given such a stipulation, then, it might be argued that a morphologically more specified form blocks the syntactic satisfaction of the argument requirements of the complex predicate for pronominal satisfaction, since the preverb is presumably inflected in the lexicon. This gives the appearance that syntactic composition is adequate to achieve the desired patterns.

On the other hand, such a solution is somewhat paradoxical: the interpretation of the inflected preverb as forming a complex predicate with the verb is only done when one knows antecedently that an uninflected preverb and the verbal stem form a complex predicate, exhibiting properties other than those shown by the simple verbal stem. In other words, one only composes the relevant elements in syntax because it is known that they form a functional-semantic unit: syntactic composition thus appears to represent an operation that achieves correct results but applies precisely when the syntactically independent elements are known to possess a lexical representation, as suggested on our analysis.

The problem of when syntactic composition must apply is further exacerbated by the fact that Hungarian has dozens of different types of preverb and verb compositions whose meanings, argument inventories, function assignments and case government requirements span the scale from purely predictable to idiosyncratic. Some properties are sometimes predictable: one must know that the combination of *bele* 'into' and *szeret* 'love' means 'fall in love'. That it requires an oblique ILLATIVE complement, however, follows from the presence of the preverb *bele*. Similarly, one must know the meaning of the behaviorally identical formation *beleköt* 'quarrel', containing the transitive verbal stem *köt* 'bind': this predicate possesses an idiosyncratic meaning, but its case marking and oblique argument requirement are fully predictable, given the presence of the preverb *bele*. The class of cases of which *beleszeret* is a member can be characterized as **causal predicates** (cf. Ackerman 1995 for discussion). This class exhibits roughly the following properties: (i) the verbal base denotes a psychological or physical state, (ii) the verbal stem co-occurs with the preverb *bele*, and (iii) the predicate governs the ILLATIVE case for its oblique argument. In addition, there are morphological restrictions on the form of the verbal base: it cannot contain the transitivizing suffix *-it* or the causative suffix *-tat*. For example, whereas the causal predicates *belevakul*

'become blind from' and *beleun* 'become bored from' exist, the corresponding forms **belevakít* 'make blind from' and **beleuntat* 'make bored from' do not.

In summary, a syntactic composition account would have to attribute to syntactic composition operations the possibility of yielding all types of predicates irrespective of their degree of regularity: such operations could create forms which exhibit various types of irregularity (from semantic idiosyncrasy to odd case government patterns). If it is argued that irregular and partly regular forms should be listed, then given the behavioural identity between the regular, partly regular, and irregular forms, it would be unclear why the representational apparatus needed for the irregular and partly irregular forms could not be employed for the fully regular ones. In other words, there would appear to be no need for syntactic composition at all, since it replicates what must already be done lexically. This, of course, would follow from usual considerations of parsimony.

The types of lexical representations compatible with the present account are designed to capture the notion of hierarchical relatedness assumed in Andrew's statement of the MPB. They are therefore appropriate objects for the operation of the MBP. In particular, lexical adicity as stated previously, requires the information associated with skeletal clause nuclei (in particular, all the grammatical function requirements of a clause) as well as inflectional information (following the Strong Lexicalist Hypothesis) to be encoded in lexical representations, independent of whether a predicate is expressed by one or more syntactic atoms. Given this assumption, the force of the MBP can be maintained: that is, it is a principle that provides a motivation for choosing between alternative expressions of related lexical representations. On the present analysis an inflected form is licensed to occur quite simply as a function of the existence of a lexical representation for the relevant item which has as one of its exponents the uninflected form of the preverb in composition with the verbal stem. In other words, the inflected form is interpretable as a more highly specified form of the uninflected form which is used to express the functional-semantic unit encoded in a lexical representation: it is the grammatical function requirements associated with this lexical representation that are relevant for calculating blocking effects. Since the contrast is between different surface realizations of a single lexical item, this distribution comports with expectations based on the LBP.

In conclusion, it appears that Hungarian may provide us with empirical evidence bearing on the desirability of a lexical vs. syntactic account of predicate formation. We have argued that a conception of lexicalism in which functional-semantic considerations are pre-eminent entails that certain lexical representations will of necessity be expressed by multiple morphological elements in syntax. This is interpretable as marked expression for lexical representations. If such marked expres-

sion types are associated with lexical representations, then we can explain why these predicates exhibit the sorts of blocking effects previously attributed to morphological blocking. On the present account, these effects are better interpreted as lexical blocking effects, where predicates associated with lexical representations can participate in blocking irrespective of their surface syntactic encoding.

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RESTRICTIONS ON THE DEGREE OF REFERENTIALITY OF ARGUMENTS IN HUNGARIAN SENTENCES

GÁBOR ALBERTI

Abstract

The phenomena whose syntactic aspects are attempted to be accounted for within a uniform system essentially based on Chomsky's (1995) checking theory, is a superset of É. Kiss' (1995) "Definiteness Effects": expressions at different degrees of referentiality cannot occur freely in different positions of Hungarian sentences. The first step is the demonstration of Referentiality Effect, which is analogous to the Specificity Effect (É. Kiss 1995) in that in both cases certain arguments are required to reach certain degrees of referentiality; furthermore, both requirements are neutralised under particular circumstances. As for technical details, the verbal requirements are expressed by +SPEC, -SPEC and +REF syntactic features, which can be satisfied with the corresponding semantic nominal features +spec, -spec and +ref, or can be erased (neutralised!) by means of a family of +op syntactic features, which can be accompanied with certain operators (e.g. focus) and whose functioning resembles that of type shifted expressions in a categorial grammar.

0. Introduction

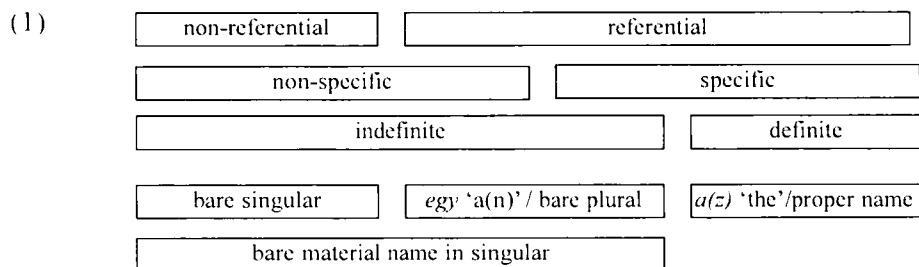
My aim is to derive the different kinds of Definiteness Effect together with their neutralisation (Barwise-Cooper 1981, de Jong-Verkuyl 1984, É. Kiss 1996, Kálmán 1995) in a uniform formal framework that is based on feature checking (Chomsky 1995).

The immediate antecedent of this paper is an analysis by É. Kiss (1995) on Hungarian data where [+specific] and [-specific] features of verbs are claimed to be responsible for different Definiteness Effects. I would like to take further steps towards a general formal system of features relevant to these phenomena, including an analogous phenomenon to be called **Referentiality Effect** and taking into account idiosyncratic properties of special verb classes described by Komlósy (1992). The Referentiality Effect is analogous to the Specificity Effect (É. Kiss 1995) in that in the former case certain arguments are required to be **referential**, as in the latter case certain arguments are required to be specific; furthermore, both requirements are neutralized under particular circumstances.

As for technical details, the verbal requirements are expressed by +SPEC, -SPEC and +REF syntactic features, which can be satisfied with the corresponding semantic nominal features +spec, -spec and +ref, or can be erased by means of a family of +op syntactic features, which can be accompanied with certain groups of operators in the Hungarian sentence structure and whose functioning resembles that of type-shifted expressions in a categorial grammar, in order to account for different instances of neutralization (Sections 2–4).¹

Section I provides data illustrating a wide range of aspects of the phenomenon that expressions at different degrees of referentiality cannot occur freely in different positions of (grammatical Hungarian) sentences. A would-be universal theory of the system of relevant restrictions should cope with the following general problems. First, there is no consensus on a universal semantic theory of degrees of referentiality (Alberti 1996b). Second, languages show a wide variety in the morphosyntactic means expressing different degrees of referentiality. In most languages there is no explicit determiner system to truly reflect semantic differences but a range of other factors are to be taken into consideration (e.g. word order, intonation, case, number, verbal prefixes, tense, aspect, context). Third, different types of nouns differ in their interaction with the system of articles in one and the same language (e.g. countable nouns, material names, proper names, abstract nouns).

The following diagram is intended to demonstrate the features of the relation of the Hungarian articles to four degrees of referentiality relevant in this article:



¹ The basic ideas have been worked out first in a non-transformational generative grammar (Generative Argument Structure Grammar (Alberti 1996a-b)), which is similar to Kálmán and Rádai's (1996a-b) Construction Grammar and the family of categorial grammars in many respects, and even LFG in certain respects. GASG is intended to serve as a strictly compositional counterpart of Kamp's (1981) discourse representation structures. The advantageous property of GASG relevant to Definiteness Effects lies in its rich lexical characterizations that contain all that predicates require of their arguments. As a detailed discussion of GASG would go beyond the scope of this paper, I am going to demonstrate the linguistic essence of the theory in up-to-date transformational generative frameworks (Brody 1990, É. Kiss 1996, Szabolcsi 1996). Special thanks are due to Katalin É. Kiss, Márta Maleczki and an anonymous reviewer for their valuable help on the earlier version(s) of this paper.

There are two articles (the indefinite *egy* and the definite *a(z)*), which refer to at least two degrees of referentiality on the semantic side. Indefinite descriptions, however, are held to be able to refer to either a non-specific or a specific element (e.g. Szabolcsi 1992).² Bare nominals in singular undoubtedly refer to a fourth semantic class of referentiality (independently of its exact semantic content). Thus, non-specificity is expressed in Hungarian by two ways: either by bare nominals (associated with no determiner/article) or by indefinite descriptions. As bare singular nominals are typically underspecified wrt. number, I regard bare plural nominals as the plural forms of indefinite descriptions (where an empty plural indefinite article substitutes for *egy* 'a(n)').

Certain nominal classes are obviously characterized by other interpretations of the article system. Proper names, for instance, do not require definite articles to be understood as definite. Further, the bare nominal form of material names may be understood as an (indefinite) referential expression. The phrase [_{NP} *kenyér*] 'bread', for instance, may correspond to the indefinite expression 'some / a little bread' (since the expression [_{NP} *egy kenyér*] means 'a loaf (or a slice) of bread').

A detailed semantic analysis of the four degrees of referentiality mentioned above is a task postponed to future research. This paper is devoted to the revelation of the syntactic system of restrictions on the degree of referentiality of arguments in neutral and non-neutral Hungarian sentences.

1. ±Specificity effects, referentiality effect, and their neutralization

This section provides a summary of the phenomena covered by the term Definiteness Effects in É. Kiss (1996) and the illustration of a similar phenomenon, called *Referentiality Effect*, which is analogous to the Specificity Effect. The analogy lies in the fact that in the former case certain arguments are required to be *referential*, as in the latter case certain arguments are required to be specific; furthermore, both requirements are neutralized under particular circumstances.

The following minimal pair of examples illustrates É. Kiss' (1995, 81) Specificity Effect on the basis of her similar ex. 47. The object in (2a) below can be interpreted only as a specific expression (according to the specificity definition of Enç (1991), used by É. Kiss (see fn. 2)) whereas the object in (2b) can be associated exclusively with a non-specific interpretation. The latter phenomenon is called a Non-Specificity Effect.

² According to Enç (1991), an NP is +spec if its referent is a subset of a set of referents already in the domain of discourse.

- (2) (a) A 'fiú 'oda-ad-ott a 'lány-nak *(egy) 'nyaklánc-ot.
 the boy prefix₁₀-give-past-3sg-indefO the girl-to *(a) necklace-acc
 'The boy has/had given the girl *(a) necklace.'
- (b) A 'fiú 'ad-ott a 'lány-nak *(egy) 'nyaklánc-ot.
 the boy give-past-3sg-indefO the girl-to *(a) necklace-acc
 'The boy gave the girl *(a) necklace.'

The indefinite article of the object is allowed to be omitted in neither case. Hence, the objects in question are prohibited from being expressed by bare nouns, that is, they are required to be referential. Nor can the subjects and the dative arguments above dispense with their articles. The term Referentiality Effect is a straightforward one to label this phenomenon (that a particular argument is required to be referential) on the analogy of the term Specificity Effect.

What the grammatical sentence in (3a) below, with the focused object expressed as a bare noun, demonstrates is not only that focusing an argument results in the neutralization of the Specificity Effect that concerns it but that the more general Referentiality Effect is also neutralized. Focusing the subject in (3b), as well as the dative argument in (3c), will also result in the corresponding argument being set free from the Referentiality Effect.

- (3) (a) A 'fiú 'nyaklánc-ot ad-ott (oda) a lány-nak (nem karórá-t).
 the boy necklace-acc give-past-3sg-indefO (prefix₁₀) the girl-to (not watch-acc).
 'The boy has/had given the girl a NECKLACE, not a WATCH.'
- (b) 'Fiú/Küldönc ad-ta (oda) Mari-nak a nyakláncot.
 boy/messenger give-past-3sg-defO (prefix₁₀) Mari-to the necklace-acc.
 'A BOY/MESSENGER gave (has/had given) Mari the necklace.'
- (c) 'Péter 'lánynak ad-ta (oda) a nyaklánc-ot.
 Péter girl-to give-past-3sg-defO (prefix₁₀) the necklace-acc.
 'Péter gave (has/had given) the necklace to a GIRL.'

The ungrammatical sentence in (4a) below shows a straightforward consequence of the Non-Specificity Effect mentioned above in connection with (2b): the indefinite object in the sentence in question, whose non-specific interpretation is the only one that provides a perfect reading, cannot be substituted for a definite description. A uniform distribution of stress, characteristic of neutral sentences, and a non-progressive aspect are assumed here.

- (4) (a) *A 'fiú 'ad-ta a 'lány-nak a 'nyaklánc-ot.
 the boy give-past-3sg-defO the girl-to the necklace-acc
 *'The boy gave the girl the necklace.' (neutral, non-progressive)
- (b) A 'fiú ad-ta a lány-nak a nyaklánc-ot.
 the boy give-past-3sg-defO the girl-to the necklace-acc
 'The BOY gave the girl the necklace.'
- (c) Az 'énekkar alakul-t *(tavalý).
 the choir form-past-3sg *(last year)
 'It was the choir that was formed LAST YEAR.'
- (d) 'Tavalý az 'énekkar alakul-t.
 last year the choir form-past-3sg
 'As for the last year, it was the choir that was formed that time.'

This effect can also be neutralized (É. Kiss 1995, 68; Szabolcsi 1986): the Non-Specificity Effect disappears if a constituent **other than the Non-Specificity Effect argument** is focused. (4b) above illustrates this phenomenon: focusing the subject has resulted in the object being set free from the Non-Specificity Effect.

If there are two foci in a sentence ((4c) here, cited by É. Kiss (1995, 69 ex. 15)), one of them is allowed to be a definite version of the Non-Specificity Effect argument since here the neutralization of this effect can be attributed to the focusing of the other argument. Thus the boldface constraint in the previous paragraph is not (regarded as) violated in the grammatical version of (4c); but the second focus must not be omitted.

The grammatical sentence in (4d), however, is an undoubted violation of the constraint mentioned. Only the Non-Specificity Effect argument is focused in this sentence, while the other complement plays the role of a contrastive topic. I will argue that the contrastive topic, presumably due to its predicative nature (illustrated in (5e) below), can neutralize the Non-Specificity Effect, too.

Finally let us return to the Referentiality Effect, introduced in this section. It can be neutralized even in a neutral sentence if, and only if, the argument in question occupies the Verbal Modifier (VM) position. Obviously, only non-specific arguments are concerned, since specific arguments cannot dispense with any article (5a,c).³ Arguments in postverbal positions (e.g. (5b)), including predicative

³ Adjectival phrases are regarded here as non-referential (and hence, non-specific) expressions (they seem to be similar to bare nominals from a semantic point of view).

arguments (5d), cannot be expressed by bare nominals. In the contrastive topic position, however, the Referentiality Effect may disappear, too (5e), as well as in the position of *is* ('also') phrases (quantifier position; (5f)) and in existential sentences ((5g); Kiefer 1992b).

- (5) (a) A 'gyerekek (egy) 'énekkar-t alakít-ott-ak.
 the children (a) choir-acc form-past-3pl-indefO
- (b) A 'gyerekek 'alakít-ott-ak *(egy) 'énekkar-t.
 the children form-past-3pl-indefO *(a) choir-acc
 int. meaning in (5a-b): 'The children formed a choir.'
- (c) 'Péter 'zöld-re fest-ette a 'kapu-t.
 Péter green-onto paint-past-3sg-defO the gate-acc
- (d) *'Péter 'fest-ette 'zöld-re a 'kapu-t.
 Péter paint-past-3sg-defO green-onto the gate-acc
 int. meaning in (5c-d): 'Péter painted the gate green.'
- (e) 'Kövér nő-vel 'Péter táncol-t.
 fat women-with Péter dance-past-3sg
 'As for fat women, PÉTER danced with one like this.'
- (f) 'Kövér nő-vel is 'táncol-t 'Péter.
 fat woman-with also dance-past-3sg Péter
 'Péter danced also with one or more fat women.'
- (g) 'Táncol-t már itt kövér nő-vel fiatal fiú.
 dance-past-3sg already here fat woman-with young boy
 'The situation that a young boy dances with a fat woman has already occurred here.'

Thus, the focus position, the contrastive topic position, the verbal modifier position, the quantifier position, and the existential sentence share the capacity for neutralizing the Referentiality Effect, which, however, seems to hold of **each** argument position, since a predicative argument (Komlósy 1992), which is never referential, cannot occupy a postverbal argument position, at least according to (5d). In a neutral sentence a predicative argument can occupy only the VM position. I am going to raise a generalization that is available in the framework provided by

É. Kiss (1996): non-referential arguments do not remain in argument positions dominated by V'.

2. The referentiality effect and its neutralization

As a first approximation, let us consider the strategy of sentence construction that the natural sentence pair in (2) (repeated here as (6)) suggests.

- (6) (a) *(A) 'fiú 'oda-ad-ott *(a) 'lány-nak *(egy) 'nyaklánc-ot.
 *(the) boy prefix₁₀-give-past-3sg-indefO *(the) girl-to *(a) necklace-acc
 *(The) boy has/had given *(the) girl *(a) necklace.'
- (b) *(A) 'fiú 'ad-ott *(a) 'lány-nak *(egy) 'nyaklánc-ot.
 *(the) boy give-past-3sg-indefO *(the) girl-to *(a) necklace-acc
 *(The) boy gave *(the) girl *(a) necklace.'

Verbs, nouns, and adjectives are all predicators (Williams 1994; 1995), but the finite verb (or other kind of predicator) in a neutral sentence provides the (main) **assertion** of the sentence, i.e. the new piece of information, whereas the information associated with nominal elements helps to decide the referents that the given piece of information is predicated of. This nominal information helps to find old referents (and in this case it belongs to the **presuppositional** part of the sentence content (vs. its **assertional** part (Kálmán 1995)), or is associated with new referents that can be referred to later just on the basis of this information. It seems that the finite verb is characterized by the categorial property of requiring its arguments to be referential (non-bare). Referentiality of a nominal expression (as well as the degree of its referentiality) is usually not due to the head noun, which is of a predicative nature, but the D head of the DP that involves the NP (e.g. Szabolcsi 1992).⁴ Obviously, the nature of the nominal expression wrt. referentiality is determined by the D head.

This simplified situation might be represented by introducing a syntactic [+REF] feature and a semantic [+ref] feature, the former indicating that a predicator requires referentiality of a certain one of its arguments and the latter denoting the referential nature of a nominal expression (usually due to an inherent semantic property of some determiner). As for technical details, the two features should

⁴ However, as was mentioned in connection with diagram (1), proper nouns and material names require no article to be understood as referential.

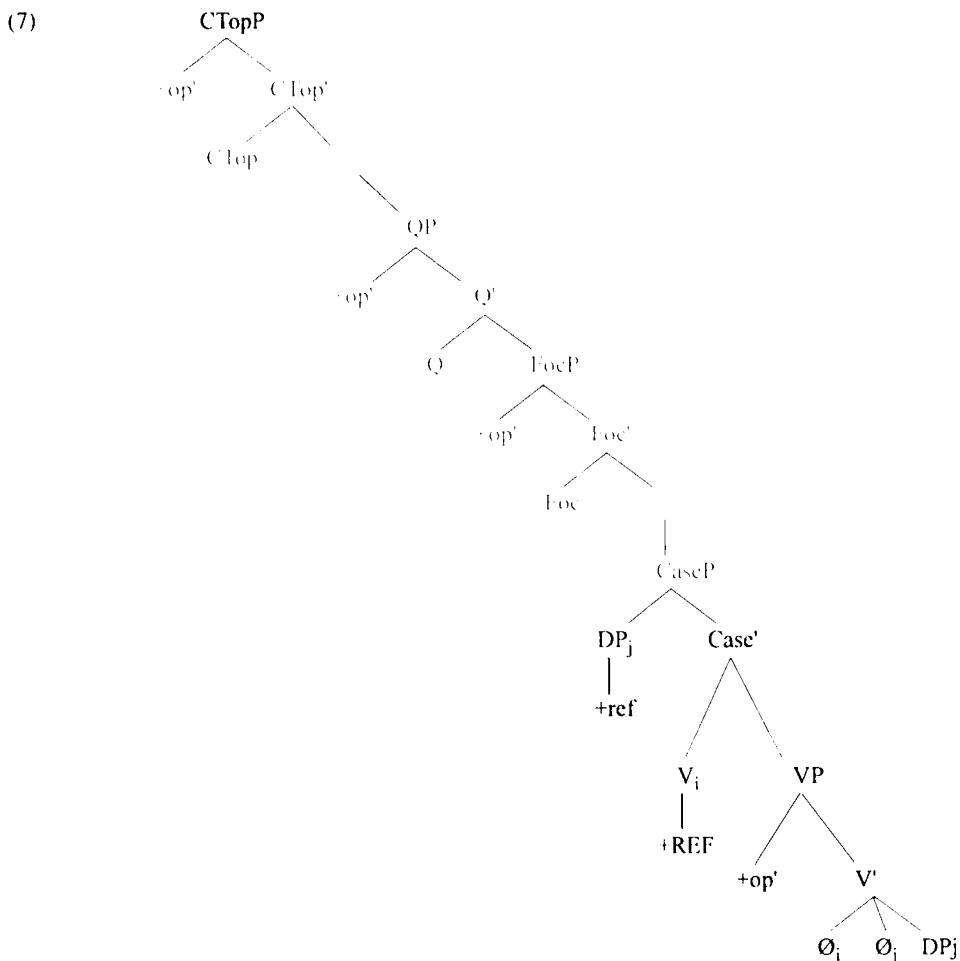
check each other in the course of the derivation of sentences. If their original head-complement relation under V' is not regarded as a checking configuration (but only spec-head configuration is accepted; Chomsky 1995), then the straightforward checking relation for them is the one where cases of arguments are held to be checked (under CaseP's; see Szabolcsi 1996)).

We have been led to the conclusion, however, that the Referentiality Effect disappears if the constituent in question occupies certain (operator) positions (focus: (3a–c), contrastive topic: (5e), verbal modifier: (2a, 5a, c), quantifier: (5f), or the sentence contains an EXIST operator (5g); É. Kiss 1992, 138).

É. Kiss (1995, 73) writes about focus as follows: "I assume, following Herburger (1993), that in sentences with a focus operator (a 'semantic focus' in her terminology), the focused constituent functions as a higher predicate; in other words, it is the focused constituent that represents the main assertion." Kálmán's (1995, 240) predicate-logical semantic analysis, based on the division of the information content of sentences into a presuppositional part and an assertional part, expresses essentially the same approach: the information content of the focused constituent belongs to the assertional part of the information content of a sentence.

As for the other operators mentioned above, it may also be assumed that the predicative/assertional power of the finite verb is extended or transferred to them. A precise investigation of these sorts of predicativity (their common core and their differences) would go beyond the scope of this syntactic paper. What is relevant now is that the introduction of a +op' syntactic feature, which may be freely associated in the numeration with the semantic features responsible for the overt move of phrases (Chomsky 1995) to the operator positions in question, can serve as a uniform explication of the neutralization of the Definiteness Effect in these positions, where the +op' syntactic feature of an expression is assumed to be similar to the +ref semantic feature in that both can satisfy the requirement of the finite verb expressed by the +REF syntactic feature. The difference lies in the fact that feature +ref satisfies a requirement concerning referentiality also in a real semantic sense, whereas +op' erases the requirement in question. This latter mechanism is based on an idea that resembles the usual type shifting mechanism of categorial grammars: instead of **satisfying** the verbal requirement, the requirement itself is **erased**. Features +op' and +REF can check (and erase) each other in the course of derivation when the verb (or some of its features, in the case of covert move) is in the given operator head and the nominal phrase is in the Spec of this operator head.⁵

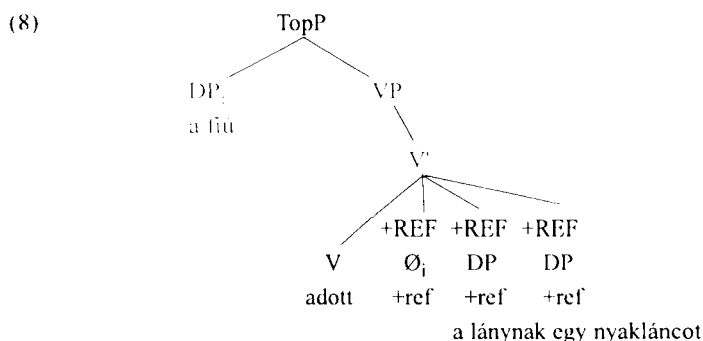
⁵ The schematic tree serving as a demonstration is based on the one elaborated by É. Kiss (1996) but has been completed with a Contrastive Topic Projection and Case Projections.



The basic assumption is that there is a general piece of information about the Hungarian (?) sentence structure associated with the finite verb, which is expressed by +REF features for each subcategorized argument of the given verb: the arguments are to be referred to by referential expressions (+ref) while it is the finite verb that provides some new assertion. This assertive power, however, can be extended or transferred to a certain part of the rich operator zone of the Hungarian sentence structure (which includes the contrastive operators (CTop, F), subcategorized adjunct predicates (“secondary predicates”) in the verbal modifier position, and quantifiers, but not the (non-contrastive) topic). In this zone arguments may

obtain another kind of legitimacy (which is not incompatible with the referential kind of legitimacy but may substitute for it). An optional common +op' syntactic feature has been introduced to liberate arguments from the original requirement of referentiality. The abbreviation *op* indicates that the decisive features of certain operators (which make phrases move overtly, or feature sets covertly, on usual assumptions) may be associated with this special erasing feature, while the prime is a warning that not all operators can be associated with this feature.

The structure of sentence (2a) below serves as an illustration of the simplest case: all arguments are legitimate due to the referentiality of different determiners. The subject's moving to the spec position of a non-contrastive topic is irrelevant now; its legitimacy is assumed to be checked in the same way as the legitimacy of the other arguments: simply under V' (É. Kiss 1995), or under CaseP's (Szabolcsi 1996). For the sake of simplicity, the former version is illustrated here:



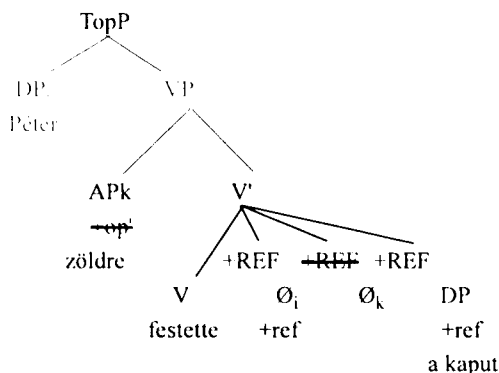
As for VM (verbal modifier) type predicative legitimacy, it is restricted to a single position in a simple sentence since there is only one verbal modifier position on the usual assumptions. If there is a preverb (2a, 3a–c) or a predicative argument (5c–d) among the complements of the finite verb of a **neutral** sentence (as a consequence of the individual properties of the given verb), then it may receive legitimacy only in the VM position, because these categories are not suitable for being associated with determiners that would ensure them a referential kind of legitimacy.⁶ Hence, if it is hypothesized that a finite verb requires each of its arguments to be referential, which is assumed to be a general syntactic requirement, then it will be a con-

⁶ I consider AdvP's and AP's to be phrases that are inevitably non-referential because of categorial reasons. Further, there are nominal arguments that are also obligatorily non-referential as a consequence of the meaning of the given verb. It will soon be demonstrated how to reconcile the general requirement concerning referentiality of each argument with idiosyncratic requirements concerning the non-referential nature of certain arguments.

sequence in my system that preverbs or predicative arguments can be found in the VM position in a neutral sentence, where this requirement is neutralized by feature $+op'$. It is in this way that the general syntactic requirement concerning referentiality of arguments can be reconciled with individual requirements of verbs to be attributed to their meaning.

The structure of sentence (5c), repeated here as (9), serves as an illustration:

- (9) Péter zöld-re festette a kapu-t.
 Péter green-onto paint-past-3sg-defO the gate-acc
 'Péter painted the gate green.'



Thus, there is a tempting generalization: all arguments of the finite verb are required to be referential (in a Hungarian sentence). This is a general syntactic requirement assigned to the finite verb, which can be reconciled with special requirements of individual verbs concerning the non-referential nature of certain arguments even in neutral sentences, due to the VM position where $+REF$ is checked (and erased) by $+op'$. This assumption bears a plausible semantic content: the verb shares its assertive power with a “secondary predicate”.

Two kinds of problems may arise. First, if a verb has two or more inherently non-referential arguments, e.g. a preverb and predicative arguments, as in (10), then one or more of them will remain without legitimacy in a neutral sentence as there is only one VM position. The simpler solution is to attribute this phenomenon to an exceptional idiosyncratic property of certain verbs, which permit an argument not to be legitimate. Another solution, which may provide a deeper explanation to the phenomenon, is based on the idea that, in the above-mentioned example, for instance, the preverb and the predicative arguments form a single constituent together in the D-structure, which is to satisfy a single $+REF$ feature:

- (10) (a) 'Péter 'át-fest-ette a 'kapu-t 'kék-ről 'zöld-re.
 Péter prefix_{through}-paint-past-3sg-defO the gate-acc blue-from green-onto
 'Péter painted the gate green from blue.'

(b) D-str.: [_V V DP DP [_{AdvP} APAP]]

(c) S-str.: [_{TopP} DP_i [_{VP} [_{AdvP} Adv Ø_j Ø_k]_i [_{V'} V Ø_i DP Ø_l DP_j DP_k]]

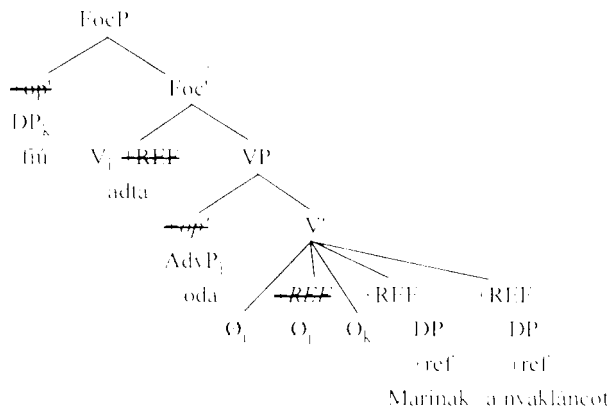
Thus the third complement of 'paint' is an AdvP with the preverb as head and two AP's as complements. The +op' feature that is assumed to be associated with the VM position neutralizes the +REF feature of the verb requiring the AdvP (as a whole!) to be referential. As is often claimed (e.g. É. Kiss 1997), the VM position is not suitable for accommodating a heavy phrase, so the AP's should move to new [XP, V'] positions in advance, which can be occupied by non-arguments as well according to É. Kiss (1992).

The second problem concerns verbs whose arguments can all be referential in neutral sentences. In a group of them no argument is permitted to occupy the VM position (e.g. *utál* 'hate') whereas in another group certain arguments (e.g. Patients, Locations, but never Agents) can or must occupy this position (e.g. (5a); Komlósy 1992). É. Kiss (1992) discusses general tendencies concerning semantic and thematic factors but it seems that Komlósy's certain examples can be attributed only to idiosyncratic semantic properties of special classes of verbs. In this syntactic paper it is not intended to be analyzed why a verb must, can, or cannot share its assertive power with a certain argument. What is relevant, is that if an argument is permitted to occupy the VM position, then it can be expressed as a non-referential phrase. For inherently non-referential arguments this is the only chance for being legitimate in a neutral sentence. Not surprisingly, verbs are inclined to share their assertive power just with such arguments (or complements).

In a focused sentence (e.g. (3b) above, part of which is repeated below as (11)), the verb's +REF feature and the +op' feature that can be associated with a focused phrase can check each other when the former one, together with the whole (pied-piped) verb, can occupy the F functional head while the latter can be found in the Spec of F. If a bare nominal occupies a contrastive topic position (5e) or a quantifier position (5f), then it is assumed that it is by a covert move that the verb's +REF feature gets to the corresponding operator head to check the +op' feature of the bare nominal in question, so in cases like these no pied-piping is assumed. Finally, the special property of existential sentences that they may contain more than one non-referential arguments can be attributed to the following properties of the EXIST operator: it occupies the VM position, and it may be associated with a +op" feature,

whose definitive property is that it is able to neutralize an arbitrary number (0, 1, 2...) of +REF requirements, i.e. an arbitrary subset of the set of +REF features.⁷

- (11) 'Tíú ad-ta (oda) Mari-nak a nyaklánc-ot.
 boy give-past-3sg-defO (prefix_{to}) Mari-to the necklace-acc
 'A BOY gave (has/had given) Mari the necklace.'



3. The specificity effect and its neutralization

The Specificity Effect (É. Kiss 1995) is an idiosyncratic, meaning-dependent, property of verbs that exerts a stricter requirement on the argument concerned than the Referentiality Effect (2a).⁸ Its straightforward technical treatment is to replace the +REF verbal requirement concerning the relevant argument with a stricter +SPEC syntactic feature, which can be satisfied by a +spec semantic feature, usually due to the determiner of the corresponding nominal phrase.⁹

⁷ The semantic background is plausible: EXIST may supply with an existential interpretation either only the whole situation, or one or more arguments as well.

⁸ Though this fact cannot be noticed easily in the case of (2a) in section I. What makes things obscure is the fact that the Hungarian indefinite article *egy* 'a(n)' may refer to a specific argument as well as a non-specific one (see (1) in Section 0).

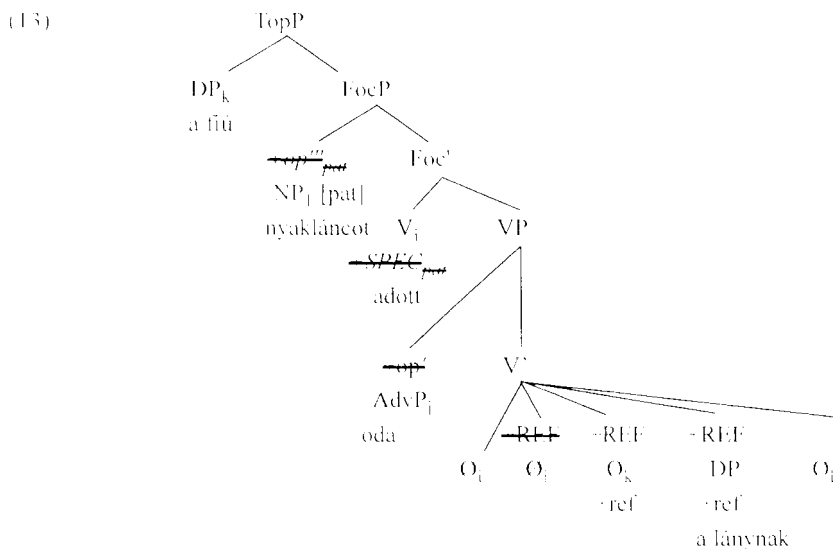
⁹ The identification of the argument concerned can be carried out by the association of the given feature with the θ -role label (Williams 1995) or the case of the argument. A mechanism like this must be permitted in a checking theory because a verb requires a certain one of its arguments to be specific (or just non-specific, etc.).

The Specificity Effect does not concern a focused constituent any more, the focused patient, for instance, in (3a), repeated here as (12):¹⁰

- (12) A 'fiú 'nyakláncot adott oda a lánynak (nem karórát).
 the boy necklace-acc give-past-3sg-indefO prefix₁₀ the girl-to (not watch-acc)
 'The boy has/had given the girl a NECKLACE, not a WATCH.'

Thus, focussing a Specificity Effect constituent results in this effect being neutralized. This neutralization can be attributed to an erasing syntactic feature again, which can be associated with decisive features of a certain subgroup of operators. This subgroup contains focus but does not contain a verbal modifier, so the new feature cannot be identical to +op'. It will be denoted by +op'''.

The structure of (12) serves as an illustration:



¹⁰ One might consider sentence (12) to be a bit clumsy. This factor depends on the verbal prefix: the richer its semantic content is, the better the corresponding sentence is.

4. The non-specificity effect and its neutralization

Some verbs require one of their arguments to be non-specific ((2b), (4a) in section 1). The well-known semantic explanation to this phenomenon is that a common factor of their meaning is the assertion of their patient's existence or coming into existence, which is not compatible with the specificity of the patient because specificity means just that the existence of the argument concerned has been presupposed.

I would like to focus on the syntactic treatment of this phenomenon, following É. Kiss' (1995) proposal concerning the introduction of a verbal feature that will be denoted by a (syntactic) –SPEC here. This feature can be satisfied by a –spec nominal semantic feature. A nominal expression is non-specific if its determiner is the appropriate version of the indefinite article *egy* 'a(n)' or contains no article at all. On the other hand, the definite article *a(z)* 'the' makes its DP specific.

Non-Specificity Effect arguments are restricted simultaneously from two sides wrt. the degree of referentiality: on the one hand, they are required to be non-specific, i.e. at most indefinite, as a consequence of the special meaning of the given verb, but on the other hand, they are also required to be referential (at least indefinite), because of the general syntactic requirement discussed in section 2. Let us review a couple of examples of section 2 in order to scrutinize the reconciliation of the two requirements.

(14) (a) A 'fiú 'ad-ott a 'lány-nak *(egy) 'nyaklánc-ot (2b)
 the boy give-past-3sg-indefO the girl-to *(a) necklace-acc
 'The boy gave the girl *(a) necklace.'

(b) *A 'fiú 'ad-ta a 'lány-nak a * 'nyaklánc-ot. (4a)
 *the boy give-past-3sg-defO the girl-to the necklace-acc
 '*The boy gave the girl the necklace.' (neutral, non-progressive)

(c) A 'gyerekek 'alakít-ott-ak *(egy) 'énekkar-t. (5b)
 the children form-past-3pl-indefO *(a) choir-acc

(d) A 'gyerekek (egy) 'énekkar-t alakít-ott-ak. (5a)
 the children (a) choir-acc form-past-3pl-indefO
 int. meaning in (14c–d): 'The children formed a choir.'

The ungrammatical version of (2b), repeated here as (14a), is not grammatical because the object NP is not referential, so the general +REF requirement is violat-

ed; it would be correct, otherwise, that this argument is expressed by a bare nominal whose –spec feature can be checked by the verb’s –SPEC feature. In the grammatical version of (14a), however, the object *egy nyakláncot* ‘a necklace-acc’ is “already” referential but “still” non-specific, at least regarding the non-specific reading of the indefinite article. Sentence (4a), repeated here as (14b), is ungrammatical because of the specific patient—whereas the non-specific patient in the ungrammatical version of sentence (5b) ((14c) here) yields ungrammaticality because this patient is not referential. In (5a), repeated here as (14d), both sentence versions are correct because both objects can be regarded as non-specific, and in the VM position even bare nominals are legitimate due to the possibility for being associated with a +op’ feature. Hence, the neutral sentence *The children formed a choir* has exactly three equivalents in Hungarian (14c–d), as is correctly predicted by the theory.

There are non-specific complements, e.g. preverbs (2a) and AP arguments (5c–d), whose non-specificity need not be expressed explicitly, i.e. by means of a verbal feature of the form –SPEC, because they are inherently non-referential, presumably due to general structural principles. Their non-specificity cannot be neutralized either, obviously.

Otherwise, however, the Non-Specificity Effect can be neutralized (examples (4b–d) are repeated here as (15a–c)):

(15) (a) A ’fiú ad-ta a lány-nak a nyaklánc-ot. (4b)
 the boy give-past-3sg-defO the girl-to the necklace-acc
 ‘The BOY gave the girl the necklace.’

(b) Az ’énekkar alakul-t *(’tavaly). (4c)
 the choir form-past-3sg *(last year)
 ‘It was the choir that was formed LAST YEAR.’

(c) ’Tavaly az ’énekkar alakul-t. (4d)
 last year the choir form-past-3sg
 ‘As for the last year, it was the choir that was formed that time.’

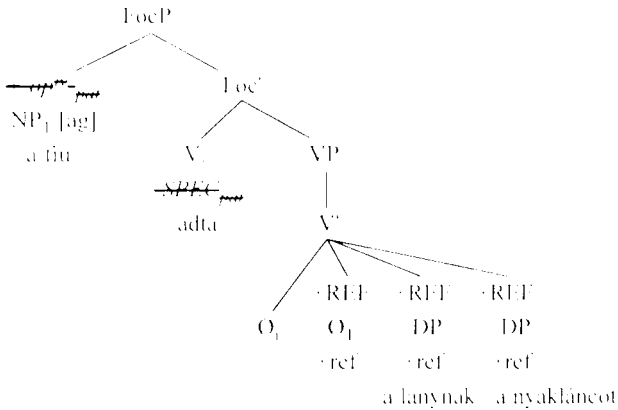
Like in the case of the neutralization of the Specificity Effect, a straightforward formal treatment of the neutralization of the Non-Specificity Effect can be based on the **erasure** of the –SPEC feature (instead of its satisfaction with an appropriate non-specific argument). According to Szabolcsi (1986) and É. Kiss (1995), the Non-Specificity Effect disappears if a constituent other than the Non-Specificity Effect argument is focused. Hence, a +opi^v syntactic feature should be introduced, which can be associated with a focused argument (and perhaps with other operators, contrastive topic, for instance, but not with quantifier). Feature +opi^v checks,

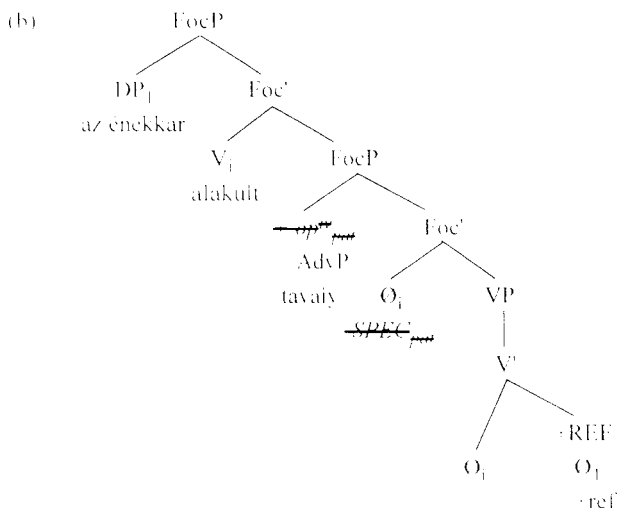
and erases, the requirement expressed by feature $-SPEC$. These features are inevitably to be assumed to be sensitive to θ -role labels or cases, as well as $+SPEC$ and $+op^m$, discussed in section 3, but in a negative way: the $-SPEC$ feature must be associated with another argument than the $+op^{iv}$ feature. Thus, $+op^{iv}_\theta$ can satisfy $-SPEC_{\theta'}$ (where θ and θ' are different theta-roles (or cases)), but not $-SPEC_\theta$.

As for semantic background, a $-SPEC_\theta$ requirement refers to the fact that the argument concerned belongs to the **assertive** part of the semantic content of the sentence (Kálmán 1995) since non-specific arguments cannot be referred to in the presuppositional part. Thus the given argument is not used referentially in a neutral sentence but predicatively. Focussing something (another argument) means that it is the semantic content of the focused constituent that represents the main assertion, relative to which the Non-Specificity Effect argument already remains in the presuppositional part of the semantic content of the sentence (Kálmán 1995, É. Kiss 1995). Hence, it is allowed to be specific so the Non-Specificity requirement should be simply erased. To sum up, certain verbs tend to share their assertive power with an argument, which is hence required to be non-specific; it may occur, however, that another argument enters a special part of the operator zone of the sentence, taking this distinguished role from the former argument, which is liberated from the $-SPEC$ requirement in this way.

Sentences (15a–b) are analyzed below:

(16) (a)





In both cases the patient is the Non-Specificity Effect argument. In the first sentence it is the constituent playing the role of the agent that is focused so it can be associated with an $+op^{iv}_{pat}$ feature, which practically erases the $-SPEC_{pat}$ feature of the verb when the verb occupies the focus head. In the second sentence the patient is focused, but there is another constituent that is also focused. It is with this latter constituent that the $+op^{iv}_{pat}$ erasing feature can be associated.¹¹ Hence the $-SPEC_{pat}$ feature of the verb is erased at a mediate point of the chain of the verb.

In (15c) the Non-Specificity Effect argument is the only focused constituent but the sentence is correct, violating what is said in É. Kiss (1995) about the neutralization of the Non-Specificity Effect. The example in question suggests that the constituent occupying the contrastive topic position is also permitted to be associated with a $+op^{iv}$ erasing feature, which can be checked by the verb's $-SPEC$ feature when this feature has moved covertly, not having pied-piped the whole verb, to the functional head of the CTopP.

The observation that sentence (4a)=(14b) has an (almost) grammatical **progressive** reading (e.g. Kálmán 1995) can be accounted for by a similar idea. It proves that the progressive operator (say, *PROGR* in É. Kiss (1992)) is also allowed to be associated with a $+op^{iv}$ erasing feature.¹² The semantic background

¹¹ It causes no technical problem to associate the $+op^{iv}_{pat}$ feature with an *adjunct* because this constituent satisfies the two relevant criteria: it has been assigned no patient label, and it bears a $+focus$ feature.

¹² It can be checked, however, that operator *EXIST* is incompatible with $+op^{iv}$. Quantifiers also seem to be incompatible with this erasing feature.

is the same as earlier: the main assertion of the sentence has been transported from the assertion of the existence of something to the demonstration of progressivity.

5. Conclusion

5.1. I have pointed out a **Referentiality Effect**, an analogue of the Specificity Effect, demonstrated by É. Kiss (1995): verbs require (certain ones of?) their arguments to be referential, i.e. prohibit them from being expressed as bare nominals. This effect, as well as the Specificity Effect and the Non-Specificity Effect, disappears in certain preverbal positions. This neutralization can be accounted for by assuming that referentiality is only one function that may legitimize an argument in a sentence; an argument may join the assertive part of the sentence (verbal modifier, focus, contrastive topic, quantifier), too, obtaining some kind of predicative legitimacy. Thus what is required of an argument in a Hungarian sentence is simply **legitimacy**, and it is not necessarily determined what kind of legitimacy is required.

5.2. The fact that preverbs and predicative arguments can be found in the VM position of neutral sentences can be derived from the tempting generalization that each verb requires each of its arguments to be referential, since inherently non-referential constituents can obtain legitimacy in a neutral sentence only in the VM position. The entire scope of this generalization is still undecided but includes every verb with at most one non-inherently referential complements. For the marginal group of verbs (apparently) violating the generalization I have suggested a technique by means of which more inherently non-referential complements can be regarded as a single constituent.

5.3. My formal treatment of the **Referentiality, Specificity, and Non-Specificity Effects** is based on feature checking (Chomsky 1995): a syntactic (hence, erasable) feature expressing that the verb requires a certain one of its arguments to bear a certain property is to check a semantic feature of the argument expressing that the given argument does bear the property required. The explanation to their **neutralization** is based on an idea that resembles the usual type shifting mechanism of categorial grammars: instead of **satisfying** the verbal requirement, the requirement itself should be **erased** (by means of special features) in the neighbourhood of certain operators, which indicate that the sentence is not neutral any more so its assertion is already different from the one expressed by the original verbal requirement.

5.4. Nevertheless, there are straightforward differences between the three effects discussed. The Referentiality Effect is assumed to express a basic syntactic characteristic of the Hungarian sentence structure. Its assignment to the finite verb is justified by the central syntactic function of V, and not by idiosyncratic properties of given verbs. The Specificity Effect means that an argument is to belong to the referential part of the sentence; and if the given argument is focused, then it receives the possibility for joining the assertive part of the sentence, yielding neutralization of the Specificity Effect. Whereas the Non-Specificity Effect means that an argument is to belong to the assertive part of a neutral sentence; focussing **another** constituent results in this latter constituent expressing the assertion of the sentence and, hence, the Non-Specificity Effect argument receiving the possibility for joining the referential part, yielding neutralization of the Non-Specificity Effect.

5.5. Sentence (4d) questions the statement (Szabolcsi 1986; É. Kiss 1995) that the Non-Specificity Effect disappears if a constituent other than the Non-Specificity Effect argument is **focused**. My treatment is based on the extension of the scope of “neutralizing” operator zone to contrastive topic. Generally, the three effects are neutralized in slightly different subdomains of the operator zone of the Hungarian sentence structure.

5.6. I have pointed out the following independent factors in the intricate area of the Non-Specificity Effect and its neutralization:

- (a) certain verbs require certain arguments to be non-specific,
- (b) the Hungarian indefinite article *egy* ‘a(n)’ can make a nominal expression either specific or non-specific, and the DP itself does not show the intended reading,
- (c) the non-specificity requirement can be satisfied by either an indefinite DP or a bare nominal,
- (d) each argument must be legitimate (either referential, or “predicative” in a precise sense) so bare nominals cannot occupy postverbal positions dominated by V', because in these positions a constituent can obtain only referential legitimacy; hence, a bare nominal occupies the VM position in a neutral sentence.

5.7. I hypothesize that the theory of Definiteness Effects illustrated with Hungarian data in this paper is a special version of a universal theory. Among the relevant parameters that are likely to differ from language to language are the mapping from degrees of referentiality to the article set of the given language, the syntactic expression of operators (focus, contrastive topic, etc.), the system of tenses and aspects, and the function of preverbal VP-internal positions. Primarily due to the rich explicit operator structure of Hungarian, the revelation of the system of restric-

tions on the degree of referentiality of arguments in Hungarian promises a significant step towards the universal system of such restrictions.

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ON 'SUBJECTIVE' AND 'OBJECTIVE' AGREEMENT IN HUNGARIAN¹

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Abstract

This paper investigates the distribution of the so-called 'subjective' and 'objective' conjugations in Hungarian, with the aim of determining the governing factor(s) in the choice between the two paradigms. After treating the data, and the accounts of the phenomenon encountered so far, attempting to solve the problem in terms of person agreement, definiteness, and/or specificity, a new way of distinction is proposed and explored, in which object nominal phrases are classified according to their outmost layer of functional projection: DPs and lesser projections are thus placed in an opposition. The paper claims that only full DP objects trigger the objective conjugation on the verb, as only these nominals are attracted to the checking domain of the object agreement functional head in the clause structure, on the assumption that this movement is Case-driven, and Case is a feature of determiners, which are absent from smaller nominal projections.

0. Introduction

Hungarian displays two verbal agreement paradigms, traditionally referred to as 'subjective' and 'objective' inflection ('alanyi ragozás' and 'tárgyas ragozás', respectively, in Hungarian). In very general terms, intransitive verbs are invariably affixed with the subjective endings, while in the case of transitive verbs, the choice depends on some property of the object. The fundamental nature of this decisive factor is the main topic of the present paper. I will argue that all the previous accounts of the nature of this 'object agreement' are unable to cover all the cases involved, because they all fail to recognize the precise properties that condition the choice between the paradigms. I will therefore propose a new criterion for the distinction between nominal phrases that trigger objective agreement, and those that

¹ I wish to thank Katalin É. Kiss for encouraging me to write the present paper, and discussing it with me in detail. I am also grateful to Ágnes Bende-Farkas, László Kálmán, and Gabriella Tóth for helpful suggestions, and to Michael Brody, András Komlósy, Gréte Dalmi, and Viktor Trón, for their various comments. The two anonymous reviewers have also made significant contribution. Much improvement in the quality of this paper is due to them, while all inadequacies and errors are mine. Finally, I wish to mention Teun Hoekstra, whose personally communicated ideas on Hungarian inspired me a lot.

do not. At the heart of my suggestion lies the assumption that nominal phrases are not uniform categorially: some project a DP-layer, while others do not, and this entails important differences in their behavior. Specifically, my account capitalizes on the minimalist view of Case-licensing, according to which Case is a feature of D^0 , whereby nominal phrases not projecting a DP-layer will not participate in any Case-licensing mechanism, thus they will not be visible objects for the verb. My proposal naturally incorporates some insights of the previous analyses, but it will be shown to be able to treat a wider range of data.

1. Previous analyses

1.1. The paradigms

Table 1 below shows the two paradigms in question, for the verb *lát* 'see', in present tense. The table is set up according to the number and person of the subject governing agreement. With other tenses/moods, and with front vowel harmony, some of the endings are slightly different, but these alterations do not affect our discussion and results in any way.

Table 1

lát 'see'	'subjective'		'objective'	
	SG	PL	SG	PL
1st	lát-ok	lát-unk	lát-om	lát-juk
2nd	lát-sz	lát-tok	lát-od	lát-játok
3rd	lát	lát-nak	lát-ja	lát-ják

plus: lát-lak – SUBJ = 1st SG, OBJ = 2nd person

The 'subjective' forms in the table have no correlation whatsoever with any property of any other phrase than the subject, however, these forms are used (among other cases) when the object is a 1st or 2nd person non-reflexive personal pronoun, except for the single case when the subject is 1st person singular and the object is 2nd person—in this case the form *lát-lak* 'I-see-you' is used. This is the sole occurrence of clear person agreement with the object.² As regards the 'objective' series, those forms do not show number and/or person agreement with the object, in the

² The suffix *-lak* can in fact be broken up into *-l-*, which is one variant of the marker of 2nd person, in the subjective paradigm (taking the place of *-sz* seen in Table 1 after stems ending in sibilants), followed by *-a-*, possibly analyzed as an epenthetic vowel, and the final *-k*, i.e. the 1st person subject agreement suffix (cf. the subjective endings).

strict sense, either. On the one hand, though it is true that they basically stand with 3rd person objects, reflexives in any person (and reciprocals) trigger this paradigm, as well. On the other hand, it is not the case that any 3rd person object forces the objective inflection—as will be discussed in much detail below, indefinites in many cases cooccur with the subjective paradigm. Thus we can immediately conclude that any attempt to explain the distribution of the two paradigms in terms of number/person object agreement is flawed.

1.2. Definiteness agreement?

The second usual analysis of the phenomenon relies on the notion of definiteness of the object: roughly speaking, if the object is a definite NP, it goes together with 'objective' agreement on V, whereas if it is indefinite, the 'subjective' inflection is chosen, cf. (1).³ (This leading idea is implemented, with different details, for example in Rácz–Takács (1974) [a brief reference grammar], Szamosi (1976), and, at least for 3rd person objects, in Szabolesi (1992, 1994a), Farkas (1987).⁴)

- | | | | | |
|---------|-----------------|-------------|-----|---------|
| (1) (a) | Látom / | *látok | a | fiút. |
| | see-1sg-ob | see-1sg-sub | the | boy-acc |
| | 'I see the boy' | | | |
| (b) | Látok / | *látom | egy | fiút. |
| | see-1sg-sub | see-1sg-ob | a | boy-acc |
| | 'I see a boy' | | | |

Furthermore, intransitive verbs pattern with verbs taking an indefinite object in this respect. This last fact is in itself a weak point of this analysis, in as much as it needs to be stipulated, since it is less than obvious that if the key factor in the choice between the paradigms is definiteness, then intransitive verbs should choose the 'indefinite' agreement affixes. Not having any object, they might as well go with the 'definite' agreement endings—the sole thing that could be evoked to remedy the situation is markedness, provided we rightfully regard the objective paradigm as more marked than the subjective one.⁵

³ In the glosses all number/person agreement specifications are meant as agreement with the subject, unless explicitly indicated otherwise; 'sub' and 'ob' mark 'subjective' vs. 'objective' inflection; features (other than agreement) not overtly marked on a particular form, e.g. present tense indicative, are dropped from the glosses. Also, Hungarian displays no gender distinctions, not even on pronouns; for simplicity's sake I will use the masculine forms in the glosses and translations throughout.

⁴ In the latter two, it is necessarily assumed that specific indefinites, discussed below, formally/featurally count as definites.

⁵ On a markedness account see Moravcsik (1988).

There are several empirically rooted objections to the definiteness agreement hypothesis, too. Definiteness of a nominal phrase is to a large extent the function of the determiners. For instance, determiners such as *egy* 'a/one', *néhány* 'some', *öt* 'five', are called indefinite determiners, in keeping with the assumption that they render the NP they determine indefinite. Thus, as expected under the definiteness analysis, they occur with subjective agreement on the verb as objects; cf.

- (2) Látok / *látom öt embert.
 see-1sg-sub see-1sg-ob five man-acc
 'I see five men'

However, when the object includes a possessive construction, the verb usually appears with the objective paradigm, even though the same indefinite determiner is present (and, accordingly, the NP is still interpreted as indefinite), as in (3):

- (3) Látom öt emberedet.
 see-1sg-ob five man-2sg-poss-acc
 'I see five of your men'

In fact, in such cases the verb could carry subjective endings, too, but with a different (non-specific) interpretation. This contrast will be treated below in detail.

A similar case is shown, this time with an indefinite pronoun, in (4a) vs. (4b):

- (4) (a) Látok / *Látom valakit.
 see-1sg-sub see-1sg-ob someone-acc
 'I see someone'
- (b) Látom valakidet.
 see-1sg-ob someone-2sg-poss-acc
 'I see someone belonging to you'

Once again, the inherent indefiniteness of the object does not fully determine the choice of agreement paradigm—instead, other factors need to be considered, too. (And once again, in (4b), subjective inflection could be used, but with a shift in the specificity of the object.)

Another complication with a definiteness account is caused by the determiner *minden* 'every'. Normally, *minden* triggers subjective agreement:

- (5) Látunk / *látjuk minden fiút.
 see-1pl-sub see-1pl-ob every boy-acc
 'We see every boy'

This situation changes, however, in certain cases. For example, similarly to the above instances, the presence of a possessive construction results in a switch to objective agreement, as in (6a). Likewise, if *minden* is preceded by the definite article,⁶ the objective pattern appears, cf. (6b). That definiteness should not be a decisive factor here is illustrated by (6c), a minimally differing case, requiring subjective conjugation.

- (6) (a) Ismerem (a te) minden titkodat.
 know-1sg-ob (the you-nom) every secret-2sg.poss-acc
 'I know your every secret'
- (b) Elégetem / *elégetek a tőled kapott minden levelet.
 burn-1sg-ob burn-1sg-sub the from-you received every letter-acc
 'I burn every letter received from you'
- (c) Elégetek / *elégetem minden tőled kapott levelet.
 burn-1sg-sub burn-1sg-ob every from-you received letter-acc
 'I burn every letter received from you'

Finally, there are interesting cases with a possessive construction lacking both an overt possessor, and an overt article, where the subjective paradigm optionally steps in (6d).

- (6) (d) Ismerek (*a te) minden titkodat.
 know-1sg-sub (the you-nom) every secret-2sg.poss-acc
 'I know your every secret'

Clearly, then, neither definiteness itself, nor the possessive construction (possibly seen as giving rise to definiteness), on its own, can be used as an explanation for the distribution of objective agreement.

⁶ *Minden* (and a number of other determiners) cannot be directly preceded by the definite article, unless there is some intervening material between them. Szabolcsi (1994a) offers a phonological account for this, claiming that there is nothing inherently wrong in the cooccurrence of the two, and in fact the article is there for syntactic and semantic purposes, but a PF-filter blocks them from appearing adjacent to each other, and deletes the article in those cases, while if there is some lexical material between them, the article can stay.

A further problem is posed for the definiteness agreement hypothesis by the fact that 1st and 2nd person personal pronouns, when objects, occur with the subjective agreement pattern, witness (7a), as opposed to 3rd person object pronouns (7b).

(7) (a) Péter lát / *látja engem / téged / minket / titeket.
 Peter see-3sg-sub see-3sg-ob me you(sg)-acc us you(pl)-acc
 'Peter sees me / you(sg) / us / you(pl)'

(b) Péter látja / *lát őt / őket.
 Peter see-3sg-ob see-3sg-sub him them
 'Peter sees him / them'

It seems perfectly unreasonable to draw a distinction between 1st and 2nd person pronouns, on the one hand, and 3rd person ones, on the other, in terms of definiteness.⁷ The only phenomenon that may suggest so is exactly the one in question, namely the divergence in the choice of V-agreement paradigms.

Finally, there is an interesting contrast correlating with the alternation of agreement endings, but (crucially) not involving any necessary difference in definiteness, as shown in (8a) vs. (8b):

(8) (a) Olvastuk Péter (öt) versét.
 read-past-1pl-ob Peter-nom (five) poem-3sg.poss-acc
 'We have read Peter's (five) poems'

(b) Olvastunk Péternek (öt) versét.
 read-past-1pl-sub Peter-dat (five) poem-3sg.poss-acc
 'We have read (five) poems by Peter'

This contrast seems to be attributable to a difference in the **specificity** of the object. In the absence of anything better, we may be inclined to say at this point that the specific–non-specific distinction plays a role in the choice between the objective and the subjective paradigms.

1.3. Specificity agreement?

In the light of the problems discussed above, it is a natural move to examine the possibility that Hungarian 'object agreement' is at least partially a case of speci-

⁷ As Farkas (1990) notes, 1st and 2nd person pronouns can be pro-dropped, and since pro-drop in Hungarian is confined to definites, this is a syntactic argument, added to the obvious semantic argument, for regarding these personal pronouns as definite.

ficity agreement. More precisely, one might claim either that (i) the prime factor governing object agreement is definiteness, but under certain conditions (especially in the case of indefinite objects) specificity may intervene, or that (ii) specificity, rather than definiteness, is the key feature. Let us take a look at the previously mentioned problems once more, to see whether we are any better off with (i) or (ii).

As it happens, (2) and (4a) are immediately problematic for a 'specificity only' approach. The object phrases *öt ember* 'five men' and *valaki* 'someone' are ambiguous in this respect: they can be interpreted either specifically or non-specifically, however, they will invariably trigger subjective agreement. Moreover, the object in (3), albeit a possessive construction, is not necessarily any more specific than the one in (2), yet it tends to occur with objective agreement. A combined definiteness-and-specificity account may be more viable, as long as we can maintain that with non-possessives definiteness counts, and with indefinite possessives paradigm selection hinges on specificity. Definite possessives are obviously specific. The data in (6), however, gets us into trouble. Arguably, there is no definiteness or specificity difference between the objects of (6b) and (6c), yet the contrast in agreement patterns is perfectly clear.

It is necessary to make mention of Enç's (1991) concept of specificity, where a nominal phrase counts as specific iff its discourse referent is linked to some previously established discourse referent by a relation of inclusion, as opposed to the case of definites, where the relevant linking relation is identity. Now, it might seem promising to follow a line here building on the assumption that possessedness in fact satisfies the criteria of the inclusion relation, hence the possessive constructions would immediately qualify as specific, rightfully triggering objective agreement under a specificity approach. Enç's theory is all the more attracting, because it is syntactically anchored: in Turkish, specific objects stand with a distinctive case-suffix, in opposition to non-specific ones, which always occur bare. Hungarian thus apparently parallels the situation in Turkish, the difference being that here verbal agreement, rather than case, morphology is the signal. However, on the one hand, the contrast in (8) does not easily yield itself to a neat explanation in Enç's terms, and, on the other hand, universal quantifiers show a striking mismatch: in Turkish they behave morphologically as specifics, and Enç actually argues that also from a semantic point of view they induce specificity. But in Hungarian, as (5) and (6) show, they clearly pattern with non-specifics. It is therefore reasonable to look for a better characterization of the Hungarian agreement choice than the one in terms of specificity.

The best we can say is that somehow the overt definite article counts for agreement. But this is worth nothing under Szabolcsi's (1994a) theory, where the definite article is always present with *minden* 'every', except at PF, thus there can be

absolutely no difference there in syntax, and paradigm selection presumably takes place before the output of morphology is fed into PF.

Furthermore, the split of personal pronouns remains a problem, unless one wants to claim that there really exists some specificity difference between 3rd person pronouns and the rest.⁸ Eventually, the data in (8) proves to be the only compelling motivation for seeking the solution in terms of specificity.

So what the data suggests is that although definiteness and specificity do show some correlation with the choice of object agreement, it is worth investigating other options, whereby it may turn out that this correlation is in fact an effect, rather than the cause.

At this point, before proceeding to my proposal, it seems useful to highlight the most crucial questions lacking a good answer:

- (i) Why do intransitives pattern with transitives taking a 'definite' (or 'specific') object in choosing the subjective conjugation?
- (ii) Why does the possessive construction trigger the objective paradigm, and why is the (6d, 8b)-type an exception to this?
- (iii) Why is there a split between 3rd person and non-3rd person pronouns, in that the latter pattern with 'indefinites', requiring subjective agreement?

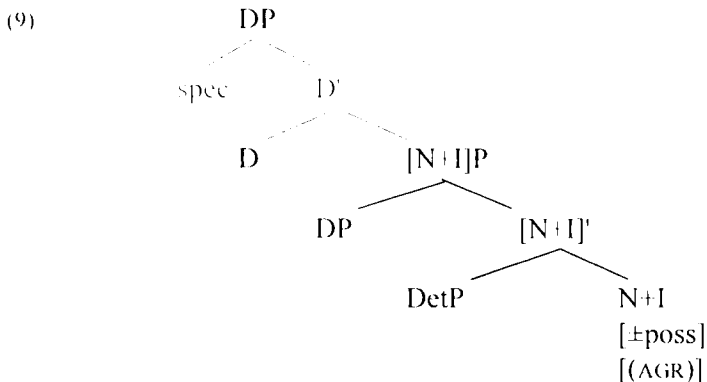
2. The proposal

2.1. A generalization

For what follows, I adopt the phrase structure attributed to nominal phrases in Hungarian as presented in Szabolcsi (1992; 1994a), shown here in (9).

⁸ É. Kiss (p.c.) suggests that one might toy with the idea of taking 1st and 2nd person pronouns to be non-specific, in a discursal sense, on the grounds that they can never be coindexed with a syntactic antecedent – the sole way of rendering an NP specific. Another suggestion (Jeffrey Goldberg, p.c.) segments the specificity hierarchy into three parts, with the 1st and 2nd person pronouns, being at the [+specific] extreme, constituting a third class, an indication of which is the fact that with a few optionally transitive verbs, like *eszik* 'eat', in the case of 3rd sg. subjects, they stand with a verb-form belonging to a 'third paradigm': the ending is different from both the 'subjective' and the 'objective' inflection, cf.

(i) *Esz / *eszi / ?eszik engem a méreg* 'eat-3sg(-*ob/?sub) me the anger.'



An important property of this analysis is the strict separation of two classes of determiners. One class comprises the definite article *a(z)* 'the', the zero indefinite article, and the demonstrative+article complex *ez/az a(z)* 'this/that—the'—their category is D^0 , and they head the outmost projection of nominal phrases. In terms of distribution, they always precede nominative-marked possessors.

- (10) (a) $[DP$ a $[N+I]P$ mi barátunk]]
 the we-nom friend-1 pl.poss
 'our friend'

As opposed to this group, there is another class, including simple demonstratives (e.g. *e(m)e*, *ezen* 'this', *ama*, *azon* 'that'), quantifiers (e.g. *minden* 'every', *kevés* 'few', *egy(ik)* 'one'), and numerals (e.g. *öt* 'five'). These are full maximal projections (DetPs in Szabolcsi's term), and occupy a slot following nominative-marked possessors.

- (10) (b) $[DP$ a $[N+I]P$ mi $[N+I]'$ minden/kevés/öt barátunk]]
 the we-nom every/few/five friend-1 pl.poss
 'our every/few/five friend(s)'

They are within a maximal projection smaller than DP; I will tentatively assume with Szabolcsi that they are in $[N+I]P$, whose head is an $[N+I]$ complex (where I is the possessive-agreement inflection) and whose specifier is filled by the nominative possessor.⁹

⁹ Szabolcsi (1992; 1994a) attributes entirely different functions to these classes. She argues that D^0 s are pure subordinators, not determiners in the semantic sense, while instances of DetP are determiners, and may consist merely of features like [+/-definite], [+/-specific], in association with the 'definite' article occupying D^0 , hence the apparent role of the article in determining definiteness and specificity.

2.2. Non-possessives

Considering now the simple cases of ‘object agreement’, where no possessive construction is involved, we get a straightforward account on the following basis: whenever there is an overt D^0 in the object phrase, objective agreement is forced on the verb, and subjective agreement is the elsewhere case. Assuming a principle of projectional economy (see e.g. Grimshaw 1991; 1997), we can rephrase the situation, saying that whenever the object is a fully projected nominal phrase, i.e. a DP, it triggers objective agreement, and when it is not a full-fledged DP, i.e. a smaller nominal projection, such as [N+I]P, it does not—the default case being subjective agreement.¹⁰

At this point it is clear already, why definiteness of the object nominal correlates with the paradigm selection. Either the article in D^0 is itself the source of definiteness, or (in keeping with Szabolcsi 1992; 1994a) there are matching rules between D^0 and DetP which ensure that the definite article only occurs when the DetP specifies its containing [N+I]P as [+definite] (or at least [+specific]).

Next we should tackle indefinite, interrogative, negative, universal, and relative pronouns, which always occur with subjective agreement, unless they are placed into a possessive construction as the possession-denoting element. ((4a) is repeated here as (11a).)

- (11) (a) Látok / *Látom valakit.
 see-1sg-sub see-1sg-ob someone-acc
 ‘I see someone’
- (b) Kit látsz / *látod ?
 who-acc see-2sg-sub see-2sg-ob
 ‘Who do you see?’
- (c) Senkit nem látok / *látom.
 nobody-acc not see-1sg-sub see-1sg-ob
 ‘I see nobody’
- (d) Mindenkit látok / *látom.
 everyone-acc see-1sg-sub see-1sg-ob
 ‘I see everyone’

¹⁰ The only problem with this view is that Szabolcsi admits a null indefinite article among D^0 s, one possible reason for which is that a SpecDP position (hence a D^0) is needed for allowing a possessor to leave the nominal phrase (to topicalize, for instance). Since I offer a different analysis for this phenomenon, I regard the null article as not present at all. The semantic consequences of omitting this null element, and the whole projection it would head, do not concern me here.

- (c) akit látsz / *látod
 who rel-acc see-2sg-sub see-2sg-ob
 'who(m) you see'

The internal structure of these pronouns is not perfectly clear, but we may build on Cheng's (1991, 84ff.) analysis, and claim that at least in (11a–d), the pronouns are Det+NP complexes, where NP is *kit*, a unit without quantificational force, and Det (*vala-*, *0-*, *sen-*, *minden-*, respectively) is a quantifier (indefinite, wh-, negative, and universal, respectively). Det thus falls in with DetPs in Szabolcsi's DP-structure (in the case of *minden* it is even the same form), thereby all of these pronouns are just [N+I]Ps, not DPs, insofar as overt material is concerned. It is no surprise, then, that they do not trigger objective agreement.

Additional support for my hypothesis comes from incorporated objects, as illustrated in (12). (For a discussion of these, see e.g. É. Kiss (1992; 1994).)

- (12) Almát eszünk / *esszük.
 apple-acc eat-1pl-sub eat-1pl-ob
 'We are eating apples (We are apple-eating)'

As seen in the example, these bare nominals never stand with objective agreement. Since they are just X⁰s, this is what we expect.¹¹

2.3. Possessives

Let us now turn our attention to possessives. Recall that in some of these cases there is an option whether such objects stand with subjective or objective agreement. The first-sight generalization seems to be that an overt definite article, or an overt nominative-case possessor, requires objective inflection (13a, b), while in the absence of both, that is, when the possessor is non-overt, or dative-marked and outside the object phrase, both agreement paradigms are grammatical, but with a specificity difference on the object (cf. (8a, b)).

- (13) (a) Látom / *látok a kutyádat.
 see-1sg-ob see-1sg-sub the dog-2sg-poss-acc
 'I see your dog'

¹¹ É. Kiss (1992) regards them as XPs represented solely by their heads. If so, they are probably the minimal XPs, i.e. NPs in our case, absent any evidence to the contrary, so they pose no problem for my analysis. But they occupy the same slot as verbal prefixes do, moreover they can be considered to be fully incorporated into V, which suggests that they may turn out to be mere X⁰s.

- (b) Látom / *látok Péter kutyáját.
 see-1sg-ob see-1sg-sub Peter-nom dog-3sg.poss-acc
 'I see Peter's dog'

The presence of an overt D^0 fits the scheme sketched above: it necessitates the projection of the DP-layer. Without it, it is at least possible for the nominal phrase to lack this outermost layer. More trouble is caused by the possessors. In Szabolcsi's now standard analysis (for details see e.g. Szabolcsi 1994a), the nominative-case possessor occupies the specifier of $[N+I]P$ (14a), while its dative-case counterpart is found in the spec of DP, if it is still within the DP at all (14b), for it is capable of leaving the DP altogether, by way of operator-type movements (such as topicalization, focusing, left-dislocation), or scrambling (14c).

- (14) (a) $[_{DP} [_{D} a] [_{N+I}P \text{ Péter } [_{N+I}' \text{ kutyája}]]]$
 the Peter-nom dog-3sg.poss
 'Peter's dog'
- (b) $[_{DP} \text{ Péternek}_i [_{D} a] [_{N+I}P \text{ } t_i [_{N+I}' \text{ kutyája}]]]$
 Peter-dat the dog-3sg.poss
 'Peter's dog'
- (c) $[_{CP} \text{ Péternek}_i [_{IP} \text{ eltűnt } [_{DP} \text{ } t_i' [_{D} a] [_{N+I}P \text{ } t_i [_{N+I}' \text{ kutyája}]]]]$
 Peter-dat disappeared the dog-3sg.poss
 'Peter's dog disappeared'

The two positions cannot normally be filled simultaneously. Though it is possible to have the full possessor phrase in the spec of DP, and a coreferential (resumptive?) pronoun in the spec of $[N+I]P$, it is markedly archaic, or jocular, in flavor, cf. (15):

- (15) % Péternek_i az ő_i kutyája
 Peter-dat the he-nom dog-3sg.poss
 'Peter's dog' (lit.: 'Peter's dog of his')

Szabolcsi, therefore, assumes that the two positions are movement-related: all possessors originate in the inner position, and can actually stay there, receiving nominative case, but they can (or in certain cases: must; see below) raise up to the outer position, which is somehow associated with a dative(-like) ending, and which can

serve as an escape hatch for further movement. Also, the outer position is an operator position (which the inner one is not).

This picture is totally incompatible with my proposal, because (i) nominals with a nominative possessor and without an overt D^0 would count as less-than-DPs, and would thus occur with subjective agreement, contrary to the facts; and (ii) dative-marked possessors would imply the presence of the DP-layer, being in need of a SpecDP, so subjective conjugation (as in (8b)) should be impossible with them. For the latter, I assume that in (8b)-type cases there is no DP projected, rather, the possessor moves directly out of the [N+I]P-internal position. Overt D^0 is never found in these cases (that would immediately trigger the objective conjugation, and yield a definite interpretation). The problem we face now is how to explain the fact that nominative possessors cannot be extracted, cf. (16).

- (16) (a) *Péter_i olvastunk [*t*_i versét].
 Peter-nom read-past-1pl-sub poem-3sg.poss-acc
 'We have read poems by Peter'
- (b) Péternek_i olvastunk [*t*_i versét].
 Peter-dat read-past-1pl-sub poem-3sg.poss-acc
 'We have read poems by Peter'
- (c) *Péter_i olvastuk [(a) [*t*_i versét]].
 Peter-nom read-past-1pl-ob (the) poem-3sg.poss-acc
 'We have read Peter's poem'
- (d) Péternek_i olvastuk [*t*'_i (a) [*t*_i versét]].
 Peter-dat read-past-1pl-ob (the) poem-3sg.poss-acc
 'We have read Peter's poem'

In Szabolcsi's account this followed from the fact that the extracted possessor had to pass through SpecDP, where it picked up its dative-ending. On the other hand, her theory does not explain why the possessor has to be extracted when D^0 is a null-element (= [-specific]), i.e. why extraction is obligatory for a non-specific reading to arise (Szabolcsi 1994a, 227). This is evident here, since with the 'null' D^0 there is no D-projection, hence no SpecDP, while an in situ, nominative possessor would force the specific reading. The reason why the nominative possessors fail to move, under minimalist assumptions (Chomsky 1995), is that they have nothing to check, neither Case, nor operator features.

We now have to say something about problem (i), i.e. the obligatory ‘DP-ness’ of nominative-possessor phrases. It is clear that if the possessor is non-overt (i.e. *pro*), then all depends on the presence vs. absence of an overt D^0 , as shown in (17):

- (17) (a) Láttunk / *láttunk kutyádat.
 see-past-1pl-sub see-past-1pl-ob dog-2sg.poss-acc
 ‘We have seen some dog(s) belonging to you’
- (b) Láttuk / *láttunk a kutyádat.
 see-past-1pl-ob see-past-1pl-sub the dog-2sg.poss-acc
 ‘We have seen your dog’

This neatly corresponds to the DP vs. [N+I]P difference. Furthermore, if the [N+I]P-internal possessor is an overt personal pronoun, the definite article must be present, and consequently the objective agreement and the definite reading is the only option:

- (18) Láttuk / *láttunk a te kutyádat.
 see-past-1pl-ob see-past-1pl-sub the you-nom dog-2sg.poss-acc
 ‘We have seen your dog’ (*‘We have seen some dog(s) belonging to you’)

This fact may serve as an indication that overt nominative possessors necessarily occur in DPs, even if in many cases there is no overt D^0 , cf. (19):

- (19) (a) Láttuk / *láttunk (a) Péter kutyáját.
 see-past-1pl-ob see-past-1pl-sub (the) Peter(-nom) dog-3sg.poss-acc
 ‘We have seen Peter’s dog’ (*‘We have seen some dog(s) of Peter’)
- (b) Láttuk minden / egy / a / sok fiú kutyáját.
 see-past-1pl-ob every / a / the / many boy-nom dog-3sg.poss-acc
 ‘We have seen every/a/the boy’s / many boys’ dog’

In some of these cases one might argue (following Szabolcsi 1992; 1994a) that the definite article is present in syntax, and deletes at PF, obeying a rule of ‘haplology’, the function of which is to eliminate D–D and D–Det sequences.¹² Even for (19a) one could propose that proper names like ‘Peter’ inherently contain a definite

¹² Indeed, sequences like *az egy* ‘the a/one’, *a minden* ‘the every’ are very rare in Hungarian, and two subsequent definite articles are totally impossible, even if such a sequence is syntactically and semantically plausible, as in *a [a fiú] kutyája* ‘the {the boy(-nom)} dog-3sg-poss’, meaning ‘the dog of the boy’ (note the double occurrence of ‘the’ in the translation).

article, and even this can trigger the PF deletion rule. But surely there is nothing wrong with D-Num, or D-*sok* ('the many') strings. We are certainly short of a perfect explanation here.

Yet some support to the underlying presence of a D⁰ comes from the fact that in each of these cases a dative-marked possessor in SpecDP, followed by an overt definite article, is possible, with no meaning difference at all, which is suggestive of the presence of D⁰ with the nominative-case possessors, too.

2.4. Remnants

There are a few other cases that have not been specifically mentioned up to this point, but merit some discussion. One of these is the fact that there are certain possessors that cannot appear in the [N+I]P-internal position, only in SpecDP, or outside of the nominal phrase, with a dative-ending. These include indefinite, negative, interrogative, universal and relative pronouns:

- (20) (a) *a ki/valaki fia
 the who/someone-nom son-3sg.poss
 'whose/someone's son'
- (b) kinek/valakinek a fia
 who-dat/someone-dat the son-3sg.poss
 'whose/someone's son'

Here I follow Szabolcsi (1994a) in attributing the phenomenon to the operator nature (= feature) of these elements, as well as of the positions they occupy: SpecDP, and the outside, clause-level specifiers.

Another interesting question is why object clauses mostly trigger objective agreement, as shown in (21):

- (21) (a) Tudom / *tudok [(azt) hogy Péter okos.]
 know-1sg-ob know-1sg-sub (it-acc) that Peter smart(-sg)
 'I know that Peter is smart'
- (b) Pétert_i akarom / *akarok [hogy megverd t_i].
 Peter-acc want-1sg-ob want-1sg-sub that beat-imp-2sg
 'It is Peter that I want you to beat'

In a detailed analysis of Hungarian embedded clauses, Kenesei (1992) proposes to treat *that*-clauses as [DP, CP] chains, where CP is theta-marked by the matrix V, while

DP is in a Case-position, Case-marked by the matrix V. In (21), *azt* ‘it-acc’ (an expletive) and *Pétert* ‘Peter-acc’ represent this DP. Consequently, object agreement holds with this DP. *Az* ‘it’ is a DP-equivalent pronoun, and *Péter* is a proper name, i.e. a DP, inherently, so objective conjugation is expected. If, however, this position is taken up by a phrase that counts, in the sense of the discussion above, as less (or other¹³) than DP, subjective agreement is what we expect, and it is what we find:

- (22) (a) *Kül_j akarsz [hogy megverjek t_j]?*
 who-acc want-2sg-sub that beat-imperative-1sg
 ‘Who do you want me to beat?’
- (b) *Öt fiút_j akarok [hogy megverj t_j].*
 five boy-acc want-1sg-sub that beat-imperative-2sg
 ‘I want you to beat FIVE BOYS’
- (c) *Hallottál olyat [hogy egy első okos legyen]?*
 hear-past-2sg-sub such-acc that a first-grader smart be-imper-3sg
 ‘Have you ever heard such a thing that a first-grader should be smart?’

To sum up briefly, these cases do not constitute counter-evidence; their behavior is in full compliance with our theory, once we have a correct analysis for them.

3. A minimalist analysis

3.1. DPs, Case, and object agreement

In this section I turn my attention to the technicalities of implementing my proposal in a minimalist framework, the basics of which are found in Chomsky (1995). In keeping with the currently standard assumptions about the functional structure of clauses, I posit an object agreement functional head and projection: Agr_O^0 , and Agr_OP , and claim that Agr_O is the locus of checking the object agreement features on the verb, directly related to the ‘subjective’ vs. ‘objective’ inflectional morphology. Moreover, object DPs have to move to SpecAgr_O for reasons of licensing (i.e. structural Case).¹⁴ The essence of my proposal, in these terms, is that certain object phrases, which are not DPs, just NPs or [N+I]Ps, do not check features at

¹³ This, with the example in (22c), was pointed out to me by a reviewer.

¹⁴ I deliberately avoid the term ‘Case’, wherever possible, to preclude confusion with morphological case, which is abundant in Hungarian, and is not entirely linked to syntactic ‘Case’.

SpecAgr_O, thus do not license objective agreement on V. In other words, they are Case-theoretically invisible to the verbal heads, unlike full DP objects, so the verbs theta-marking them will behave as intransitives from a Case-theoretic point of view. This immediately provides a simple account of why verbs taking 'indefinite' objects pattern with true (theta-)intransitives, as far as subjective vs. objective agreement is concerned. Also, if the raising of XPs to agreement- and/or Case-checking positions is driven by the connection between the attracting features of functional heads, and the D-features of the raised phrases, then it is obvious that non-DPs will not get attracted to these positions.

At this point it is natural to ask what is the Case-status of these less-than-DPs. I propose that they have inherent (theta-linked) Case, i.e. they are licensed via the theta-roles assigned to them. A remark is in place here about morphological case. Accusative morpho-case is not strictly linked to structural Case checking of objects, witness (23a, b).

(23) (a) Péter van itt a legtöbbit.
 Peter-nom he-3sg here the most-acc
 'Peter is here most frequently'

(b) Péter hatalmasat nőtt tavaly óta.
 Peter-nom enormous-acc grow-past-3sg last_year since
 'Peter has grown enormously since last year'

The accusative-marked phrases in these examples are not proper objects, and these verbs do not even have objective conjugation, yet the degree adverbials bear case-suffixes as 'quasi-objects'. This shows that it is not unique for the non-DP proper objects to display accusative case-endings without being Case-licensed as objects.

Many other questions arise, as well, as to the properties of the agreement-driven movement process proposed. One of them is whether this is an overt movement, or a covert one. As is well-known, Hungarian is predominantly an overt movement ('early') language: the vast majority of scope relations are established in the overt phase of syntax—something that in many languages typically pertains to the LF phase. Since the object DPs in question can occupy the preverbal scope positions (the topic, quantifier, or focus positions) before spellout, we are left with only two options. Either the Agr_O projection is higher than the operator positions—an unlikely state of affairs, or they must move to / pass through SpecAgr_O overtly, en route to the operator positions. On the other hand, object DPs staying postverbally can occur in any order with respect to any other element in that field. This suggests that either (i) they can check at SpecAgr_O covertly, but if they must move

to the preverbal scope positions, they necessarily pass through it in the overt phase; or (ii) they check overtly in all cases, but may scramble back to the right of V afterwards, either by rightward-moving themselves, or by staying put while V (and possibly some other material) raises leftward across them.¹⁵

Let me dive here into a brief digression, to show how my analysis ties in with a fact about Hungarian quantificational phrases, discussed in Szabolcsi (1994b; 1995). As will become evident, this result is clearer if we opt for (i) above, i.e. that raising to SpecAgr_O can be covert.

Szabolcsi classifies Hungarian nominal phrases into three groups according to their distribution, especially with respect to the four basic preverbal operator positions: topic, quantifier, focus, and verbal modifier (VM), and shows that this classification matches the one made on semantic grounds. Type (A) nominals can be topicalized or focused, type (B) are those that can occur in the quantifier-slot, while type (C) must land in VM-position unless the focus slot is filled by some element, and can be (further) focused. Without going into details, I wish to focus on one point of her discussion. When these nominals are forced to stay postverbally, there are certain cases of inverse scope linking. In particular, Szabolcsi's type (A) and (B) phrases can assume scope over other postverbal quantificational phrases to their left, witness (24a, b), while type (C) ones can never do so, cf. (24c, d). (These examples are modeled after Szabolcsi's (1995) (71a–d). *Hatnál több x* 'more than six x', and *kevés x* 'few x' are of type (C); *minden x* 'every x' is of type (B); *Kati és Mari* 'Katie and Mary' belongs to type (A).)

- (24) (a) Kedden harapta meg hatnál több kutya Katit és Marit.
 Tuesday-on bit V-prefix six-than more dog Katie-acc and Mary-acc
 'It was on Tuesday that more than six dogs bit Katie and Mary'
 ok Tuesday > more than six dogs > Katie and Mary
 ok Tuesday > Katie and Mary > more than six dogs
- (b) Kedden harapott meg hatnál több kutya minden fiút.
 Tuesday-on bit V-prefix six-than more dog every boy-acc
 'It was on Tuesday that more than six dogs bit every boy'
 ok Tuesday > more than six dogs > every boy
 ok Tuesday > every boy > more than six dogs

¹⁵ Note that there are arguments from WCO-effects that in Hungarian Agr_O is above VP (Brody 1995), contra Koizumi (1993).

- (c) Kedden harapott meg hatnál több kutya kevés fiút.
 Tuesday-on bit V-prefix six-than more dog few boy-acc
 'It was on Tuesday that more than six dogs bit few boys'
 OK Tuesday > more than six dogs > few boys
 ?? Tuesday > few boys > more than six dogs
- (d) Kedden harapott meg minden kutya kevés fiút.
 Tuesday-on bit V-prefix every dog few boy-acc
 'It was on Tuesday that every dog bit few boys'
 OK Tuesday > every dog > few boys
 * Tuesday > few boys > every dog

As regards their semantics, type (A) contains set- (or group-) denoters; type (B), set- (group-)denoters typically associated with a clausemate distributive operator; while type (C) is constituted by cardinality quantifiers. In our terms, types (A) and (B) also include DPs, but type (C) phrases are always smaller projections. Now, if Agr_ρP is above VP, then for DPs there is always an option of taking scope at least as high as that position, whereby inability to take up inverse scope would be unexpected for them. Type (C) phrases, however, are crucially not DPs, so they do not have the chance to raise to SpecAgr_ρ , which is a possible explanation for why they never scope over material to their left in the postverbal domain.¹⁶

3.2. Remaining problems

I conclude this paper by pointing out two problem areas, where further research is necessary. One concerns the DP vs. less-than-DP distinction of nominal phrases. This distinction proved to be useful in giving an account for object agreement phenomena, but it brings its own difficulties. For one thing, if these two types are consistently distinguished, then we have to say something about why they behave identically in certain respects. Such a case was brought up by M. Brody (p.c.): Although syntactic passivization has a somewhat marked (non-standard) status in Hungarian, it certainly exists, very productively, and treats my object DPs and non-DPs identically, i.e. both are potential undergoers. If Hungarian passivization is a Case-driven phenomenon, then my analysis needs to be modified to cater for it. Moreover, the fact that when they are subjects, these two types do not display any divergence on the surface, is a potential source of difficulties. This leads us to the question of subject agreement,

¹⁶ It is another question, how those type (A)/(B) phrases that are not DPs take up inverse scope – suffice it to say here that they are eligible for (covert) movement to RelP or DistP (cf. Beghelli – Stowell 1995) by their inherent properties.

and its formalization, in Hungarian—an issue too big to be dealt with cursorily here. I would like to mention, though, that if my sketchy analysis for Szabolcsi's (1994b) type (C) QPs is on the right track, then these QPs should be blocked from ever accessing an Agr_S projection above VP, and this may suggest either that nominal phrases are not uniform in this respect, just like in the cases where they are objects, or that there is no Agr_S in Hungarian at all, which obviates our problem.

Secondly, I have not offered any explanation for the fact, discussed in the first part of the paper, that 1st and 2nd person object pronouns do not stand with objective agreement, unlike 3rd person ones, which is contrary to expectations, on the assumption that they are all DP-equivalents. Note, though, that this case was equally problematic for analyses relying on definiteness, specificity, or even person/number object agreement. Farkas (1987; 1990), in fact, outlines an analysis for them in terms of feature structures, splitting apart 1st and 2nd person nominal phrases from 3rd person ones (including 3rd person pronouns) by the feature [participant].¹⁷ Objective conjugation is triggered by a [definiteness] feature on the object, which is induced differently by the [participant] feature (for 1st, 2nd person), and by other features, like possessedness, or determiner features (affecting 3rd person nominals), so that at the point of paradigm selection 1st and 2nd person personal pronouns are not (yet) marked featurally as [definite], while at the level of semantic interpretation they (already) are. What this analysis fails to satisfactorily explain, though, is why the [participant] feature should involve this particular behavior; it is simply attributed to the "inherent definiteness" of the 1st and 2nd person personal pronouns.

To cope with the problem, I have two directions in mind, for subsequent work, to find out which (if either) is correct. One of them is to examine the categorial status of 1st and 2nd person pronouns: if some evidence can be found that they are less-than-DPs, then they fit into the scheme without further stipulation. The other possible path would be to relate the present facts to an 'ergative-like' split in the behavior of pronouns. Because of temporal limitations, I cannot pursue these matters here, but I am going to carry on with my work along these paths, in the near future.¹⁸

¹⁷ Number, i.e. plurality, is irrelevant to the issue.

¹⁸ Notice that there is a piece of data that has not been treated at all: the single *látlak* 'I-see-you' form, i.e. the sole case where there is person agreement with the object, besides the number and person agreement with the subject. What's more, it occurs with a 2nd person pronominal object, something that goes with subjective agreement if the subject is anything else than 1sg, by virtue of which this lonely offender should be grouped with subjective agreement, the defining property of which is the lack of checking at Agr_O ! Absent any better analysis, though, I leave this question entirely open.

4. Summary

I have discussed the nature of the choice in agreement inflection paradigms in Hungarian, in dependence of properties of object phrases. I have shown that previous accounts, in terms of number/person object agreement, definiteness, and specificity, are unsatisfactory in some respects, and, in the case of the latter two, they are on the wrong track, in as much as correlations in these features are the result, rather than the motif, of the selection of agreement paradigms. I set up a distinction between nominals having and lacking a DP layer, and took this to be the key factor, which, through licensing (\bar{C} -Case) related checking at an object agreement functional projection, determines the paradigm choice. While fleshing out this proposal in minimalist terms, I pointed at a scope phenomenon that yields itself to a simple treatment under my analysis of object phrases.

As a coda, let me reflect on the questions set up in 1.3. I consider it one of the important gains of the proposed system that the identical behavior of verbs without an object, and ones with an 'indefinite' object falls out trivially. I have had partial success in answering the question about possessive constructions: they take the objective conjugation, regardless of (in)definiteness, whenever they contain a D, that is, whenever they are indisputably DPs. When they are not, the possessor hangs loosely around, with a dative suffix. Finally, no satisfactory account has been found for non-3rd person pronouns, only some paths towards the solution have been sketched.

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PRO-DROP UND TEXTKOHÄRENZ: INTERAGIERENDE REGELN IM GEBRAUCH DES SUBJEKTSPRONOMENS IM UNGARISCHEN

PIROSKA KOCSÁNY

Abstract

The paper tests the hypothesis that the licensing or blocking of pro-drop is determined by various linguistic and non-linguistic factors. It is examined on the basis of data from Hungarian, a pro-drop language with a rich verbal morphology, (i) under what conditions pro-drop is blocked sentence internally, and (ii) what rules govern pro-drop across sentence boundaries, i.e., in a text. A systematic analysis of empirical material leads to the conclusion that pro-drop is realized as a result of the interaction of logical-syntactic and pragmatic rules as well as rules facilitating text understanding.

0. Einleitung (Zum Pro-Drop-Phänomen)

Das Ungarische verfügt über ein Konjugationsparadigma, das eindeutige Informationen über Person und Numerus des Subjekts, bzw. weitere Informationen über das Objekt vermittelt. Dem Prinzip der Ökonomie entsprechend wird das Subjektspronomen (und in bestimmten Fällen auch das Objektspronomen, vgl. dazu Farkas 1987) im Satz phonologisch erspart, soweit ihm nur die Aufgabe zukommt, Person und Numerus genau anzugeben. Vgl.:

- | | | |
|-----|---------------------------|--------------------|
| (1) | Mit csinál a gyerek? | Ír. |
| | ‘Was macht das Kind?’ | ‘[Es] schreibt.’ |
| | Mit csinálnak a gyerekek? | Írnak. |
| | ‘Was machen die Kinder?’ | ‘[Sie] schreiben.’ |

Das gleiche wiederholt sich bei nicht-menschlichem Subjekt:

- | | | |
|-----|-----------------------|-----------------|
| (2) | Hol van a tojás? | Fő. |
| | ‘Wo ist das Ei?’ | ‘[Es] kocht.’ |
| | Hol vannak a tojások? | Főnek. |
| | ‘Wo sind die Eier?’ | ‘[Sie] kochen.’ |

Das dargestellte grammatische Phänomen ist in der generativen Grammatik unter dem Namen „Pro-Drop“ bekannt. Sprachen, in denen ein pronominales Element ausfallen, d.h. einfach fehlen kann, werden Pro-Drop-Sprachen genannt. Dabei unterscheidet man zwischen dem anaphorischen Null-Pronomen, genannt PRO, das die Merkmale eines leeren Subjekts neben einem Infinitiv trägt, und dem nicht-anaphorischen, weggelassenen Pronomen, genannt *pro*, das keineswegs nur als Null-Subjekt (sondern auch als Null-Objekt) auftauchen kann. In der Diskussion über das Pro-Drop-Verfahren geht es unter anderem darum, auf der Folie welcher allgemeinen Regelmäßigkeiten bzw. auf Grund welcher spezifischen Eigenschaften dieses Verfahren in einer Sprache ermöglicht wird. Daß das Fehlen des Subjekts (und ggf. des Objekts) mit einer morphologisch abgesicherten Kongruenz von Verb und Subjekt (bzw. Objekt) zusammenhängen mag, scheint genauso klar zu sein wie die Einsicht, daß die morphologische Absicherung allein wohl nicht genügt, eine allgemeingültige Pro-Drop-Regel zu formulieren, zumal in vielen Sprachen die Person- und Numeruskongruenz in der Verbflexion zwar gesichert, aber das Pro-Drop-Verfahren trotzdem nicht gestattet ist, und es auch Sprachen gibt, ganz ohne flexivische Kongruenzmerkmale (z.B. das Chinesische), in denen Pro-Drop trotzdem zustandekommen kann (vgl. dazu zusammenfassend Harbert 1995, 220ff. mit weiterführender Literatur).

Als nicht-konfigurationelle Sprache — in der die Gliedfolge in einem bestimmten Sinn nicht gebunden ist — zeigt das Ungarische außerdem die auch in ähnlichen Sprachen beobachtbaren Regeln der Tilgung der koreferenten Pronomina in der Satzfolge, vgl. das folgende Beispiel (\emptyset steht für das fehlende Pronomen):

- | | | |
|---------|--|--|
| (3) (a) | A fiú _{s1} észrevette az öregembert.
‘Der Junge _{s1} bemerkte den Alten.’ | Ø _{s1} Odament hozzá.
[Er] _{s1} ging zu ihm.’ |
| (b) | A fiú _{s1} észrevette az öregembert _{s2} .
‘Der Junge _{s1} bemerkte den Alten _{s2} .’ | Az _{s2} odament hozzá.
Der (= „Jener“) _{s2} ging zu ihm.’ |

Im folgenden wird versucht, auf die gegebene Interaktion der Bedingungen aufgrund der Möglichkeiten des Ungarischen hinzuweisen, die das Pro-Drop-Verfahren ermöglichen — oder blockieren. Dabei geht es 1. um den Gebrauch des Subjektspronomens der dritten Person im isolierten Satz und 2. um die Regeln der pronominalen Wiederaufnahme in der Satzfolge.

1. Satzinterne Perspektive (Blockiertheit des Pro-Drop-Verfahrens im Satz)

Im „neutralen“ Satz gilt das eingangs schon erwähnte Prinzip, daß die phonologische Form des Pronomens getilgt werden kann, sofern das Pronomen nur über Merkmale verfügt, die auch aufgrund der Verbflexion (Person, Numerus usw.) rekonstruierbar sind. (Der Begriff „neutraler“ versus „nicht-neutraler Satz“ wird von Kálmán (1985, 13) in dem Sinn verwendet, daß „Neutralität“ mit dem Fehlen eines möglichen Kontrast-Akzentes verbunden wird. Neutrale Sätze werden durch eine gleichmäßige Prosodie („level prosody“) gekennzeichnet, d.h. es gibt in ihnen keinen besonders hervortretenden Satzakkent — wohl gibt es jedoch mehrere gleiche oder schwach hervortretende Akzente —, im Gegensatz zu den sog. korrektiven oder nicht-neutralen Sätzen, die einen (oder etliche) besonders starke Akzent(e) haben.) Sollte das Pronomen jedoch außer der Angabe von Person und Numerus des Subjekts auch andere Leistungen tragen, so kann es wohl nicht mehr bzw. nicht immer getilgt werden. Die bestimmenden Leistungen des Pronomens hängen im Ungarischen mit logisch-pragmatischen Funktionen zusammen, die auf Grund der logischen Geregelttheit des ungarischen Satzes durch die Gliedfolge sowie durch begleitende Intonations- und Akzentverhältnisse zum Ausdruck kommen. So registrieren wir im ungarischen Satz das satzeinleitende Topik und das mit dem Fokus beginnende Comment. Das Topik kann einfach oder kontrastiv sein, der Fokus ist „normal“ oder stark akzentuiert. (Vgl. É. Kiss 1987; 1992; Prószéky 1989. — É. Kiss 1992 spricht nicht von kontrastivem Topik, sondern von Linksversetzung.) Der neutrale Satz enthält keinen stark akzentuierten Fokus und kein kontrastives Topik.

Tatsächlich lassen sich für den Gebrauch des Subjektspronomens in den genannten, syntaktisch markierten Funktionen folgende Verallgemeinerungen festhalten:

1.1. Wenn das Pronomen in Fokusposition steht, kann es phonologisch nicht mehr getilgt werden, vgl.

(4) Ő jött ki elém a megállóba.

‘Er war es, der mich von der Haltestelle abholte.’

* Ø jött ki elém a megállóba.

1.2. Wenn das Pronomen durch eine Fokuspartikel (*is* ‘auch’) oder durch einen Quantor gebunden ist, kann es phonologisch nicht getilgt werden:

- (5) (a) Ő is kiment az állomásra. * Ø is kiment az állomásra.
 'Er ging auch zum Bahnhof.'
 (b) Ők hatan kimennek az állomásra. Hatan kimennek az állomásra
 'Sie zu sechs gehen zum Bahnhof.' 'Sechs (= Leute) gehen zum Bahnhof.'

1.3. Wenn das Pronomen in kontrastiver Topikposition steht, kann es nicht getilgt werden.

- (6) Ő türelmesen várt. Türelmesen várt.
 'Er — was ihn anbelangt/seinerseits — [Er] wartete
 wartete geduldig.' geduldig.'

Wird der Satz ohne Pronomen konstruiert, erhalten wir einen „neutralen“ Satz ohne Topik.

Das Pronomen als kontrastives Topik erscheint sehr oft in typischen, semantisch vorhersagbaren Kontexten, nämlich in solchen, wo von einer Menge von Elementen auf ein Element hingewiesen wird. Typische Kontexte sind dementsprechend z.B. Vergleiche, wobei die Wahl aus der Menge betont wird:

- (7) Ő mindig mást vett észre, mint a többi ember.
 'Er (— seinerseits —) hat immer etwas anderes entdeckt, als die anderen Menschen.'

Das als kontrastives Topik hervorgehobene Pronomen kann auch durch einen (restriktiven) Relativsatz modifiziert werden:

- (8) Ő, aki mindent látott, hallgatott. Aki mindent látott, hallgatott.
 'Er, der alles gesehen hatte, schwieg.' 'Wer alles gesehen hatte, schwieg.'

Das Relativpronomen *aki* wird ohne Bezugswort verallgemeinernd gebraucht.

Das Pronomen kann in seiner Funktion als kontrastives Topik auch durch eine Partikel lexikalisch verstärkt werden:

- (9) (a) Ő meg csak állt ott egyedül. *Ø meg csak állt ott egyedül
 'Er (seinerseits) stand nur dort allein.'
 (b) Ő pedig türelmesen várt. Pedig türelmesen várt.
 'Er aber (seinerseits) wartete geduldig.' 'Obwohl [er] geduldig wartete.'

Während die homonyme Partikel und Konjunktion *pedig*, abhängig vom Satz mit und ohne *ő*, mal als Partikel, mal als Konjunktion identifiziert wird, kann das Wort *meg* im gegebenen Kontext nur als Partikel definiert werden. Es ist wohl kein Zufall, daß das Ungarische über eine ganze Reihe von Partikeln in dieser Position verfügt, offensichtlich braucht das Pronomen in kontrastiver Topikfunktion oft eine lexikalische Unterstützung (zum Beispiel: *ő bezzeg, ő aztán* usw.): ein Gedanke, der für eine kognitiv eingestellte Linguistik auch von großem Interesse sein dürfte. Vielleicht hängt das auch mit dem Faktum zusammen, daß die kontrastive Topikfunktion des Personalpronomens im Textkontext durch andere, kontextuelle Regeln geschwächt wird, s. später unten.

1.4. Einen besonderen Fall stellen die Kopulasätze dar, in denen das Identifizieren von vornherein nach zwei vergleichbaren Gliedern verlangt. Dementsprechend werden diese Sätze ebenfalls mit dem Pronomen konstruiert.

(10) *Ő az olasz trónörökös.*

‘Er ist der italienische Thronfolger.’

Az olasz trónörökös.

‘Der italienische Thronfolger.’

Wenn das Pronomen fehlt, haben wir es mit einer situativen Ellipse, d.h. mit einer NP zu tun, die im Kontext jeweils anders rekonstruierbar ist, u.z. entweder als Subjekt — z.B. *Melyik visel szemüveget? Az olasz trónörökös.* ‘Welcher trägt eine Brille? Der italienische Thronfolger.’ — oder als Teil einer VP — z.B. *Ki ez az ember? Az olasz trónörökös.* ‘Wer ist dieser Mann? Der italienische Thronfolger.’ Es ist nicht eindeutig zu entscheiden, ob wir es in dem vollständigen Satz infolge des Gebrauchs des Pronomens zugleich auch mit einem kontrastiven oder mit einem einfachen Topik zu tun haben. Im Dialog, wo die Möglichkeit der Ellipse auch gegeben ist, (– *Ki ez az ember?* – *Ő az olasz trónörökös./ Az olasz trónörökös* ‘– Wer ist dieser Mann? – Er ist der italienische Thronfolger./ Der italienische Thronfolger.’) scheint das Pronomen in der Antwort allerdings eher als kontrastives Topik zu funktionieren. (Noch stärker ist diese Rolle des Pronomens bei nicht-menschlichen Subjekten, wo das Pronomen *az* ‘jenes’ steht, s. das Beispiel (21) weiter unten.)

1.5. Eine weitere, vom logischen Aufbau des Satzes nicht mehr abhängige Regel läßt sich in bezug auf die Aufzählung festhalten:

Ein phonologisch leeres Element kann nicht koordiniert werden, dementsprechend kann das Pronomen in der Aufzählung nicht getilgt werden:

- (11) A húga, ő meg a barátja egy egész tortát evett meg.
 'Seine Schwester, er und sein Freund haben eine ganze Torte gegessen.'

1.6. In den genannten Fällen stand das Pronomen sowohl in Topik- als auch in Fokusfunktion am Satzanfang bzw. vor dem Verbum finitum. Es gibt jedoch auch Sätze, in denen *ő/ők* unmittelbar nach dem am Satzanfang hervorgehobenen Verb folgt.

- | | | |
|------|--|---|
| (12) | Ment ő haza már máskor is
éjfél után.
'Ging er doch schon oft
nach Mitternacht nach Hause.' | ?Ment haza már máskor is
éjfél után.
'[Er] ging auch schon oft
nach Mitternacht nach Hause.' |
| (13) | Fog ő még keresni engem!
'Er wird mich noch suchen!' | Fog még keresni engem.
'[Er] wird mich noch suchen.' |

Die Minimalpaare zeigen einen interessanten Unterschied. Die Sätze mit dem Personalpronomen vertreten einen auffallenden, d.h. über die (einfache) Mitteilung hinausweisenden Sprechakt: Sie sind Beteuerungen, die der Sprecher vorträgt, um in einer Argumentationskette seinen Standpunkt, seine Erwartung — anderen Meinungen gegenüber — zu verstärken. Demgegenüber sind die Sätze ohne Personalpronomen einfache Feststellungen, und sie sind als selbständige Sätze gegebenenfalls nicht einmal vollständig. Ein weiteres, paralleles Merkmal der Strukturen mit dem nicht-getilgten Personalpronomen hängt mit den inneren Zeitverhältnissen der Sätze, also mit dem Aspekt zusammen. Die Beispiele stellen eine Möglichkeit für die sog. existentielle Lesart der Sätze dar. (Vgl. Kiefer 1992, 867ff. Kiefer zitiert ein ähnliches Beispiel: *Ment ő haza egyedül, bzw. Hazament ő egyedül máskor is*, der Gebrauch des Pronomens wird aber von ihm nicht untersucht.) Diese Lesart basiert auf der Abgeschlossenheit der Handlung. Sie kann durch den Ausdruck „es ist schon vorgekommen, daß...“ paraphrasiert werden, wobei die Paraphrase nur mit grenzbezogenen Temporalbestimmungen stehen kann. Sätze mit der existentiellen Lesart können sowohl aus Sätzen mit dem perfektiven als auch aus Sätzen mit dem progressiven Aspekt abgeleitet werden. Die erwähnte Aspektbezogenheit wird durch die große Frequenz einer Art ergänzender Lexik bekräftigt: vgl. die obigen Sätze mit *már* 'schon' und *még* 'noch'.

Ein natürlicher Kontext zum ersten Satz mit dem Vergangenheitstempus ist die Zurückweisung eines Standpunktes, der Satz selbst gilt als betuerndes Gegenargument:

- (14) Nem kell aggódnod. Ment ő haza már máskor is éjfél után.

‘Du brauchst dir keine Sorgen zu machen. Ist er doch auch schon früher mal nach Mitternacht nach Hause gegangen.’

Die Variante ohne Personalpronomen ist allein — ohne unmittelbaren Textzusammenhang — auffallend weniger akzeptabel.

Ein natürlicher Kontext zu dem Satz ohne Personalpronomen — wo der Satz voll akzeptabel wirkt — könnte dagegen folgender sein:

- (15) Péter nem aggódott. Ismerte jól a környékét, ment Ø haza már máskor is éjfél után, tudta, mire kell vigyázni.

‘Peter sorgte sich nicht. Die Umgebung war ihm vertraut, [er] ging auch schon früher nach Mitternacht nach Hause, er wußte, worauf er achten sollte.’

Die Akzeptabilität der Variante ohne Pronomen hängt auch mit der Koordinierung von gleich strukturierten Sätzen zusammen, s. auch weiter unten.

Der Satz mit dem Zukunftstempus ist die Beteuerung eines bevorstehenden, zu erwartenden Zustandes, der für den Sprecher als Zurückweisung einer angenommenen Niederlage gilt, vgl. den Kontext:

- (16) Fog ő még keresni engem, de akkor már késő lesz.

‘Er wird mich schon noch suchen, aber da wird es schon zu spät sein!’

Die Variante ohne Pronomen ist für mein Sprachgefühl in diesem Kontext nicht akzeptabel. Steht der Satz ohne Pronomen, so könnte ein möglicher Kontext wie folgt lauten:

- (17) Egy csomó részletet nem tisztáztunk. Fog Ø még keresni engem, talán már holnap, telefonon.

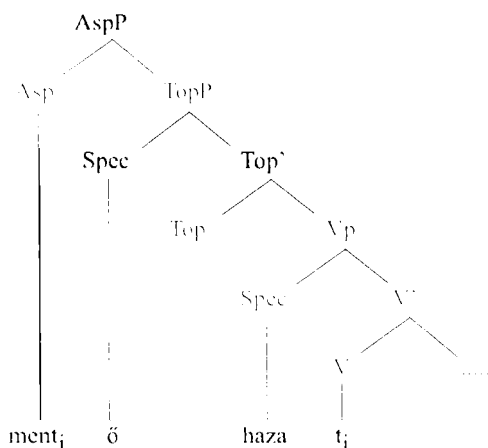
‘Wir haben eine ganze Reihe von Detailfragen noch nicht geklärt. [Er] wird mich noch suchen, vielleicht schon morgen, per Telephon.’

Die Variante mit dem Pronomen ist in diesem Kontext **nicht** möglich.

Zusammenfassend läßt sich als Regel 1.6. folgendes festhalten: Wird das Verb, einer Aspektprojektion untergeordnet, nach vorn bewegt, so muß das Subjektspronomen (als ursprüngliches Topik), das direkt nach dem Verb folgt, nicht getilgt werden. Die Nicht-Tilgung ist mit bestimmten Interpretationen verbunden, die in einer Pragmatik zu klären sind. Unter Aspektprojektion wird, entsprechend den Operationsregeln der Rektions- und Bindungsanalyse, die Hervorhebung des

Verbs im Kopf, über das Topik, verstanden, vgl. den folgenden Lösungsvorschlag, für den ich Katalin É. Kiss danke:

(18)



Die genannten Bedingungen, die das Pro-Drop-Verfahren blockieren, sind also die folgenden:

(i) für die Informationsstruktur bzw. für die logische Struktur des Satzes bestimmende Bedingungen: Das Subjekt ist entweder der Fokus oder ein durch Quantoren oder Fokuspartikeln gebundenes Topik oder ein hervorgehobenes, kontrastives Topik des Satzes;

(ii) durch einfache logische Überlegungen erklärbare Bedingungen:

-- das Pronomen wird in einem identifizierenden Kopulasatz gebraucht (im Gegensatz zu den auch ohne Pronomen konstruierbaren situativen Ellipsen, wobei es in der Schwebeliege bleibt, ob die Sätze mit dem Pronomen zugleich notwendigerweise ein kontrastives Topik enthalten oder nicht)

-- das Pronomen wird mit anderen NP-s koordiniert;

(iii) pragmatische Bedingungen: das Pronomen wird nach das Verbum finitum verschoben, was mit pragmatisch erklärbaren Folgen einhergeht.

All diese Bedingungen sind auch im Falle von nicht-menschlichen Subjekten gültig. Das Pronomen, das hier in betonter Fokusposition, in kontrastiver bzw. durch Partikeln/Quantoren hervorgehobener Topikposition, nach dem Verbum fini-

tum, koordiniert oder im Kopulasatz nicht getilgt werden kann, ist das Pronomen *az* 'jenes', zum Beispiel:

- (19) (Nem esszük meg a húst?)
 ('Wollen wir das Fleisch nicht essen?')
- (a) Odaégett. [Es] ist angebrannt.
 (b) Az égett oda. Das ist es, was angebrannt ist.
 (c) Az odaégett. Was das anbelangt, das ist angebrannt.'

(Den Unterschied zwischen Fokus und kontrastivem Topik zeigt die Position des im Ungarischen trennbaren Verbalpräfixes *oda* an.)

- (19) (d) Égett az oda már máskor is. 'Es ist doch auch schon früher mal angebrannt.'
- (20) (Hol a gyümölcsöstál?)
 ('Wo ist die Obstschale?')
- (a) A kancsó, a két kistányér meg az sajnos összetört.
 'Der Krug, die zwei Untertassen und sie (=jene) sind leider zerbrochen.'
- (b) Az, a kancsó meg a két kistányér sajnos összetört.
 'Sie (=jene), der Krug und die zwei Untertassen sind leider zerbrochen.'

(Immerhin wirkt die zweite Variante der Aufzählung, wo das Pronomen *az* nach vorn gesetzt erscheint, viel natürlicher — im Gegensatz zu dem Pronomen *ő*, das ohne weiteres als mittleres oder letztes Glied der Aufzählung stehen kann. Das hängt u. (a) mit der Eigenschaft des letzteren zusammen, auf Menschen hinzuweisen, was in der Kognition die Identifikation leichter zu machen scheint.)

- (21) (Mi ez a fekete valami?)
 ('Was ist dieses schwarze Ding?')
- Az a hús. / A hús.
 'Das ist das Fleisch. / Das Fleisch.'

Dem erwähnten Ökonomie-Prinzip entsprechend wird also das Pronomen in der Regel fallengelassen, d.h. getilgt, sofern es nur als einfaches Topik steht, aus natürlich-logisch zu nennenden Gründen in der Koordination oder der Identifikation nicht beibehalten wird und pragmatisch keine hervorgehobene Rolle übernimmt.

2. Satzexterne (textuelle) Perspektive

Im Textzusammenhang treten die genannten Bedingungen in Interaktion mit anderen Regeln, die die Wiederaufnahme eines Nomens in unmittelbar nacheinander folgenden Sätzen durch Pronomen steuern. Dabei geht es um gravierende Unterschiede je nachdem, (i) ob das Subjekt oder eine andere NP (ein Objekt) wiederaufgenommen wird, (ii) in welcher Position die wiederaufgenommene NP steht, d.h. ob sie einfaches Topik, kontrastives Topik oder Fokus des Satzes ist, und (iii) ob die Wiederaufnahme in der nächstfolgenden Phrase oder erst nach einer dazwischengeschobenen Phrase erfolgt.

Die Wiederaufnahme im „neutralen“ Satz haben Pléh–Radics (1976, 261ff.) behandelt. Eine Darstellung auch in „nicht-neutralen“ Sätzen lesen wir bei É. Kiss (1978, 445ff.) (mit Angabe von weiterer Literatur aus der älteren ungarischen Forschung). Sie macht auf die Interaktion von semantischem Merkmal (nämlich [-HUM] oder [-HUM]), Topikposition und Fokusposition bei der Pronominalisierung aufmerksam, und faßt den Gebrauch des Null-Pronomens, des Personalpronomens und des Demonstrativpronomens in einem Algorithmus zusammen. In ihre Fußstapfen tretend, wird im folgenden versucht, die Gebrauchsbedingungen der Pronomen in der Satzfolge darzustellen.

2.1. Wiederaufnahme des Subjekts als Subjekt (Realisierung von Pro-Drop)

Für nacheinander folgende Sätze mit gleichem Subjekt läßt sich folgendes festhalten:

2.1.1. Wenn im zweiten Satz Subjekt und Topik zusammenfallen, ist die Tilgung des Subjekts in der Wiederaufnahme obligatorisch. Zum Beispiel:

- (22) Márton meglátta Jánost. \emptyset Átment az úton és \emptyset odaadta neki a pisztolyt.
 ‘Márton erblickte János. [Er] ging über die Straße und übergab ihm die Pistole.’

(Ein ähnliches Beispiel s. auch bei Pléh–Radics 1976.)

- (23) Az asztal eldőlt. \emptyset Megreccsent és \emptyset gurulni kezdett.
 ‘Der Tisch kippte um. [Er] krachte und fing an herunterzurollen.’

2.1.2. Wenn im zweiten Satz — ähnlich dem ersten Satz — Subjekt und Fokus zusammenfallen, kann das Pronomen bei Beibehaltung der Topik-Fokus-Gliederung als Fokus wiederaufgenommen werden, und zwar auch innerhalb einer koordinativen Satzverknüpfung mehr als einmal:

- (24) Márton látta meg Jánost. Ő ment át az úton és ő adta oda neki a pisztolyt.
 'Márton war es, der János erblickte. Er war es, der über die Straße ging und er war es, der ihm die Pistole übergab.'
- (25) Az asztal dőlt fel. Az recesent meg és az kezdett gurulni lefelé.
 'Der Tisch war es, der (=jener) umkippte. Er war es, der (=jener) krachte und er war es, der (=jener) anfing, herunterzurollen.'

Ein eventuelles Weglassen des Pronomens gilt als stilistische Variante, wo die VP-s, und nicht die Sätze koordiniert werden:

- (26) Márton látta meg Jánost. Ő ment át az úton és \emptyset adta oda neki a pisztolyt.
 'Márton war es, der János erblickte. Er war es, der über die Straße ging und ihm die Pistole übergab.'

2.1.3. Wenn im zweiten Satz Subjekt und kontrastives Topik zusammenfallen, kann das Nomen als kontrastives Topik in dem Folgesatz durch das Pronomen wiederaufgenommen werden, das Pronomen wird aber in der Koordination nicht mehr wiederholt! Das Personalpronomen kann als Fokus beliebig oft wiederaufgenommen werden, aber bei kontrastiver Topikfunktion ist die Wiederaufnahme in der Satzverknüpfung blockiert. Als kontrastives Topik kann ein Nomen durch ein Pronomen **einmal** wiederaufgenommen werden, d.h. das kontrastive Topik verhält sich in der Koordination dem einfachen Topik und nicht dem Fokus ähnlich.

- (27) Márton látta Jánost. Ő átmehetett az úton és \emptyset odaadhatta neki a pisztolyt.
 'Was Márton anbelangt, er hat János gesehen. Er — seinerseits (= Márton) — konnte über die Straße gehen und ihm die Pistole übergeben.'

Das gleiche gilt auch für das Pronomen *az* bei nicht belebten Subjekten.

Die Wiederaufnahme des Subjekts fassen wir tabellarisch wie folgt zusammen:

	1. Satz	2. Satz und koordinierter	3. Satz
Topik	NOMEN	\emptyset	\emptyset
kontrastives Topik	NOMEN	PRONOMEN	\emptyset
Fokus	NOMEN	PRONOMEN	PRONOMEN

Wenn die nach dem ersten Satz folgenden Sätze das Subjekt nicht als Fokus oder als kontrastives Topik beibehalten, so gilt ebenfalls die für die Beibehaltung des einfachen Topiks typische Tilgungsregel, vgl.:

(28) Márton látta meg Jánost. Ø A bódé mögül kiválóan látott mindent.

‘Es war Márton, der János erblickte. Hinter der Bude hat [er (= Márton)] alles ausgezeichnet gesehen.’

Für das Pro-Drop-Verfahren ist also die Topikfunktion sowohl in der Perspektive des Satzes als auch in der der Regeln der Wiederaufnahme unbedingt ausschlaggebend. Ist es nun auch ausschlaggebend, was für eine NP — Subjekt oder Objekt — als Topik in der Subjektstelle wiederaufgenommen wird? Wird jedes pronominale Subjekt in der Topikposition getilgt — oder nur das, das zugleich Subjekt und Topik des vorausgegangenen Satzes ist? Diese Frage soll im folgenden untersucht werden.

2.2. Wiederaufnahme eines Nicht-Subjekts als Subjekt (Unterlassen von Pro-Drop)

Wenn ein Nicht-Subjekt in der Satzfolge als Subjekt wiederaufgenommen wird, gelten andere Regeln.

2.2.1. Ein Nicht-Subjekt kann, als Subjekt wiederaufgenommen, auch in der Topikposition **nicht** weggelassen werden, zumal **im System der Gebrauchsregeln die Tilgung für die gleichen Subjekte bestimmt** ist. Vgl. das folgende Minimalpaar:

(29) A lány_{s1} észrevette a fiút. ø_{s1} Elpirult.

‘Das Mädchen erblickte den Jungen. [Es] errötete.’

(30) A lány_{s1} észrevette a fiút_{s2}. Az_{s2} elpirult.

‘Das Mädchen erblickte den Jungen. Der (= Jener) errötete.’

In der Wiederaufnahme des Nicht-Subjekts erscheint ein Kode-Wechsel: statt des Personalpronomens wird das Demonstrativpronomen (‘jener’) verwendet, d.h. die Trennung nach dem Merkmal [HUM] wird aufgehoben, bzw. das Demonstrativum verliert sein Merkmal [-HUM] und erscheint als allgemeiner grammatischer Verweis (s. dazu auch Pléh–Radics 1976 und É. Kiss 1978). Vgl.:

- (31) A lány eldobta a gyűrűt. Az eltűnt a fűben.
 'Das Mädchen warf den Ring weg. Er (= jener) verschwand im Gras.'

Nun scheint aber dieser Gebrauch des Demonstrativums in zweierlei Hinsicht nicht sichergestellt zu sein. Es gibt nämlich jede Menge Sätze, in denen das Demonstrativum auch erspart bleibt, bzw. in denen statt des Demonstrativums das Personalpronomen erscheint. Dies braucht eine nähere Untersuchung.

2.3. Wiederaufnahme eines Nicht-Subjekts als Subjekt (auch mit Pro-Drop)

Grundsätzlich gilt die Regel, daß das Objekt des vorausgehenden Satzes als Subjekt durch das Demonstrativum *az* 'jener' wiederaufgenommen wird. Wann kann das Pronomen *az* als Subjekt in der Wiederaufnahme trotzdem fehlen? Welche Bedingungen sind hier für diese Tilgung verantwortlich bzw. notwendig?

Vergleichen wir die Beispiele (29)–(30) und die folgenden, in denen jeweils entweder das Subjekt oder das Objekt des vorausgehenden Satzes als Subjekt des betreffenden Satzes gilt, ohne daß man es phonologisch ausdrücken müßte:

- (32) *Az édesanyja megtalálta a fiút.*
 (a) Ø Jól elnáspángolta.
 (b) Ø Már mindenhol kereste.
 (c) Ø Egy málnabokor alatt ült és málnát evett.
 (d) Ø Az apja elől szökött meg.

'Die Mutter hat den Sohn gefunden.

- (a) [Sie] hat [ihn] verprügelt.
 (b) [Sie] hat [ihn] schon überall gesucht.
 (c) [Er] hat unter einem Himbeerbusch gesessen und Himbeeren gegessen.
 (d) [Er] ist vor dem Vater geflüchtet.'

Welche Faktoren spielen bei dem Identifizieren des Subjekts im Kontext eine Rolle? Es ist wohl nicht verfehlt, den aspektuellen und Zeitverhältnissen in der Satzfolge besondere Beachtung zu schenken.

Ich möchte dafür plädieren, daß in aufeinander folgenden Sätzen vor allem der Aspekt und damit einhergehend die Zeitfolge bzw. die kausalen Zusammenhänge darüber entscheiden, wie wir das phonologisch fehlende Subjekt des zweiten Satzes rekonstruieren. Dabei ergeben sich folgende Möglichkeiten:

- (i) In der engeren Satzfolge können die Abgeschlossenheit und die Nachzeitigkeit, gekoppelt mit einem möglichen kausalen Verhältnis, als Grundlage für eine Art

„gemeinsame Einordnungsinstanz“ entdeckt werden. Ewald Lang (1977) verwendet diesen Begriff bei der Erklärung des Faktums, daß in einer Koordination aus den Satzbedeutungen „eine von den Konjunktbedeutungen verschiedene Einheit konstituiert wird“ (66). Dies nennt er die Gemeinsame Einordnungsinstanz (GEI) der Konjunktbedeutungen. Allgemeiner formuliert stellt GEI „die Art von Kenntnisumstrukturierung dar, die daraus resultiert, daß zwei in Sätzen kodierte Informationsmengen in dem durch die Konjunktionsbedeutung induzierten Zusammenhang verarbeitet werden“ (67). Ein analoger Prozeß könnte in den Einheiten der Wiederaufnahme, in den sogenannten engeren Satzfolgen, beobachtet werden. So haben wir im Satz (32a) ein Folgeverhältnis von „gefunden“ und „verprügelt“, im Satz (32b) ein Folgeverhältnis von „gefunden“ und „schon überall gesucht“ (perfektiv).

2.3.1. Wenn das durch die Zeitverhältnisse mitbegründete Folgeverhältnis entdeckt werden kann, dann ist das phonologisch getilgte Glied im zweiten Satz obligatorisch das als einfaches Topik wiederaufgenommene Subjekt des ersten Satzes.

Die Tilgung der gleichen Subjekte ist eine so starke Regel, daß sie auch für Fälle gilt, wo das so identifizierte Subjekt unserem Erfahrungswissen widerspricht. Zum Beispiel:

(33) Paula meghívta Pétert ebédre. Ø Egy üveg Martinit vitt neki.

‘Paula lud Peter zum Mittagessen ein. [Sie] brachte [ihm] eine Flasche Martini.’

Trotz unserer Erwartung (daß es doch wahrscheinlich der eingeladenen junge Mann war, der die Flasche mitgenommen hat) wird die Subjektgleichheit „gewinnen“, so daß man in der Fortsetzung des Dialogs mit Recht überrascht fragen würde: *Ki? Paula?* ‘Wer? Paula?’.

(ii) Die durch die Zeitverhältnisse begründete Einheit kann unterbrochen werden bzw. kommt nicht notwendig zustande, wenn in der Satzfolge ein Satz mit progressivem Aspekt oder mit durativem Aspekt erscheint, wo man sich aber innerhalb der Dauer auf einen bestimmten Augenblick konzentriert. (Den progressiven Aspekt führt Kiefer 1992a, 849ff ein, s. dazu auch Kiefer 1992b.) Das sind die Fälle, in denen auch das Objekt des ersten Satzes als Subjekt des zweiten Satzes identifiziert werden kann, ohne explizit angegeben zu sein. Diese Sätze können immer durch das Adverbial *éppen* ‘eben, gerade’ ergänzt werden; vgl. den Satz (32c). Das „Unterbrechen“ der Satzfolge durch den progressiven Aspekt kann immerhin sowohl zugunsten der Subjektgleichheit als auch zugunsten des als

Subjekt wiederaufgenommenen Objekts ausgelegt werden. Vgl. die folgenden Beispiele:

- (34) A lány ekkor meglátta a fiút. \emptyset A villamosról szállt le éppen, bőrönddel a kezében.
 'In diesem Augenblick erblickte das Mädchen den Jungen. [Er] stieg gerade aus der Straßenbahn aus, einen Koffer in der Hand.'
- (35) A lány ekkor meglátta a fiút. \emptyset Leszállt a villamosról és futni kezdett.
 'In diesem Augenblick erblickte das Mädchen den Jungen. [Sie] stieg aus der Straßenbahn aus und begann zu laufen.'

Die Gliedfolge, insbesondere die Stellung des Verbalpräfixes *le* in *szállt le* und *leszállt*, ist ein bestimmendes Zeichen des Aspekts. Während Beispiel (35) in jedem möglichen Kontext nur die Wiederaufnahme des Subjekts enthalten kann, kann Beispiel (34) abhängig von der Fortsetzung die Möglichkeiten des progressiven Aspekts unterschiedlich ausnützen, und dementsprechend können sowohl die obige Auslegung als auch die Subjektsgleichheit bestätigt werden, vgl.:

- (36) A lány ekkor meglátta a fiút. \emptyset A villamosról szállt le éppen, amikor ő befordult a sarkon.
 'In diesem Augenblick erblickte das Mädchen den Jungen. [Er] stieg gerade aus der Straßenbahn aus, als *sie* um die Ecke bog.'
- (37) A lány ekkor meglátta a fiút. \emptyset A villamosról szállt le éppen, amikor az befordult a sarkon.
 'In diesem Augenblick erblickte das Mädchen den Jungen. [Sie] stieg gerade aus der Straßenbahn aus, als *er* (= jener) um die Ecke bog.'

Je nachdem, ob das Objekt des ersten Satzes — der Junge — oder das Subjekt — das Mädchen — einbiegt, muß, genau der Regel entsprechend, entweder *az* 'jener' oder *ő* 'sie' gesetzt werden. Warum *az*, das mag aufgrund des bisher Gesagten klar sein, vgl. Regel 2.2.1. Warum *ő*, darauf werden wir im späteren, bei der Behandlung der Wiederaufnahme nach einem dazwischengeschobenen Satz mit einem anderen Subjekt, noch zu sprechen kommen.

Folgende Regel kann formuliert werden:

2.3.2. In einem Satz mit progressivem Aspekt oder mit durativem Aspekt bei Konzentration auf einen gegebenen Augenblick kann auch das Objekt des vorausgehenden Satzes als phonologisch leeres Subjekt wiederaufgenommen werden.

Manchmal kann diese Identifizierung sogar bevorzugt werden, vgl. (34). Die Konzentration auf einen gegebenen Augenblick läßt auch einen Zustand als

Endpunkt einer Handlung zu, so können Sätze wie (32d) entsprechend verstanden werden.

Da die Durativität bzw. der progressive Aspekt eine Gleichsetzung des Objekts des ersten Satzes mit dem Subjekt des zweiten zuläßt bzw. unter entsprechenden kontextuellen Bedingungen sogar fördert, können Sätze, in denen die Durativität als zusammenhaltendes Moment entdeckt werden sollte, bei fehlendem pronominalem (oder nominalem) Hinweis nicht immer eindeutig enträtselt werden. Vgl.:

(38) Péter esendben figyelte Mártát. Ø Egy könyvben lapozgatott éppen, közben ø fel-felnézett, s a tekintetük ilyenkor találkozott.

‘Peter hat Martha im Stillen beobachtet. [Er(Sie?)] hat in einem Buch geblättert, inzwischen hat [er sie??] immer wieder aufgeschaut und ihre Blicke haben sich getroffen.’

Wenn dabei aus Erfahrungsgründen nur das Objekt des ersten Satzes als Subjekt des zweiten in Betracht kommen kann, so genügt unser „Erfahrungswissen“ zur Identifizierung des Subjekts nicht: Wir müssen das Subjekt, der obigen Regel 2.2.1. entsprechend, durch *az* ‘jenes’ markieren, sonst wirkt der Text komisch! Z.B. ein gegen die grammatische Regel 2.2.1. verstoßender Satz, wo der Verstoß aus Erfahrungsgründen besonders auffällt:

(39) ?Péter esendben figyelte a lányt. Ø Kézimunkázott, közben Ø fel-felnézett, s a tekintetük ilyenkor találkozott.

‘Peter hat das Mädchen im Stillen beobachtet. [Er? Es?] strickte, inzwischen hat [er? es?] immer wieder aufgeschaut und ihre Blicke haben sich getroffen.’

Dagegen richtig:

(40) Peter esendben figyelte a lányt. Az kézimunkázott, közben Ø fel-felnézett, s a tekintetük ilyenkor találkozott.

‘Peter hat das Mädchen im Stillen beobachtet. Sie (=“Jenes““) hat gestrickt, inzwischen hat [sie] immer wieder aufgeschaut und ihre Blicke haben sich getroffen.’

Von den befragten Muttersprachlern gab es mehrere, die im Beispiel (38) eine — nach meinem Sprachgefühl mögliche — Gleichsetzung von Objekt im ersten und Subjekt im zweiten Satz nicht rekonstruieren konnten, sie bestanden darauf, daß — genauso wie in Satz (39) bzw. (40) — auf das neue Subjekt explizit mit *az* hingewiesen werden sollte. Wenn wir die Satzfolge trotzdem als zweideutig empfinden, so könnte doch — über die grammatischen Unterschiede hinaus — ein gravierender Unterschied in der Erklärung des Weglassens des Subjektspronomens

in Beispielen wie (32a) und (35) einerseits und (32c) und (34) andererseits festgehalten werden. Während die Regeln 2.1.1–3 und ganz auffallend die Regel 2.2.1 und 2.3.1 in bezug auf eine engere Satzfolge, d.h. eine Art „verlängerte“ Satzverknüpfung formuliert worden sind (vgl. auch den Hinweis auf die „Gemeinsame Einordnungsinstanz“), könnte man im Fall der Regel 2.3.2 auch an eine andere Art Regelmechanismus denken, nämlich an textuelle Regeln, die direkt mit dem Verstehensprozeß, d.h. mit weit über die Grammatik hinausweisenden Faktoren der Kommunikation und der Kognition zusammenhängen.

In diesem Sinne können wir die Möglichkeit wohl auch nicht ausschließen, daß wir — ggf. unter dem Druck unseres lexikalischen Wissens oder Erfahrungswissens und dem Kooperationsprinzip der Kommunikation folgend — die phonologisch leere Subjektstelle auch in anderen, weiteren Fällen nicht dem Subjekt, sondern dem Objekt des vorausgehenden Satzes zuweisen, wie das im folgenden Beispiel unausweichlich geschieht (nach einem Beispiel von É. Kiss 1978, 450):

(41) Pétert Paula készítette fel a vizsgára. Ø Meg is bukott.

‘Paula war es, die Peter für die Prüfung vorbereitet hat. [Er] ist dann auch durchgefallen.’

Um dieses und ähnliche Beispiele verstehen zu können, ist es notwendig, Minimalpaare nach ihrer Akzeptabilität zu vergleichen.

1. Minimalpaar:

(42) ? Paula felkészítette Pétert a vizsgára. Ø Megbukott.

‘Paula bereitete Peter für die Prüfung vor. [?] fiel durch.’

(43) Paula felkészítette Pétert a vizsgára. Ø Kudarcot vallott.

‘Paula hat Peter für die Prüfung vorbereitet. [Sic] hatte einen Mißerfolg.’

Beispiel (42) wirkt lückenhaft und daher befremdend. Wir müssen den zweiten Satz eindeutiger einführen, einerseits mit einem starken Hinweis auf den inhaltlichen Widerspruch, z.B. durch eine Konjunktion, andererseits mit der Einbeziehung unserer eventuellen Erwartungen, vgl.: *Mégis megint megbukott.* ‘Trotzdem ist [er] schon wieder durchgefallen.’ Sonst ist die Satzfolge dubiös. Die Ursache liegt wohl darin, daß das Subjekt des ersten Satzes nicht ohne weiteres als — phonologisch leeres — **Subjekt** des zweiten Satzes verstanden werden kann, wir die zwei Sätze also als eine „enge Satzfolge durch eine Wiederaufnahme“ nicht rekonstruieren können. Andererseits haben wir zu wenig „Anregung“ und Information, um den Widerspruch zu verstehen und hinter den Sätzen den Textzusammenhang zu entdecken. Vgl. dazu die Variante (43), wo nicht mehr das Verb *megbukik* ‘durchfällt’

steht, sondern ein weniger spezifischer Ausdruck, und wo dementsprechend in der Rezeption die Subjektsgleichheit überwiegt. Dieses Beispiel wirkt immerhin auch etwas befremdend: man erwartet die Fortsetzung: z.B.: *Péter már az első feladatot elrontotta*. 'Peter hat gleich die erste Aufgabe verpatzt.'

2. Minimalpaar:

- (44) Paula felkészítette Pétert a vizsgára. Ø Meg is bukott.
'Paula bereitete Peter für die Prüfung vor. Auch ist [er] (?sie?) durchgefallen.'

(Der erste Satz wird „neutral“ akzentuiert, Paula gilt als einfaches, nicht kontrastives Topik.)

- (45) (a) Paula készítette fel Pétert a vizsgára. Ø Meg is bukott.
(b) Pétert Paula készítette fel a vizsgára. Ø Meg is bukott.
'Paula war es, die Peter für die Prüfung vorbereitet hat. Auch ist [er] durchgefallen.'

Beispiel (44) ist reibungsloser akzeptabel, wenn die Implikatur, nämlich die mitverstandene Meinung des Sprechers, daß von Paula und ihrer „Vorbereitung“ nichts Gutes zu erwarten ist, sprachlich „unterstützt“ wird. (Das Wort Implikatur wird hier nach Grice 1979a und 1979b verwendet. Für weitere Überlegungen s. noch Liedtke 1993 zur Unterscheidung von Diktum und Implikatum sowie zur Typologisierung und zu Abgrenzungsproblemen.) Durch die Hervorhebung von *Paula* als Fokus vor dem Verbum finitum (Beispiel (45a)) und besonders durch die Topikalisierung der NP, die auch in der Wiederaufnahme als Topik erspart wird, (Beispiel (45b)) wirkt die Satzfolge wesentlich natürlicher.

Die Hypothese, nach der in Zweifelsfällen die Topikgleichheit der Subjektsgleichheit überlegen sei (s. É. Kiss 1978, 450), kann nicht überzeugend bestätigt werden, vgl. die trotz der Topikalisierung doch stärkere Subjektsgleichheit im folgenden Fall:

- (46) Pétert_(Objekt, Topik) meghívta Paula ebédre. Ø_(Subjekt, Topik) Egy üveg Martinit vett neki.
'Peter_(Akkusativ) hat Paula zum Mittagessen eingeladen. (= Peter wurde von Paula zum Mittagessen eingeladen.) [Sie] kaufte ihm eine Flasche Martini.'

Die Regel der Wiederaufnahme des Subjekts durch Null-Pronomen bei Entdeckung einer engeren Satzfolge, mitbegründet in den Zeitverhältnissen, ist stärker als die Topikgleichheit. Dagegen kann die zur Identifizierung verhelfende Implikatur zum

Beispiel durch besondere Hervorhebung des Verbs im Fokus (und durch entsprechende inhaltliche Ergänzung) unterstützt werden:

(47) Pétert_(Objekt, Topik) meghívta Paula ebédre.

Ő_(Subjekt, Topik) Vett is neki örömeben egy üveg Martinit.

‘Peter_(Akkusativ) hat Paula zum Mittagessen eingeladen. (= Peter wurde von Paula zum Mittagessen eingeladen.) [Er] hat ihr vor Freude auch eine Flasche Martini gekauft.’

Die „Ausnahmen“, in denen es also darum ging, Pro-Drop im zweiten Satz in bezug auf das Objekt und nicht auf das Subjekt zu gebrauchen, und die wir hier durch einen Hinweis auf mögliche Implikaturen zu erklären suchten, zeigen einerseits die Möglichkeit, besser gesagt Notwendigkeit der Unterstützung der Implikatur z.B. durch Partikeln (*is* ‘auch!’) und/oder durch die logische Struktur des Satzes (Fokussierung und günstige Erfüllung der Topikposition), weisen aber auch auf eine andere, noch wesentlichere, wenn auch nicht klar definierte Gemeinsamkeit hin: Zwischen den beiden Sätzen der Satzfolge gibt es eine Art Zäsur, die den Gebrauch des grammatischen „Hilfswortes“ *az* ‘jener’ auch blockieren kann, wie es u. (a) im Beispiel (44) der Fall ist: Es wäre mit der Angabe des ersparten Subjekts *az* im zweiten Satz einfach unvorstellbar. Tatsächlich gelten die Eigentümlichkeiten der Wiederaufnahme nur in der unmittelbaren Folge von Sätzen, die eine Art Einheit = eine engere Satzfolge bilden. Die Wiederaufnahme des Objekts als Subjekt durch *az* ‘jener’ ist in einem Dialog nach einer Unterbrechung durch den Gesprächspartner nicht nur nicht mehr notwendig, sondern sogar ausgeschlossen:

(48) A. Paula meghívta Pétert ebédre.

B. Na és? Mi történt?

A. Semmi különös. Ø Rengeteget evett, még többet ivott.

‘A. Paula hat Peter zum Mittagessen eingeladen.

B. Na und? Was ist passiert?

A. Nichts besonderes. [Er] hat sehr viel gegessen, noch mehr getrunken.’

In solchen und ähnlichen Fällen geht es nicht um „Satzfolge“ im dargestellten Sinn, sondern um Sätze in einem Textzusammenhang, jeweils mit einem einfachen, nicht kontrastiven Topik, wo das Subjekt in Topikfunktion regelgerecht eliminiert wird, und wo die Rekonstruktion des „verschwiegenen“ Subjekts im komplexen Textverstehensprozeß gesichert sein muß.

Die Einbettung der Sätze in einer kohärenten Texteinheit kann es andererseits auch ermöglichen, daß wir auf die Angabe dessen, von dem in einem längeren Abschnitt die Rede ist, unabhängig von der grammatischen Rolle (aber nicht unabhängig von der Art des Topiks), einfach verzichten, wobei wir uns beim Enträtseln der Sätze auf den Textzusammenhang bzw. auf unsere sonstigen Kenntnisse verlassen. Besonders auffallend sind die Beispiele, in denen das als Subjekt wieder aufgenommene Objekt selbst ein phonologisch erspartes pronominales Objekt ist. Die Wiederaufnahme durch *az* ist hier mehr als fragwürdig, d.h. statt der grammatischen Explizierung verlassen wir uns auf unser Verständnis des Textes mit dessen kompliziertem Verweismechanismus, vgl. die folgenden parallelen Beispiele:

- (49) (a) Paula tegnap meghívta *Ő* ebédre. *Ő* Vett neki egy üveg Martinit meg egy szál virágot.
Ő Gondolta, hátha *Ő* örülni fog. *Ő* Nem csalódott.

‘Paula hat [ihn] gestern zum Mittagessen eingeladen. [Sie/Er] hat ihm/ihr eine Flasche Martini und ein Stück Blume gekauft. [Sie/Er] dachte, vielleicht wird [er/sie] sich darüber freuen. [Sie/Er] hat sich nicht getäuscht.’

- (b) Paula tegnap meghívta *Ő* ebédre. *Ő* vett neki egy üveg Martinit meg egy szál virágot.
Ő Gondolta, hátha *Ő* örülni fog. *Ő* Nem csalódott.

‘Paula hat [ihn] gestern zum Mittagessen eingeladen. Er (seinerseits) hat ihr eine Flasche Martini und ein Stück Blume gekauft. [Er] dachte, vielleicht wird [sie] sich darüber freuen. [Er] hat sich nicht getäuscht.’

- (c) *Paula tegnap meghívta ebédre. Az vett neki egy üveg Martinit meg egy szál virágot.
Ő Gondolta, hátha *Ő* örülni fog. *Ő* Nem csalódott.

(Unmögliche Formulierung)

- (d) Paula tegnap meghívta ebédre. *Ő* Vett neki egy üveg Martinit meg egy szál virágot.
Ő Gondolta, hátha *Ő* örülni fog. *Ő* Nem csalódott. Paula egészen elérzékenyült.

‘Paula hat [ihn] gestern zum Mittagessen eingeladen. [Er] kaufte ihr eine Flasche Martini und ein Stück Blume. [Er] dachte, vielleicht wird [sie] sich darüber freuen. [Er] hat sich nicht getäuscht. Paula war ganz gerührt.’

- (e) Paula tegnap meghívta ebédre. *Ő* Vett neki egy üveg Martinit meg egy szál virágot.
Ő Gondolta, hátha *Ő* örülni fog. *Ő* Nem csalódott. Péter egészen elérzékenyült.

‘Paula hat [ihn] gestern zum Mittagessen eingeladen. [Sie] kaufte ihm eine Flasche Martini und ein Stück Blume. [Sie] dachte, vielleicht wird [er] sich darüber freuen. [Sie] hat sich nicht getäuscht. Peter war ganz gerührt.’

- f. ?Paula tegnap meghívta ebédre. Ø Vett neki egy üveg Martinit meg egy szál virágot. Ø Gondolta, hátha Ø örülni fog. Ø Nem csalódott. Ø Egészen elrészényült.

‘Paula hat [ihn] gestern zum Mittagessen eingeladen. ? kaufte ? eine Flasche Martini und ein Stück Blume. ? dachte, vielleicht wird ? sich darüber freuen. ? hat sich nicht getäuscht. ? war ganz gerührt.’

Beispiel (49a) kann nur in einem größeren Kontext verstanden werden, wo wir schon wissen, von wem die Rede ist. (Z. B. nach einem ersten Satz wie: *Péter napok óta izgalomban égett*. ‘Peter war seit Tagen sehr aufgeregt.’)

Die Beispiele (49b) und (49c) zeugen davon, daß der Gebrauch der zwei Pronomina *ő* und *az* auf ganz anderen Ebenen geregelt sein kann. *Az* ist ein grammatischer Verweis auf ein als Subjekt wiederaufgenommenes **nominales** Objekt, *ő* ist unter syntaktischem Aspekt ein kontrastives Topik, vom textuellen Gesichtspunkt aus aber ein Textverweis, dessen Bedeutung im Rahmen der Textdeixis interpretiert werden kann, und zwar entweder als Hinweis des Autors auf eine handelnde Person oder als logophorisches (d.h. auf die redende Person hinweisendes) Pronomen in der erlebten Rede. (Das meist pejorativ gebrauchte *az* in kontrastiver Topikposition und oft lexikalisch ergänzt: *az meg* ist mit der grammatischen Verweisform *az* natürlich nicht gleichzusetzen.)

Die Beispiele (49d) und (49e) veranschaulichen, inwiefern die Unsicherheit im Beispiel (49a) innerhalb einer Texteinheit zum Schluß aufgelöst wird: Der letzte Satz läßt den ganzen Abschnitt jeweils unterschiedlich interpretieren. Beispiel (49a) könnte aufgrund unserer grammatischen Kompetenz im Sinne von Variante (49e), aufgrund von möglichen Implikaturen im Sinne von Variante (49d) ausgelegt werden. Eine solche Implikatur könnte von der Erzählperspektive manifestiert werden, die uns zum Beispiel entscheiden hilft, wo und wann alles von dem Gesichtspunkt der „Hauptfigur“ aus erzählt wird, die dann auch nicht dem Namen nach erwähnt werden muß. *ő* weist ohnedies eindeutig auf sie (in unserem Text auf Peter) hin. (Vgl. Beispiel (49b). S. dazu die Rolle des logophorischen *ő* in der erlebten Rede: Kocsány 1996.)

Beispiel (49f) will zeigen, wo die Grenzen der Ersparung der Pronomen liegen. Der letzte Satz macht den Leser besonders unsicher. Das ist wohl der Punkt, wo man nun endlich wissen müßte, von wem die Rede ist.

Im Lichte dieser und ähnlicher Beispiele ist es klar, daß wir den Gebrauch der Pronomen erst lückenlos überblicken können, wenn wir den Begriff „Wieder-

aufnahme“ (und die hier eingeführte „engere Satzfolge“) geklärt bzw. sie von sonstigen Zusammenhängen im Text und von verschiedenen Manifestationen der Textkohärenz unterschieden haben. Zugleich müßte auch die Textkohärenz in einem entsprechenden (kognitiven) Rahmen untersucht werden: eine Aufgabe, die in dieser Arbeit nicht einmal ansatzweise gelöst werden kann.

2.4. Wiederaufnahme des Subjekts nach einem dazwischengeschobenen Satz mit einem anderen Subjekt

Wenn neue Subjekte auftauchen, gelten weitere Regeln. Vgl. die folgende Opposition:

(50) Klára_{s1} volt a legfiatalabb lány a családban. A nővére_{s2} másfél éve elköltözött a városba és Ø_{s2} azóta magányosan élt. Ø_{s2} Csak ritkán mozdult ki otthonról.

‘Klára_{s1} war die jüngste Tochter in der Familie. Ihre Schwester_{s2} war vor anderthalb Jahren in die Stadt gezogen und lebte seitdem allein. Nur selten ging [sie]_{s2} von zu Hause weg.’

(51) Klára_{s1} volt a legfiatalabb lány a családban. A nővére_{s2} másfél éve elköltözött a városba, és ő_{s1} azóta magányosan élt. Ø_{s1} Csak ritkán mozdult ki otthonról.

‘Klára_{s1} war die jüngste Tochter der Familie. Ihre Schwester_{s2} war vor anderthalb Jahren in die Stadt gezogen, und sie_{s1} lebte seitdem allein. Nur selten ging sie_{s1} von zu Hause weg.’

Die Pro-Drop-Regel, die die Tilgung des pronominalen Subjekts in der Topikposition vorschreibt, wird durch die gleiche Regel überlagert.

2.4.1. Wenn wir zu einem früheren Subjekt zurückkehren wollen, müssen wir es noch einmal explizieren, sonst werden wir den einander folgenden VPs regelgerecht die gleiche Subjekt-NP zuordnen. Beim Wiederkehren wird im Falle von Subjekten mit dem Merkmal [+HUM] das Pronomen *ő* gebraucht, bei nicht-menschlichen Subjekten müssen wir aber das Substantiv wiederholen! Vgl.:

(52) A kerek asztal lassan gurulni kezdett. A kis szék is megindult, de Ø egy nagyobb kőnél megakadt. Az asztal azonban tovább gurult.

‘Der runde Tisch fing langsam an zu rollen. Der kleine Hocker rollte auch los, aber [er] blieb bei einem größeren Stein hängen. *Der Tisch* aber rollte weiter.’

(Die Verwendung des Demonstrativpronomens mit jeweils unterschiedlichem Charakter — mal als grammatischer Ersatz, mal mit der ursprünglichen Bedeutung des Hinweisens, mal mit der Betonung des Merkmals [–HUM] — und die so entste-

henden, einander überlagernden Systeme, bestehend aus Oppositionen zwischen Demonstrativ- und Personalpronomen, bzw. zwischen Pronomen und Nomen, müssen im Gesamtsystem der Wiederaufnahme erfaßt werden, dessen Behandlung würde aber den Rahmen dieser Abhandlung sprengen. So konnten hier nur Anhaltspunkte genannt werden.)

3. Zusammenfassung und Ausblick

Entsprechend den Erwartungen, die aufgrund des Ökonomie-Prinzips an eine Sprache mit distinktiven kategorialen Merkmalen der Konjugation gestellt werden, gibt es auch im Ungarischen die Erscheinung des Pro-Drop-Verfahrens. Da aber die Pronomen auch andere Rollen haben können, als die Kategorien Person, Numerus und Kasus (Subjekt und Objekt) anzuzeigen, so galt es aufzudecken, welche weiteren Aufgaben gegen das Pro-Drop-Verfahren wirken können.

Es konnte nachgewiesen werden, daß das Subjektspronomen (um das es in dieser Studie ging) nur als einfaches Topik getilgt werden kann. Weder die Fokus- noch die kontrastive Topikfunktion oder das durch Quantoren oder Fokuspartikeln gebundene Topik lassen die Tilgung zu. Ähnliches konnte von dem Pronomen in der Koordinierung bzw. in der Identifikation festgestellt werden. Steht das Subjektspronomen schließlich hinter dem Verbum finitum, so geht es um dessen besondere pragmatische Leistung, verbunden mit einem spezifischen Aspekt (mit der existentiellen Lesart des perfektiven Aspekts) des Satzes. In den Fällen, wo die Tilgung nicht zustande kommt, verfährt die Sprache nach dem Merkmal [HUM] zweigleisig: das Merkmal [+HUM] wird vom Personalpronomen, [-HUM] vom Demonstrativpronomen getragen.

Parallel zu der Frage, wann Pro-Drop im Satz möglich ist, stellt sich auch die Frage, wann Pro-Drop satzextern möglich ist. Die phonologische Tilgung des Pronomens in Topikfunktion hängt mit den Regeln der Wiederaufnahme des Nomens bzw. des Pronomens im Text zusammen. Das Subjektspronomen wird obligatorisch getilgt, wenn es das als Topik stehende Subjekt eines vorausgehenden Satzes wiederaufnimmt. Das Subjektspronomen wird dagegen obligatorisch gesetzt, wenn es das Objekt eines vorausgehenden Satzes wiederaufnimmt. Das als Topik obligatorische Subjektspronomen ist das Demonstrativpronomen *az*, dessen pure grammatische Rolle auch dadurch erscheint, daß es die Unterscheidung nach dem Merkmal [HUM] nicht mehr trägt.

Angesichts der vielen Ausnahmen, bei denen das System der Wiederaufnahme des Subjekts (bei gleichen Subjekten als Topik: obligatorisches Null-Pronomen, bei der Wiederaufnahme Objekt-Subjekt: obligatorisches Demonstrativpronomen)

infolge des trotzdem fehlenden Demonstrativpronomens aufzuweichen scheint, mußte nach weiteren Anhaltspunkten gesucht werden. Es war immerhin symptomatisch, daß das System nicht etwa durch trotzdem **gesetzte** Subjektspronomen in Topikfunktion, sondern durch trotzdem **fehlende** Pronomen aufgelockert wurde. So kam es zu der Feststellung, daß durch Lexik (Partikeln usw.) und Gliederung (Fokussierung, Topikalisierung der zu wiederholenden NP) verstärkt, bestimmte Implikaturen die explizite Wiederaufnahme nicht mehr verlangen bzw. bei Gelegenheit sogar ausschließen können. Diese Tatsache einerseits sowie das Fehlen des Demonstrativpronomens bei absolut eindeutiger Identifizierung des als Subjekt wiederholten Objekts andererseits führten zu der Hypothese der unmittelbaren Satzfolge als engere (kognitive) Einheit. Sofort lag dann auch die Annahme klar auf der Hand, daß für den Gebrauch der Pronomen Satz und Satzfolge einerseits und größere „kohärente“ Textteile andererseits gleich verantwortlich sind. Obligatorische Gebrauchsregeln für die Wiederaufnahme durch *az* konnten nur in bezug auf eine enge Satzfolge gegeben werden, während dem Pronomen *ő* ein größerer Spielraum gesichert werden konnte.

Dies könnten wir verallgemeinern, indem wir den scheinbar parallelen Gebrauch von *ő* und *az* zu begründen versuchen. Während *az* in einer engeren Einheit von (quasi koordinierten) Sätzen als eindeutiger grammatischer Hinweis funktioniert, wird *ő* — genauso wie sein Fehlen! — in einem größeren Verstehensrahmen im jeweiligen Text ausgelegt. Diese seine Rolle hat keine Entsprechung im Bereich der Subjekte mit dem Merkmal [–HUM], dort wird — den Erfordernissen der Textkohärenz entsprechend — das Substantiv selbst wiederholt.

Während die Wiederaufnahme im folgenden Beispiel (53) in jedem beliebigen weiteren Kontext dieselbe ist, kann im Falle von Beispiel (54) eine ganze Reihe von verschiedenen Lösungen in Betracht kommen.

(53) A lány sürgette a fiút. Az rögtön megértette, miről van szó.

‘Das Mädchen hat den Jungen bedrängt. Er (= jener) hat sofort verstanden, worum es geht.’

(54) A lány sürgette a fiút. Ő rögtön megértette, miről van szó.

‘Das Mädchen hat den Jungen bedrängt. [Er = der Junge /Es = das Mädchen /X = eine dritte Person, die früher erwähnt wurde, oder von deren Perspektive her berichtet wird] (was ihn/es/sie anbelangt) hat sofort verstanden, worum es geht.’

Im Satz (54) haben wir es mit einem kontrastiven Topik *ő* zu tun, der aufgrund der Kenntnisse der Sprecher unterschiedlich identifiziert werden kann.

Über die Weglaßbarkeit des Pronomens wird je nachdem entschieden, ob uns die Satzfolge genügend Information dazu bietet, das Subjekt im größeren

Verstehensrahmen zu identifizieren. Für mein Sprachgefühl wirkt das Beispiel ohne explizite Wiederaufnahme — selbst wenn es eine günstige Topikalisierung enthält, s. Variante (55) — lückenhaft bzw. unvollendet:

(55) ? A fiút_{s1}, Objekt, Topik már sürgette a lány_{s2}.

Ø_{Subjekt, Topik, s1} Rögtön megértette, hogy miről van szó....

‘Den Jungen hat das Mädchen schon bedrängt. [Er] (?) hat sofort verstanden, worum es geht....’

(Anders s. bei É. Kiss 1978.)

Man muß sich allerdings fragen, wieso hier, ganz unerwartet, auch die Subjektsgleichheit nicht funktioniert, d.h. warum das Beispiel auch nicht regelgerecht (d.h. Subjekt des ersten Satzes — das Mädchen — = erspartes pronominales Subjekt des zweiten) ausgelegt werden kann, so wie es zum Beispiel im ähnlichen Fall (32b) ohne weiteres möglich ist. Tatsächlich wirkt der zweite Satz der Einheit ohne explizite Angabe des Subjekts im zweiten Satz verfremdend. Die Ursache liegt wohl darin, daß die inneren kausalen und/oder Zeitverhältnisse, die für das Zustandekommen einer Einheit der Wiederaufnahme verantwortlich sind, gestört sind. Das Wort *rögtön* ‘sofort’, das ein direktes zeitliches Nacheinander vermittelt — steht im Widerspruch zum ersten Satz, der keineswegs etwas linear Vorausgehendes enthält, genau im Gegenteil: der zweite Satz gilt als Begründung für den ersten. So ist es kein Wunder, daß eine natürliche Satzfolge mit dem gleichen Subjekt — wenn das Subjekt als kontrastives Topik nicht hervorgehoben wird, vgl. Variante (54) — wie folgt lauten muß:

(56) A lány már sürgette a fiút. Ø Rögtön megértette *ugyanis*, hogy miről van szó.

‘Das Mädchen hat den Jungen schon bedrängt. [Sie] hat *nämlich* sofort verstanden, worum es geht.’

Daß gegen die starke Regel der Tilgung der gleichen Subjekte in nicht-kontrastiver Topikfunktion auch hier nicht verstoßen wird, liegt klar auf der Hand: Alle Varianten mit einem expliziten Pronomen als nicht-kontrastives Topik im zweiten Satz müssen, der Regel 2.2.1 entsprechend, als Subjekt des zweiten Satzes **das Objekt** des vorausgehenden Satzes aufweisen. (S. die Varianten (53) und weiter unten (57).)

Diese Überlegung macht uns wiederum auf das Zusammenspiel von Textkohärenz und Regeln der Pronominalisierung aufmerksam. Ohne das erklärende Adverbial *ugyanis* ‘nämlich’ gilt das Beispiel infolge seiner Semantik als ein klassischer Fall eines zeitlichen Nacheinanders bei unterschiedlichen Subjekten (das Mädchen hat ihn bedrängt — der Junge hat das verstanden). Eben deshalb, d.h.

eben weil wir es also durchaus mit einer engeren Satzfolge zu tun haben, muß das Objekt des ersten Satzes im zweiten Satz expliziert werden.

Außer den obigen zwei Möglichkeiten (nämlich *az* oder *ő* als unterschiedlich identifizierbares kontrastives Topik, s. Variante (53) und (54)) gibt es auch eine weitere Möglichkeit:

(57) A lány már sürgette a fiút. *Ő rögtön megértette, miről van szó, és ...* (összeszedte minden erejét ... stb.)

‘Das Mädchen hat den Jungen schon bedrängt. Er hat sofort verstanden, worum es geht, und ... (hat seine ganze Kraft zusammengenommen... usw.)’

Dieses *ő* ist nicht nur deshalb eine zu erklärende Erscheinung, weil es die Regel der Wiederaufnahme durch *az* zu stören scheint: dies ließe sich erklären, indem man versucht, die Wiederaufnahme in der Satzfolge (= grammatischer Verweis) und die Wiederaufnahme im Text (= als Sicherung des Textverstehens bzw. der Textkohärenz) stichhaltig zu explizieren. Das Beispiel enthält aber auch ein anderes Problem, das sich erst zeigt, wenn man die Akzentverhältnisse des Satzes näher untersucht. Das Pronomen enthält keinen besonderen Akzent, wie es sonst in betonter Fokusposition der Fall ist, noch wird es durch einen kleineren Druck und eine ihm folgende Pause hervorgehoben, wie es in kontrastiver Topikposition geschieht, wohl aber erhalten die dem Pronomen folgenden Satzglieder alle (im Sinne der „level prosody“) einheitlich einen Akzent (s. die hervorgehobenen Silben im Anlaut). Dieses *ő* ist also kein Fokus und kein kontrastives Topik, es tritt als Konkurrenzform statt des Demonstrativpronomens auf. Daß es doch etwas anderes leistet als der grammatische Verweis durch das Demonstrativum, läßt sich aber auch daran ablesen, daß der Satz unvollendet wirkt, man verlangt nach einer Fortsetzung, d.h. man will den Satz in einem breiteren Rahmen der Textkohärenz interpretieren.

Von den Akzentverhältnissen her gesehen, müssen wir also, außer den eingangs aufgezählten Regeln 1.1–6, eine weitere Gebrauchsmöglichkeit für das Pronomen *ő* zulassen. Dies ist die Leistung des Pronomens für die Textkohärenz. Da das als einfaches Topik stehende Pronomen *ő* im Satzrahmen immer getilgt wird, kann dieses *ő* nur erklärt werden, wenn wir unser Augenmerk auf die verschiedenen Relationen der Verknüpfungen im Text richten: eine Aufgabe, die die Untersuchung der — kognitiv begründbaren — Textkohärenz auch für die Grammatik legitimieren kann.

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ACTION NOMINALIZATION AND THE POSSESSOR FUNCTION WITHIN HUNGARIAN AND ENGLISH NOUN PHRASES

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Abstract

The paper investigates two interrelated phenomena in the domain of Hungarian and English noun phrases. On the one hand, it describes the most fundamental syntactic aspects of action nominalization in the context of both a typological overview and some general generative syntactic considerations; and, the other hand, it explores the nature of the possessor grammatical function in noun phrases headed by action nominals. It adopts the view that nominals of the event type retain the argument structures of the input verbal predicates and, on these grounds, it explores what consequences this assumption has for an analysis in a recent version of Lexical-Functional Grammar. Its most important claim is that the possessor function is to be considered semantically unrestricted, at least in languages like Hungarian, and it develops a theory of mapping the arguments of derived nominals of the event type onto grammatical functions. In addition, it points out that an analysis along those lines may eventually be extended to languages like English.

1. Introduction

This paper will investigate two interrelated phenomena in the domain of Hungarian and English noun phrases. On the one hand, it will describe the most fundamental syntactic aspects of action nominalization, and, on the other, it will explore the nature of the possessor grammatical function in noun phrases headed by action nominals. The discussion will be largely based on several parts of the first two chapters of Laczkó (1995). However, there will also be some considerable differences. Firstly, given the limitations of a paper as opposed to a book, the presentation of the analysis here will be less technical. Secondly, some of the theoretical issues will be addressed in greater detail and a few further (mostly typological) aspects of the constructions under investigation will also be taken into consideration. Thirdly, various parts of the first two chapters of the book will be reorganized and modified for the purposes of the line of argumentation to be pursued here.

I will discuss the nature of action nominalization in the context of Koptjevskaja-Tamm's (1993) typological classification of seventy languages, on the one hand, and

on the basis of some recent generative approaches to the argument structure of derived nominals, on the other. In particular, I will adopt the view that nominals of the event type retain the argument structures of the input verbal predicates and, on these grounds, I will investigate what consequences this assumption has for an analysis in a recent version of Lexical-Functional Grammar (LFG, for short), the theoretical framework of this paper. My most important claim will be that the POSSESSOR function is to be considered semantically unrestricted, at least in languages like Hungarian, and I will develop a theory of mapping the arguments of derived nominals of the event type onto grammatical functions. In addition, I will also show that an analysis along those lines may eventually be extended to languages like English. And occasionally, I will compare my analysis with Anna Szabolcsi's account in the framework of Government and Binding Theory (GB, for short).

The paper is structured in the following way. In section 1, I present the features of LFG which are relevant to the subsequent discussion (1.1), point out the most important aspects of Hungarian noun phrases (1.2) and briefly mention some remarkable approaches to action nominalization (1.3 and 1.4). In section 2, I will discuss several typological issues pertaining to action nominalization. In section 3.1, I will offer a new analysis of nominalization in Hungarian in the framework of LFG by also suggesting a few significant modifications in the theory. In section 3.2, I will outline how this new approach can, in principle, be extended to English. Section 4 will contain some concluding remarks.

1.1. Traits of LFG

In section 1.1.1, I outline classical LFG. It is to be noted that even subsequent developments have left most of the principles and assumptions of the original model intact. The greatest change is that the newer versions have incorporated a substantial sub-theory of mapping arguments onto grammatical functions (cf. section 1.1.2).

1.1.1. The architecture of early LFG

In LFG, there are two structures assigned to every well-formed sentence of a language.

1. **A constituent structure** (c-structure), which is a version of standard X-bar syntactic representation designed to express 'surface' constituency relations. A c-structure is **phonologically** interpreted.

2. **A functional structure** (f-structure), which represents the basic grammatical relations in the sentence. F-structures are **semantically** interpreted.

The correspondence between c-structures and f-structures arises from functional annotations associated with the nodes by general principles. C-structures are designed to encode language-particular phenomena, whereas f-structures are intended to capture grammatical generalizations across languages.

In the classical version of the theory, the arguments of a predicate, represented in the argument structure included in the lexical form of that predicate, were associated with grammatical functions like SUBJ(ect), OBJ(ect), OBL(ique), etc., which were assumed to be primitives, that is, non-derived categories of the theory. The grammatical function associations in the lexical form of the predicate and the grammatical function annotations in c-structure ensured the correct mapping of arguments onto grammatical functions in the syntax.

LFG was designed to observe two general constraints on grammar: monotonicity (a computational constraint) and universality (a linguistic constraint). Monotonicity was ensured by the principle of direct syntactic encoding. This principle prevents any syntactic rules from changing the grammatical relations of the elements of a sentence. The assumption that grammatical functions were universal primitives of grammar, their association with arguments in the lexical forms of predicates and the f-structure level of representing invariant grammatical relations across languages enabled the theory to achieve universality in the description of phenomena in different types of languages, which posed rather serious problems for various versions of transformational grammar.

Given that no grammatical function-changing rules were assumed to be operational at the syntactic level of representation, correspondences like the active ~ passive alternation or the dative shift were captured in terms of **lexical redundancy rules** which created new lexical forms. For instance, every passivizable transitive predicate was postulated to have two lexical forms: an active and a passive one (cf. (1a) and (1b)), the latter being the result of a lexical function-changing rule (cf. (2)). Consider:

(1) (a) kill, V 'KILL <Ag, Th >'
SUBJ OBJ

(b) killed, V 'KILLED <Ag, Th >'
OBL/∅ SUBJ

(2) (a) Morphological change: V ⇒ V_[part]

(b) Functional change: SUBJ ⇒ ∅ / OBL_{ag}
OBJ ⇒ SUBJ

There are three important well-formedness conditions on f-structures. The most important one, for our purposes, is the following.

- (3) Consistency: every function (feature) must have a unique value.

This constraint blocks conflicts of values and functions. For instance, features like TENSE, CASE, etc. cannot have conflicting values. This principle is usually applied to the association of arguments with grammatical functions in the form of the following condition:¹

- (4) Function-Argument Biuniqueness: each a-structure role must be associated with a unique function, and vice versa.

This ensures that the same grammatical function will not be assigned to more than one argument within a single argument structure and no argument will be associated with more than one grammatical function. The following function assignments are thus ruled out by this condition.²

- (5) (a) \cdot 1 2 $>$
 SUBJ SUBJ

- (b) $<$ 1 2 $>$
 / \ / \
 SUBJ OBL OBJ

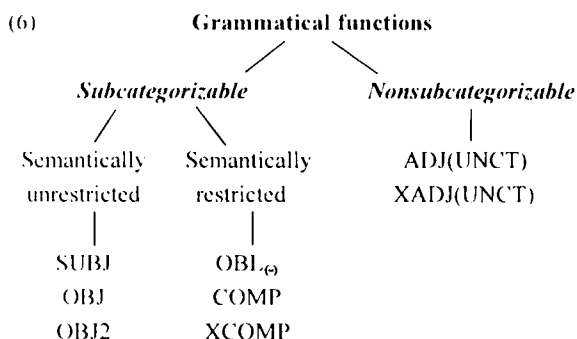
¹ This condition is comparable to the assignment of Theta roles to arguments in GB.

² The other two well-formedness conditions are as follows.

Completeness: if an argument-taking predicate obligatorily subcategorizes for a grammatical function, this function must appear in the relevant f-structure. This condition rules out examples like the following: **I put the book*. This sentence is ungrammatical because the predicate *put* subcategorizes for three grammatical functions, but in the f-structure representation of the sentence there are only two grammatical functions realized. The function to be associated with the Locative argument is missing.

Coherence: if a subcategorizable grammatical function appears in an f-structure, that f-structure must contain a PRED which is subcategorized for that function. It is this condition that will predict the ungrammaticality of constructions of the following kind: **John died into the kitchen*. Here the problem is that *into the kitchen* is interpreted as an argument assigned a directional oblique function (OBL_{dir}), but the predicate *die* does not subcategorize for that function.

Given the fact that grammatical relations, postulated to be universal, play a crucial role in this grammar, LFG needs a substantial theory of the nature of these relations. Consider the following classification from Bresnan (1982c).



The major distinction is that between subcategorizable and non-subcategorizable functions. The former are assigned to argument structures by predicates, while the latter are optional modifiers (adjuncts) of predicates and as such they are never subcategorized by these predicates. Subcategorizable functions are further classified into two groups. The semantically unrestricted functions (SUBJECT, OBJECT and OBJECT2) are so called because they can be assigned to a whole range of semantic roles; moreover, sometimes a predicate may assign them to non-thematic arguments (in 'raising' constructions). By contrast, the semantically restricted functions (OBLIQUE_Θ, COMPLEMENT and XCOMPLEMENT) can only be assigned to arguments having particular semantic roles. The Θ subscript in OBL_Θ stands for the specification of the semantic role of the argument to which a special OBL function has to be assigned. Thus, we can distinguish Instrument, Goal, Theme, etc. OBL functions (OBL_{inst}, OBL_{go}, OBL_{th}, etc.). XCOMP, COMP and XADJ are normally assigned to propositional arguments. The difference between XCOMPs and XADJs, on the one hand, and COMPs and ADJs, on the other, is that the former are open functions in the sense that their predicates do not assign the SUBJ function to one of their arguments. This argument receives a grammatical function from a different predicate or it is controlled by one of the arguments of this other predicate.³

After this overview of the classification of grammatical functions in early LFG, I would like to make three remarks. Firstly, note that the POSSESSOR function, one of the most important functions within NPs, has not been included in (6). This may be due to the fact that at that early stage, practitioners of LFG were pre-

³ For a detailed discussion, see Bresnan (1982c).

occupied with the fundamentals of the theory and the analysis of basic clause level phenomena.⁴ Secondly, in Lexical Mapping Theory, the new component of LFG, the classification of grammatical functions as semantically restricted and unrestricted plays a fundamental role (cf. the next section). Thirdly, the OBJ2 function is no longer treated as semantically unrestricted.

1.1.2. Lexical Mapping Theory

Although the classical version of LFG succeeded in observing the principle of monotonicity by handling all relation changes in the lexical component of grammar and in achieving a remarkable degree of universality in the formulation of several important rules, there were some serious problems with its account of relation changes.⁵ The theory of lexical mapping solves this problem and several others. In this new component of LFG, the association of arguments of predicates with syntactic functions is done by **lexical mapping rules**. The basic idea is as follows.

All arguments in the argument structure bear some semantic role. Each semantic role is provided with a **partial specification** of the grammatical function(s) it can be mapped onto in the syntax. Patient-like roles can be mapped onto either subjects or objects, whereas other roles, like the Agent and the Locative, can alternate between subject and oblique functions. The various functions are classified in terms of the following features:

⁴ For an analysis of POSSESSORS in English NPs, within the classical LFG framework, see Rappaport (1983). For my criticism and an alternative approach, see sections 3.1 and 3.2.

⁵ For a detailed discussion of these problems, see Bresnan (1990). Here I would only like to briefly point out one of the most serious problems. There were no principled constraints imposed on the ways in which grammatical functions were associated with semantic roles. For instance, in theory an alternative lexical rule of passivization could also take the following form:

- (i) (a) SUBJ \Rightarrow OBJ
(b) OBJ \Rightarrow SUBJ

This would yield the active – passive correspondence in (ii).

- (ii) (a) John killed the bird.
(b) The bird killed John.

However, (iib) is ungrammatical as the passive equivalent of (iia). The pair of relation changes in (i) is extremely rare. Practically, it is restricted to a special kind of predicates in a particular type of languages. The problem for early LFG was that it had no substantive theory of lexical relations; therefore, it could not offer a principled explanation for the contrast in frequency across languages between the ordinary passive rule and (i).

- (7) (a) [-r] = -restricted
 (b) [+r] = +restricted
 (c) [-o] = -objective
 (d) [+o] = +objective

The feature [-r] refers to an unrestricted syntactic function, that is, a function which is not restricted by the semantic role borne by the argument that is mapped onto that function. It is only subjects and objects that are [-r]. Obliques and restricted objects are [+r]. The feature [-o] designates non-objective functions. Subjects and obliques belong to this category. Objects and restricted objects (in English) are [+o]. Consider:

(8)

r	-o SUBJ	+o OBJ
+r	OBL _(θ)	OBJ _(θ)

The arguments in the a-structure are arranged according to the relative prominence of their semantic roles. The hierarchy assumed in Bresnan–Kanerva (1989), for instance, is this:⁶

- (9) Ag < Ben < Exp/Goal < Inst < Pat/Th < Loc⁷

The following basic principles determine the unmarked choice of syntactic features in the a-structure:

⁶ It has to be noted that the interest of LFG in the exact nature of semantic roles was relatively low at first. The fundamental function-changing rules were not formulated with reference to them. Consider, in this respect, the passive rule in (2). (2b) simply states that the argument bearing the SUBJ function in the a-structure of the active predicate will receive the OBL_{ag} or the zero function in the a-structure of the passive. When some derivational rules did make reference to semantic role conditions (cf. Bresnan's (1982b) rule of Participle → Adjective Conversion in English), the generally accepted semantic role labels were used in the usual way.

The Theory of Lexical Mapping, however, makes crucial use of the semantic roles of arguments and their hierarchy. But here, too, some fairly widely recognized hierarchies are 'imported' (and slightly modified when necessary). Bresnan–Kanerva (1989), for instance, adopts Kiparsky's (1987) hierarchy. My overall impression is that it is the hierarchy of arguments, rather than the exact nature of their semantic role labels, that is important for the theory. Consequently, it appears that new approaches which call the applicability of traditional semantic role labels into question but which still argue for a hierarchy of arguments on more or less different grounds can be quite easily accommodated in LFG.

⁷ Where Ag = Agent, Ben = Benefactive, Exp = Experiencer, Inst = Instrumental, Pat = Patient, Th = Theme and Loc = Locative.

- (10) (a) Patient-like roles: Θ
 [-r]
 (b) semantically restricted Patient-like roles: Θ
 [+o]
 (c) other roles: Θ
 [-o]

The mapping rules are also quite simple. The underspecified roles are freely mapped onto all compatible functions, subject to some general constraints expressed in terms of the following Mapping Principles:

- (11) Subject roles:
 (a) the Θ highest in the semantic hierarchy is mapped onto SUBJ,
 [-o]
 otherwise:
 (b) Θ is mapped onto SUBJ.
 [-r]

Other roles are mapped onto the lowest compatible function in the following markedness hierarchy:

- (12) SUBJ < OBJ/OBL $_{\Theta}$ < OBJ $_{\Theta}$

In most languages (including English and Hungarian) there is a general condition:

- (13) Subject Condition: every (verbal) predicator must have a subject.

This ensures, among other things, that the [-r] argument of an ordinary intransitive predicate, which, in theory, can choose between the SUBJ and OBJ functions, will end up being mapped onto SUBJ. Some other constraints formulated in the early version of LFG, for instance the three fundamental conditions on well-formedness, are still assumed to hold.

Given the principles of the Lexical Mapping Theory, several grammatical function-changing lexical redundancy rules are no longer necessary. Instead, it is assumed that certain morphological processes can have special effects on the a-structure of predicates. For instance, they may add new features to the default features of arguments, provided that there is no clash between the old feature and the new one. As regards the active ~ passive correspondence, for example, it has been postulated in this new model that the passive morpheme adds the [+r] feature to the default [-o] fea-

ture of the Agent argument. As a consequence, the SUBJ function, being [-r], is no longer available to this argument, which can only have the OBL_{ag} function optionally. From this it follows that the Theme argument with its [-r] specification can only be mapped onto the SUBJ function, in order to meet the SUBJ Condition in (13).

However, this is only one of the two principal ways in which Lexical Mapping Theory can capture passivization. Recently, a different account has been introduced and it appears to have taken the place of the original in several versions of LFG. Its essence is as follows. The role of the passive morpheme is not to add another syntactic feature to the Agent argument but rather to prevent this argument from functioning as an ordinary argument. This phenomenon is called Suppression. The Agent argument is suppressed, and, therefore, it is unavailable for function assignment by the predicate. This argument can only be linked to a special adjunct, that is, it can only have an ADJ function (cf. the *by*-phrase in English). The fundamental consequence of this assumption is the same as that of the previous account. Owing to the unavailability of the Agent argument, it is the Theme argument that has to be mapped onto the SUBJ function.

Komlósy (1994), however, shows that *által*-phrases ('by-phrases') in some Hungarian participial constituents can function as controllers of the 'missing' subjects of other constructions. On the grounds of the widely accepted view that only arguments can function as controllers, Komlósy points out that this poses serious problems for the suppression account of these participial expressions. In the subsequent discussion, accepting Szabolcsi's (1990) original insight, I will also assume that the Agent argument of a Hungarian action nominal is not suppressed either. If the rather generally accepted assumptions about suppression in the case of participle and derived nominal formation in English and the rejection of suppression in accounts of these phenomena in Hungarian prove to be tenable, then, it seems, at least two types of languages will have to be distinguished with respect to the nature of these derivational processes.

1.2. Some important aspects of Hungarian noun phrases

In order to provide the necessary background information, I highlight those characteristic features of the Hungarian NP which are relevant to the discussion in the present paper.

Although the Hungarian sentence is non-configurational as far as the encoding of grammatical relations is concerned,⁸ The Hungarian NP is configurational and the rightmost element is the head of the construction. Given that the configurational nature of Hungarian NPs has no bearing on the assumptions and arguments made in

⁸ According to É. Kiss (1994) the Hungarian sentence has a flat propositional part where head-complement relations are expressed and a hierarchical left periphery for the expression of logical relations (e.g. topic and focus).

this paper, I refer the reader to Szabolcsi (1992), which offers a detailed structural analysis of these NPs within the framework of Government and Binding Theory.⁹

As regards the expression of the “direct” arguments of a derived nominal, the SUBJ and OBJ functions are not available to them, only the POSSessor function. The “subject” argument of a nominal derived from an intransitive verb and the “object” argument of a nominal derived from a transitive one will receive the POSS function, while the “subject” argument of a nominal derived from a transitive verb will be assigned an oblique function. Compare:

(14) (a) Edit nevet-ett.
 Edith.nom laugh-past.3sg.indef
 ‘Edith laughed.’

(b) Edit nevet-és-e
 Edith.nom laugh-NOM-her
 ‘Edith’s laughing/laughter’

(15) (a) Az ellenség elpusztít-otta a város-t.
 the enemy.nom destroy-past.3sg.def the city-acc
 ‘The enemy destroyed the city.’

(b) a város-nak az ellenség által-i elpusztít-ás-a
 the city-dat the enemy by-aff destroy-NOM-its
 ‘the city’s destruction by the enemy’

And also consider the following examples.

(16) (a) Edit piros kalap-ja
 Edith.nom red hat-her
 ‘Edith’s red hat’

(b) Edit-nek a piros kalap-ja
 Edith-dat the red hat-her
 ‘Edith’s red hat’

As (14b), (15b) and (16) show, the possessor can be realized in two different forms (in either nominative or dative case). It is to be noted, however, that only one of

⁹ For an alternative account within Generalized Phrase Structure Grammar, see Kornai (1985).

these options is available within the same NP even when the head of the NP is a derived nominal. These two forms cannot be combined in the way the *s* and *of* constituents can in the following English example.

(17) the enemy's destruction of the city

If both possessor forms could be used within the same NP, the Hungarian equivalent of (17) would be the following construction.

(18) *az ellenség-nek a város elpusztít-ás-a
 the enemy-dat the city destroy-NOM-its

As far as the right-headedness of the Hungarian NP is concerned, the rule is that both adjectival phrases (APs) and participial constructions (VPs), either with or without complements, must always precede the noun heads. As an illustration, let us take some participial constructions (compare the following Hungarian examples with the English equivalents).

(19) (a) a nevet-ő fiú
 the laugh-part boy
 'the laughing boy'

(b) a kalap-já-n nevet-ő fiú
 the hat-his-on laugh-part boy
 'the boy laughing at his hat'

(c) *a fiú a kalap-já-n nevet-ő
 the boy the hat-his-on laugh-part
 'the boy laughing at his hat'

(d) *a fiú nevet-ő a kalap-já-n
 the boy laugh-part the hat-his-on
 'the boy laughing at his hat'

It is a further significant feature of Hungarian NPs that the head's oblique arguments or adjuncts realized by postpositional phrases or (oblique) case-marked NPs cannot precede it in their original forms. They have to acquire special attributive forms, which, loosely speaking, means that they have to be converted into adjectival or participial expressions. Postpositions can take the adjectivizing suffix *-i* or

they can combine with an appropriate participle, whereas case-marked NPs only have the latter option.¹⁰ This holds for NPs headed by either derived or non-derived nouns.^{11,12} Let us now take some examples with derived nominal heads. For the sake of comparison, occasionally, I also give the sentential counterparts of these NPs (but this does not mean, of course, that I assume a derivational relationship between complete sentences and their NP equivalents).

- (20) (a) János meg-érkez-et Budapest-re.
 John perf-arrive-past.3sg Budapest-onto
 'John arrived in Budapest.'
- (b) *János Budapest-re meg-érkez-és-e
 John Budapest-onto perf-arrive-NOM-his
 'John's arrival in Budapest'
- (c) János Budapest-re való meg-érkez-és-e
 John Budapest-onto BEING perf-arrive-NOM-his
 'John's arrival in Budapest'
- (d) *János Budapest-re-i meg-érkez-és-e
 John Budapest-onto-all perf-arrive-NOM-his
 'John's arrival in Budapest'

¹⁰ For a detailed analysis of 'attributivization', see Laczkó (1995).

¹¹ However, there are certain exceptions to the attributivization rule. Certain oblique arguments of certain derived nominals do not (need to) undergo attributivization. Consider:

- (i) János Budapest-re érkez-és-e
 John Budapest-onto arrive-NOM-his
 'John's arrival in Budapest'

For a GB account, see Szabolesi (1994) and for an LFG analysis, see Laczkó (1995).

¹² It is also to be noted that sometimes an oblique constituent may follow the head. Consider:

- (i) János meg-érkez-és-e Budapest-re
 John perf-arrive-NOM-his Budapest-onto
 'John's arrival in Budapest'

For a long time, this was considered incorrect usage. By now, it has been accepted under certain circumstances. For an overview of the conditions on its use, see Laczkó (1987) and Szabolesi and Laczkó (1992).

- (21) (a) *Edit ebéd után levizsgáztat-ás-a
 Edith lunch after examine-NOM-her
 'the examination of Edith after lunch'
- (b) Edit ebéd után-i levizsgáztat-ás-a
 Edith lunch after-aff examine-NOM-her
 'the examination of Edith after lunch'
- (c) Edit ebéd után való levizsgáztat-ás-a
 Edith lunch after BEING examine-NOM-her
 'the examination of Edith after lunch'

1.3. A brief and fragmentary history of the analysis of action nominals

In the summary below I will only highlight those aspects of this rather large and complex domain of linguistic investigation which are relevant to the discussion in this paper.

The first question to raise is what we call action nominals. One of the most generally accepted descriptions was offered by Comrie (1976). According to him action nominals (a) are nouns derived from verbs with the general meaning of an action or process; (b) are capable of declining or taking prepositions or postpositions in the same way as non-derived nouns; and (c) show 'reasonable' productivity (178). In her study of over seventy languages, Koptjevskaja-Tamm (1993) adopts this definition but she also points out several problems from the perspective of the typologist (for instance, the difficulty of ascertaining whether action nominals in a language can really decline or take adpositions in the same way as non-derived nouns and the vagueness of the term *reasonable productivity*). On the basis of Hopper and Thompson's (1984) generalizations, she also discusses some further special distinguishing features of derived nominals. She writes: "[a]ction nominals, like *discovery*, *shooting*, etc., clearly refer to events, like verbs do, although not by asserting the occurrence of the events of the discourse, but by giving them a name. In other words, they combine semantic and discourse features of both verbs and nouns. In their morphology they also combine verbal and nominal features and different languages treat them as being closer to one or other of these word classes" (1993, 6). We can accept these descriptions as a point of departure to be made more precise shortly in the light of some recent developments in generative grammar.

As is well known, in the beginning generative grammar derived noun phrases headed by deverbal nouns from underlying sentences (one of the most important manifestations of such an approach is Lees 1960). Chomsky's (1970) Lexicalist Hypothesis postulating that verbs and corresponding derived nominals should be lexically, rather

than syntactically, related paved the way for some initial interest in the organization of the lexicon. According to this hypothesis verbs and related nominals share the very same syntactic structural properties (cf. the parallels between English sentence and noun phrase structure), that is, their arguments occupy the very same positions and it is only the actual formal realization of these arguments that differs depending on the categorial specification of the predicate (whether it is a verb or a noun). An interesting example of an account of nominalization in English along these lines, utilizing the principles of Chomsky's Government and Binding Theory, is provided by Kayne (1981).

As should be clear from sections 1.1.1 and 1.1.2, Lexical-Functional Grammar regards all processes bringing about a change in the distribution of grammatical functions assigned to arguments as lexical and treats them accordingly. The nominalization of a verbal predicate in languages like English and Hungarian is one of the par excellence examples of a lexical process, given that the nominal clearly assigns different functions to its direct argument(s) from the input verbal predicate. Within the theoretical framework of LFG, Rappaport (1983) has offered the most principled and detailed analysis of English nominalization. She proposes that verbs and their derived nominal counterparts should be related in terms of sharing the same argument structure rather than in terms of selecting the same syntactic structure to be inserted into. This analysis has proved to be extremely influential and it has been adopted even by several versions of GB Theory. The next logical and theoretically crucial task has been to explore exactly what types of derived nominal actually have argument structures to begin with. This issue will be discussed in the next section.

In the remainder of this section I would like to offer a sketchy history of the analysis of Hungarian derived nominals against the general background outlined above.

Traditional Hungarian descriptions have primarily been concerned with the diachronic, morphological and semantic aspects of nominalization. For instance, they have concentrated on the semantics of derived nominal heads and that of possessors as well as the correspondence between possessors in NPs and sentences (for an overview, see Szabolcsi 1992).

The classic descriptions also discussing, in part, some of the phenomena related to nominalization include Simonyi (1913), Kertész (1914) and Klemm (1928). Tompa (1961; 1965) and Rácz (1976) are rightly considered the two outstanding works aiming at a synthesis of traditional descriptive grammatical investigations. For semantically oriented approaches to Hungarian possessive NPs, see Hadrovics (1969) and Tamásiné Bíró (1986). Certain aspects of nominalization are discussed in the spirit of Chomsky's (1965) 'Aspects' model in Dezső (1969) and from the perspective of Fillmore's (1968) Case Grammar in Dezső (1971).

Szabolcsi, in Szabolcsi (1992) and Szabolcsi (1994), presents a coherent GB account of the structure of Hungarian ordinary NPs in general and possessive NPs

headed by either derived or non-derived nominals in particular.¹³ In the relevant sections of Laczkó (1995), I offer an alternative account of NPs headed by deverbal nouns within an LFG framework. In addition, I make a critical remark on a crucial aspect of Szabolcsi's approach. However, it is important to note that both Szabolcsi and I accept the view held by several generative linguists that it is only derived nominals of the event type that must be assumed to have argument structures (cf. the next section).

1.4. Event vs. result nominals

The basic generalization made in several recent works, mostly on the basis of English data, is that verbs and nouns derived from them have 'lexical conceptual structures'. This conceptual structure contains information about the participants of the situation denoted by a lexical item. Verbs project (some) participants into their argument structures and make them grammatical arguments. The same is true of process/event nominals, whereas result nominals do not project argument structures. Consequently, nouns belonging to the latter group do not take arguments: they can only take adjuncts. A great number of derived nouns may be used in either a process/event or a result sense and sometimes the very same expression combined with such a noun is analysed, in the process/event sense, as an argument, and, in the other sense, as an adjunct (for a variety of approaches, see, for instance, Abney 1987, Grimshaw 1990,¹⁴ Williams 1987 and Zubizarreta 1987).

Szabolcsi (1990) applies this generalization to Hungarian data. It turns out that, by and large, it holds for Hungarian as well. Moreover, in addition to the general features that distinguish process/event from result nominals, there is a special feature in Hungarian which yields further evidence in favour of this distinction. Consider the following summary of the most important diagnostics for the distinction between these two types of deverbal nouns.

A) Process/event nominals usually do not have plural forms:

- (22) Anna levizsgáztat-ás-a(-*i) sok idő-t vesz(-*nek) igény-be.
 Anne examine-NOM-her(-*pl) much time-acc takes(-*3pl) demand-into
 'Anne's examination(*s) takes a long time.'

¹³ The corresponding parts of Szabolcsi and Laczkó (1992) are also entirely her contribution.

¹⁴ In actual fact, Grimshaw (1990) makes a distinction between *complex event nominals*, on the one hand, and *simple event* and *result nominals*, on the other. On the basis of different diagnostics, she argues convincingly that only complex events have argument structures. In the present paper the simpler and looser terminology will suffice. However, the reader should bear in mind that by 'process/event nominals' I mean Grimshaw's complex events and the term 'result nominals' comprises both simple events and results.

B) The possessor of a process/event nominal must be interpreted as one of its arguments. Compare:

- (23) (a) Ez Anna levizsgáztat-ás-a volt.
 this Anne examine-NOM-her was
 'This was Anne's examination.' (process)
 (*Anna* = examinee)
- (b) *Ez a nap levizsgáztat-ás-a volt.
 this the day examination-NOM-its was
 '*This was the examination of the day.'
 (grammatical if *a nap* 'the day' = examinee)
- (c) Ez Anna vizsgá-ja volt.
 this Anne exam-her was
 'This was Anne's exam.'
 (*Anna* was not necessarily the examinee)
- (d) Ez a nap vizsgá-ja volt.
 this the day exam-its was
 'This was the day's exam.'

C) The arguments of a process/event nominal are usually obligatory and they can only be deleted in specific cases of control relations:

- (24) (a) *A levizsgáztat-ás gyors volt.
 the examine-NOM quick was
 '*The examination was quick.' (process)
- (b) Anna levizsgáztat-ás-a gyors volt.¹⁵
 Anne examine-NOM-her quick was
 'Anne's examination was quick.' (process)

¹⁵ The 'examiner' argument is not expressed, but when a sentence like this is uttered, it is normally inferrable from the speech situation or the linguistic context. It is also to be noted at this juncture that on most accounts of nominalization in English (e.g., in Zubizarreta 1987 and Grimshaw 1990) the argument structure of *examination*, the English counterpart of *levizsgáztatás*, is assumed not to contain an Agent argument under any circumstances (even when it seems to be realized by a *by*-phrase); however, both Szabolcsi (1990) and Laczkó (1995) postulate that at least in the case of the Hungarian derived nominal predicate the Agent argument is always present in the argument structure, whether realized in the construction or not. For details, see section 3.1.2.4.

- (c) A vizsga gyors volt.
 the exam quick was
 'The exam was quick.' (result)

The characteristics of process/event nominals given in points A, B and C are shared by English and Hungarian. The following feature, however, is peculiar to Hungarian nominals.

Deverbal nouns in Hungarian tend to take arguments and adjuncts in attributivized forms (cf. 1.2). The two most productive attributivizing elements are the derivational suffix *-i* and the present participial form of the verb *van* ('to be'): *való* ('being'). Szabolcsi (1990) shows that when either element can be used, in the case of oblique arguments and adjuncts expressed by postpositional phrases, the application of *való* will trigger the process/event reading of an otherwise ambiguous nominal. Consider:

- (25) (a) Hatástalan volt az ebéd után-i beszélget-és.
 ineffective was the lunch after-aff converse-NOM
 'Conversing after lunch was ineffective.' (process)
 or: 'The conversation after lunch was ineffective.' (result)
- (b) Hatástalan volt az ebéd után való beszélget-és.
 ineffective was the lunch after being converse-NOM
 'Conversing/*The conversation after lunch was ineffective.' (process/*result)

2. Action nominalization in a typological context

Koptjevskaja-Tamm (1993) offers a very important typological description of various patterns of nominalization in seventy languages by focussing on the internal syntax of action nominal constructions. She fundamentally accepts the views of Comrie (1976) and Comrie and Thompson (1985) who claim that it is not possible to establish a simple dichotomy across languages between sentence-like and NP-like action nominal constructions because such constructions vary considerably as regards the "extent to which their internal structure corresponds to that of a non-derived noun phrase, rather than to the internal structure of a sentence with a finite verb" (Comrie 1976, 200). This variety "precludes us from using internal structure even as a heuristic test in universal grammar for distinguishing noun-headed noun phrases from verb-headed constructions" (Comrie 1976, 178).

Koptjevskaja-Tamm (1993) discusses four theoretical possibilities of realizing action nominal constructions (ANCs) in the following way.

From the point of view of logical possibilities, we can expect to find the four major types of ANCs given below ('sentential' as opposed to 'nominal' syntactic means is to be understood as signalling syntactic relations in finite clauses as opposed to those in NPs):

- 1 the relations between an AN and all of its arguments are signalled by the sentential syntactic means;
- 2 the relations between an AN and all of its arguments are signalled by the nominal syntactic means;
- 3 the relations between an AN and some of its arguments are signalled by the sentential syntactic means, while its relations with the other arguments are signalled by the nominal syntactic means;
- 4 the relations between an AN and some or all of its arguments are signalled by special means, used in neither finite clauses nor in NPs.

It turns out that this last logical possibility is not realized across languages; that is, ANCs, in a sense, do not exist as autonomous, independent constructions, but always 'borrow' syntactic means from finite clauses and/or NPs. This corroborates Comrie's (1976: 200) conclusion that ANCs in different languages can be classified 'according to the extent to which their internal structure corresponds to that of a non-derived noun phrase, rather than to the internal structure of a sentence with a finite verb'. However, while Comrie suggests that 'this classification principle leads ultimately to a continuum, rather than a dichotomy between noun phrase-like and sentence-like action nominals', the present discussion shows that the description 'continuum' is hardly appropriate in this connection. Though ANCs can be placed on a scale according to the extent of their 'sentence-likeness' and 'NP-likeness', this scale consists of discrete points, corresponding to well-defined **types** of ANCs (Koptjevskaja-Tamm 1993, 60).

Following Comrie and Thompson (1985), Koptjevskaja-Tamm (1993) makes a distinction between two major types of nominalization: A) lexical nominalization—which involves a discernible change in the categorial status of the predicative element in the construction; and B) clausal nominalization—when there is no evidence in favour of such a categorial change. Clear-cut examples of the first type are nominalization in Hungarian and non-gerundive nominalization in English (e.g. *the enemy's destruction of the city*). As regards the second type, in certain languages (e.g. Lakhota, Ancient and Modern Greek and Nama Hottentot) a whole clause is nominalized by adding to it an article typically used in noun phrases or, in verb-final languages, by attaching a special nominal suffix to finite verbs. Koptjevskaja-Tamm calls these endings **nominal inflectional suffixes**. She writes: "In the resulting constructions, the verbs decline in the same way (or in a similar way) as non-derived nominals.

However, there may still be some arguments against considering them as ANs, in particular, the presence of personal affixes" (1993, 50). On the basis of the investigation of seventy languages she concludes that "there is probably no sharp boundary between clausal nominalizations and ANCs. Some languages have clausal nominalizations, some have lexical nominalizations, some have both types, and, finally, some do not distinguish between the two types" (1993, 52).

With respect to the expression of the major (that is, direct) arguments of the predicates in the constructions under investigation, she classifies nominalizations across languages in the following way.¹⁶

1 Sentential type (SENT) -- all the arguments in ANCs retain their sentential dependent-marking;

2 Possessive-Accusative type (POSS-ACC) -- the S and the A in ANCs genitivize, while the P retains the sentential dependent-marking;

3 Ergative-Possessive type (ERGI-POSS) -- the P and the S in ANCs genitivize, while the A gets another dependent-marking. Within this type it is, perhaps, reasonable to distinguish between (a) the Sentential-Possessive subtype (SENT-POSS), in which the A retains its sentential marking, and (b) the Oblique-Possessive subtype (OBL-POSS), in which the A turns up as an oblique NP;

4 Nominal type (NOMN) -- all the arguments in ANCs assimilate to dependents in non-derived NPs. Here it is also possible to distinguish between (a) the Double-Possessive subtype (DBL-POSS), in which both the S, P and A genitivize, and (b) the Possessive-Adnominal subtype (POSS-ADN), in which both the S and the A genitivize, while the P gets the same dependent-marking as some oblique NPs;

5 Mixed type (MIX) -- the S genitivizes, the A turns up as an oblique NP (perhaps in the same form as the Agent in passive clauses), while the P retains its sentential dependent-marking;

6 Incorporating type (INC) -- the P forms a part of the complex AN, the S retains its sentential dependent-marking or genitivizes, while the A is either similar to the S or turns up as an oblique NP;

7 Relative type (REL) -- the S and P genitivize or, at least, appear as adnominal dependents, while the A is expressed within the relative clause referring to the AN (1993, 61).

The following simplified version of the table in Koptjevskaja-Tamm (1993, 63) offers an overview of the syntactic types of ANCs (nominalization patterns) in her sample.¹⁷

¹⁶ In her notation, based on Dixon's (1972) terminology, S represents the single argument of an intransitive verb or an intransitive action nominal, and the Agent-like and Patient-like arguments of a transitive verb or action nominal are symbolized as A and P, respectively.

¹⁷ Koptjevskaja-Tamm's symbols and abbreviations in the table are as follows: FC = the argument retains its sentential dependent-marking (FC is short for finite clause); G = the argument is genitivized; OBL_{FC} = dependent-marking restricted to clauses; OBL_{NP} = dependent-marking compatible with non-derived nouns; p- = P builds a compound with an AN; ? = marginal or questionable; * = restricted to highly referential or pronominal arguments.

Table 1

Types of action nominal constructions	S	A	P	Number of languages
1 SENT	FC	FC	FC	15 + ?2
2 POSS-ACC Pure Anti-passive	G	G	FC	24 + ?1 + 2* 1
3 ERG-POSS Pure: a) SENT-POSS b) OBL-POSS Passive	G G	FC OBL _{FC}	G G	3 22 6
4 NOMN a) DBL-POSS b) POSS-ADN	G G	G G	G OBL _{NP}	8 + ?3 + 7* 3
5 MIX	G	OBL _{FC}	FC	2 + ?2 + 1*
6 INC a) SENT-INC b) POSS-INC c) OBL-INC	FC G G	FC G OBL _{FC}	p- p- p-	2 8 1
7 REL2	G	REL	G?	2

In the context of this typological overview of seventy languages, I would like to make some remarks, from the perspective of theoretical considerations, on Koptjevskaja-Tamm's treatment of nominalization in general, and in Hungarian and English in particular.

We have seen that Koptjevskaja-Tamm (1993), on the basis of Comrie and Thompson (1985), makes a distinction between two fundamental types of nominalization: **lexical** vs. **clausal**. According to her, the main distinguishing feature is whether the nominalizing element is combined with a finite verb form or not. If it is, then she talks about clausal nominalization, if it is not, then she considers this an instance of lexical nominalization. I would like to make the following comments on this classification.

Firstly, note that the use of the term **clausal** may be somewhat misleading because, as Koptjevskaja-Tamm herself points out, occasionally even in this type the nominalizing element is a suffix attached to the finite form of a verb. So this is clearly a morphological process. Therefore, it really depends on our overall views on the architecture of grammar whether we assume that these processes take place

in the lexicon or not. If we postulate that they do then the term **clausal** may prove to be inappropriate.

Secondly, Koptjevskaja-Tamm calls these special endings attached to finite verbs **nominal inflectional suffixes**. This is, obviously, a slight contradiction in terms since **nominal** implies a category-changing derivational process whereas **inflectional** by definition indicates a different type of morphological operation.

Thirdly, and most importantly, as regards the three major patterns of action nominalization, Koptjevskaja-Tamm draws by far the most important line of demarcation between what she calls clausal nominalization and all the other patterns. This may be justified from a typological point of view. However, from a (formal) theoretical linguistic perspective, it is equally crucial, if not more crucial, to radically separate the second and the third types. At this point, as a reminder, let me describe the three types briefly. 'AN' predicates can be distinguished with respect to the association of their direct arguments (S, A and P) with grammatical functions in the following way.

1. The predicate in the ordinary clausal type of nominalization can be argued to retain its verbal category because it is normally still inflected and its arguments can 'keep' their ordinary finite clausal subject and object grammatical functions. On the basis of the data in Koptjevskaja-Tamm (1993), it appears to be the case that no argument of any other types of nominalized predicates can be mapped onto subject.

2. When the P argument cannot be mapped onto the object function either then we can assume that the derived predicate is unquestionably a noun. This is a generally accepted view. Hungarian nominalization and various types of English non-gerundive nominalization definitely belong to this class.

3. However, there is another major type of nominalization (both in nominative-accusative and in ergative languages) which is between the definitely sentential and the definitely nominal extremes. In what follows I will call it the POSS-SENT type.¹⁸ Its most important feature is that the direct arguments of the derived nominal predicate exhibit a mixture of (sentence-type vs. NP-type) marking for grammatical functions. Certain arguments take forms typical of arguments of verbs whereas certain others are used in forms characteristic of constituents within noun phrases. These are the POSS-ACC class (in certain nominative-accusative languages) and the ERG-POSS class (in certain ergative languages). And both classes are very large. They each contain over 25 languages in which this marking is avail-

¹⁸ Note that by doing so I collapse two distinct types in Koptjevskaja-Tamm's analysis: the POSS-ACC type and the ERG-POSS type. Given the distinguishing feature they share, I think this move is justifiable.

able (or it is the only option). As I have already pointed out, Koptjevskaja-Tamm (1993) examined 70 languages, and a language may employ more than one pattern of nominalization. From this it follows that the number of the instances of the use of particular patterns across these languages is larger than the overall number of the languages investigated. According to Koptjevskaja-Tamm's table, the 70 languages together use the seven types of nominalization in approximately 115 instances (if we also include the instances marked as dubious or marginal). Even if we take the 115 instances into consideration, the POSS-SENT type itself comprises one half of all these instances. Thus, we are justified in regarding it as **the** major type of nominalization.¹⁹

Hungarian does not exhibit this type, but English does, with its gerundive constructions it also belongs to the POSS-ACC class. And the analysis of these constructions has always been a challenge for formal (generative and non-generative) theories. Obviously, here we cannot go into the details of this problem. What is important for present purposes is the treatment of the genitival argument in these constructions. As an illustration, I will briefly point out the standard LFG approach.

As far as I am aware, so far in Lexical-Functional Grammar this argument has invariably been considered to bear the SUBJ (and **not** the POSS) grammatical function (contrary to Koptjevskaja-Tamm's classification). In other words, it has been regarded as a subject argument realized in a special way (in a genitival form). The reason for an account along these lines, at earlier stages of the theory, was that ordinary subjects in clauses and these special (genitival) arguments in gerundive constructions share several significant features which easily lend themselves to the same sorts of generalizations (although in theory, the attachment of the gerundive ending *-ing* could also have been analyzed as triggering the following grammatical function changing lexical redundancy rule SUBJ → POSS). However, after the development of Lexical Mapping Theory the more recent versions of LFG simply do not seem to have a choice. This is due to the fact that a mapping pattern involving the POSS and the OBJ functions associated with the two direct arguments of the predicate would be incompatible with the theory of mapping, given the generally accepted assumptions about the nature of the POSS function. As I will point out in 3.2.1, the overwhelming majority of linguists working in some version of LFG consider POSS semantically restricted, and as such it cannot enter into the same mapping relationship with OBJ as the SUBJ function. As a consequence, in

¹⁹ It is noteworthy that the other two main types are represented by roughly the same number of instances (SENT: 17 and NOMN: 21).

gerundive constructions the genitival constituent has to be assumed to be mapped onto the SUBJ function.²⁰

What this short discussion of English gerunds illustrates is that, if we accept an analysis in this vein, in one extremely important respect the POSS-SENT type and the SENT type are very similar. So much so that one might even wish to ask the question of whether these two types should be considered two classes of basically the same major type, and the real line of demarcation should be drawn between this major type and the rest of the types, most notably the NOMN type. Obviously, this is no more than a theoretical possibility that can be investigated in the future.

The most important point here is that if it turns out that from a theoretical perspective it is more tenable to assume that the argument with the possessor marking in actual fact does not have the POSS grammatical function but the function it is normally associated with in clauses then the SENT type and this POSS-SENT type will be best envisaged as constituting a major type, in which the direct arguments of the nominalized predicate can be assigned the same grammatical functions as those of the input verbal predicate. Then the most important line of demarcation will be drawn between this major type and the rest of the patterns of nominalization. The main difference between the two subtypes in this major category, on such an account, will be that in the first (Koptjevskaja-Tamm's (1993) SENT) type the predicate can be finite and in the second (Koptjevskaja-Tamm's (1993) POSS-ACC and ERG-POSS) the predicate is non-finite and the grammatical functions of some of the direct arguments are realized in a special (genitival) form.²¹

And now let us turn to the details of Koptjevskaja-Tamm's description of nominalization in Hungarian and English.

1. It is obvious that, according to her criteria, of the two fundamental types of nominalization, clausal vs. lexical, both Hungarian and English belong to the lexi-

²⁰ Note that in 3.2.2.1 I will argue that the POSS function should be considered semantically unrestricted and in 3.1.2.3 I will propose a new theory of lexical mapping for derived nominal predicates; however, that is a theory about the mapping of arguments of derived nominals and not gerunds. I also share the view that, as far as lexical mapping is concerned, the arguments of gerunds follow the same pattern as all the other verbal predicates.

²¹ Naturally, an analysis along these lines will have to be based on a detailed account of the relevant data across all the languages investigated in an explicit and coherent theoretical framework. And to provide such an account is far from being a trivial task. Sometimes radically different analyses may suggest themselves even with respect to the data in one and the same language. Some generative accounts of Japanese nominalization to be mentioned briefly in 3.2.2.3 illustrate this point. For instance, if we accept Ishikawa's (1985) or Iida's (1987) account then we have to consider Japanese to belong to the NOMN type, whereas if we adopt Saiki's (1987) approach then Japanese has to be regarded as a member of the SENT type.

cal type, because they employ nominal affixes and these endings never attach to finite forms of verbs.

2. In terms of the nominalization patterns shown in the table above, she classifies Hungarian and English as follows.

A) Hungarian

(26) (a) INC: POSS-INC, her example:

Péter újság-olvas-ás-a
 Peter newspaper-read-AN-3sg.poss
 'Peter's reading of newspapers' (1993, 298)

(b) REL, her example:

Norvégia Németország által történ-ő elfoglal-ás-a
 Norway Germany of happen-pres.ptcp occupy-AN-poss
 'Germany's occupation of Norway' (1993, 14)

She writes:

[...] in Hungarian it is impossible to have constructions with both the A and the P which are directly dependent on one and the same transitive action nominal (derived with the suffix *-ás/-és*). If either of the arguments is present, Hungarian uses a possessive construction. However, when both are present it is necessary to put a type of dummy element, most often the present or past participle of the verb *történik* 'to happen', between the action nominal and one of its arguments, which means that the whole construction looks like a relative clause (1993, 13–14).

B) English

(27) (a) POSS-ACC, her example:

I heard the singing of the Marseillaise. (1993, 5, 283)

(b) ERG-POSS: OBL.-POSS, her examples:

the secretary's arrival/the arrival of the secretary
 the secretary's dismissal by the chairman/the dismissal of the secretary
 by the chairman (1993, 290)

(c) NOMN: DBL.-POSS, her example:

John's playing of Ravel is wonderful. (1993, 5, 294)

3. My remarks on this classification and some of her examples are as follows.

A) If Hungarian is considered to belong to the INC: POSS-INC type, too, then English can equally well be regarded as also being a member of this class. Consider:

(28) Peter's newspaper-reading

B) (28) would be a more appropriate English translation of the Hungarian example in (26a) anyway because the incorporated noun is absolutely neutral with respect to number.

C) The generalization that the A and the P arguments of a transitive AN cannot be simultaneously expressed as directly dependent on the AN head is false. On the one hand, under limited distributional circumstances a postpositional phrase can follow the head of the NP in an unmodified form.²² Consider:

(29) Norvégia elfoglal-ás-a Németország által
 Norway occupy-AN-poss Germany by
 'Norway's occupation by Germany'

Here the parallel between the Hungarian example and its English counterpart is straightforward and the 'by-phrases' can be considered to be directly related to the head in both languages. On the other hand, most Hungarian post-positional phrases (as opposed to case-marked NPs) can even premodify, in a special adjectival form, the NP head without any relative clause-looking structure. Consider:

(30) Norvégia Németország által-i elfoglal-ás-a
 Norway Germany by-aff occupy-AN-poss
 'Norway's occupation by Germany'

In this case, too, it can be argued that the special form of the PP is directly dependent on the head. From all this it follows that the OBL-POSS type is also available in the Hungarian language.

D) It is also noteworthy that the most neutral and most frequently used 'dummy' participial element is *való* 'being', one of the present participial forms of the Hungarian copula *van* 'be'. Consider:

²² Cf. footnotes 11 and 12.

- (31) Norvégia Németország által való elfoglalás-a
 Norway Germany by BEING occupy-AN-poss
 'Norway's occupation by Germany'

E) It is a minor but, in the context of the patterns of nominalization, an important point that the gloss in (26b) is incorrect and, therefore, it is misleading just like the English translation. The correct gloss and the two more appropriate English equivalents would be the following.

- (32) Norvégia Németország által történő elfoglalás-a
 Norway Germany by happen-pres.ptcp occupy-AN-poss
 'Norway's occupation by Germany'
 or: 'the occupation of Norway by Germany'

The problem with the original gloss is that *által* means 'by' and not 'of'. In the Hungarian construction *Norvégia* 'Norway' has the (genitival) possessor function and *Németország által* 'by Germany' has the agentive oblique function. Consequently, the English translation with two possessors in the book is entirely misleading.

F) It seems that Koptjevskaja-Tamm (1993) refers to an inappropriate example in the case of the POSS-ACC type in English. Instead of (27a) she would need an example like that in (33).

- (33) I like John's singing the Marseillaise.

3. The possessor function

The main objective of this section, based on Chapter 2 in Laczkó (1995), is to explore how the Mapping Theory originally designed to describe phenomena related to the argument structure of verbal predicates can be extended to handle phenomena related to the argument structure of derived event nominals, under the recent assumption that these nominal predicates inherit the argument structures of the input verbal predicates. I am primarily concerned with the nature and assignment of the possessor (POSS) grammatical function. My major assumptions and claims are as follows.

1. Following Grimshaw (1990) and others, I assume that only event nominals have argument structures; consequently, only they can have arguments. Result nominals, for lack of an a-structure, can only have adjunct modifiers.²³

2. I postulate that event nominals are capable of assigning the possessor (POSS) function to one of their arguments by themselves; consequently, the possessive suffix obligatorily attached to the noun head is merely used to mark agreement. This is contrary to Szabolcsi's (1990; 1992; 1994) assumption that the noun stem and the suffix make up a complex predicate and this predicate assigns both Case and Theta-role to the possessor.

3. I take the POSS function to be a semantically unrestricted function, and I argue against Rappaport's (1983) claims to the contrary.

4. I postulate that in NPs headed by event nominals the POSS function is as obligatory as the SUBJ function with verbal predicates (cf. the Subject Condition). If there is no possessor in such an NP then we are dealing with a PRO possessor (PROs are phonetically not realized pronominal elements). In other words, these NPs are similar to non-finite verbal clauses.

5. I briefly point out that, *mutatis mutandis*, this analysis can be extended to English NPs, in which the relevant phenomena are far more complicated on account of the fact that there are two distinct means of realizing the POSS function.

3.1. Lexical mapping in Hungarian NPs

Given that, on the one hand, I share most of Szabolcsi's insights formulated within the framework of GB Theory and, on the other hand, I disagree with one crucial aspect of her approach, which has important theoretical consequences, first I summarize Szabolcsi's account.

3.1.1. Szabolcsi's account

In a Government and Binding framework, Szabolcsi analyses Hungarian NPs in general and those headed by event nominals in particular in the following way.

A) She claims that the structure of Hungarian NPs is reminiscent of that of English sentences in that the NP can be taken to be the projection of the determiner, which is comparable to the standard analysis of sentences in terms of projections of complementizers (CPs). For this reason, she calls NPs DPs.²⁴

²³ Two terminological remarks are in order here.

A) As I pointed out in footnote 14, by *event nominal* I mean Grimshaw's (1990) *complex event nominal*.

B) I use the term *modifiers* to refer to oblique arguments and adjuncts collectively in cases when the distinction between them is irrelevant for my purposes.

²⁴ Although I accept Szabolcsi's DP analysis, in this paper I refer to noun phrases as 'NPs', given that nothing hinges on the categorial contrast in my discussions.

B) Furthermore, she argues that the possessive suffix in NPs (which is obligatorily present on the head noun in all possessive constructions) is functionally similar to INFL in sentences. From this it follows that possessive NPs are like finite clauses and non-possessive NPs are like non-finite ones (as regards the presence or absence of the INFL node).

C) She suggests that the ‘unexpressed’ Agent arguments of event nominals are best analysed as PROs (as opposed to Grimshaw’s 1990 notion of Suppression).

D) On her account, the nominal head and the possessive suffix form a complex predicate and this predicate assigns a Theta-role and nominative case to the possessor.²⁵

E) She postulates that even event nominals assign both nominative case and the relevant Theta-role to the possessor through the mediation of the possessive suffix. Consequently, if the event nominal occurs in a non-possessive NP it will be incapable of assigning any Theta-role to any syntactic position. Thus, Szabolcsi concludes, although in the analysis of such NPs we have to posit a PRO argument, that argument cannot be present in the syntactic structure (for it cannot receive a Theta-role); therefore, it is most probably in the lexical structure of the nominal predicate.

In what follows I will spell out my alternative approach within the theoretical framework of LFG.

3.1.2. Towards an LFG analysis

3.1.2.1. Possessors with ordinary noun heads

I agree with Szabolcsi as far as the relationship between an ordinary (or result) noun and the possessive suffix (Px, for short) is concerned. Intuitively, it is plausible to say that it is this suffix that enables the noun head to assign the POSS function to a constituent in the NP. In other words, when such a noun occurs in a non-possessive NP, we normally do not ‘understand’ the entity designated by that noun to be in some kind of a semantic relation (R-relation, as it is commonly called) to any other entity. For example, when we say sentences like (34a–c), they will not entail an R-relation between the entity they mention and any other entities.

- (34) (a) Tegnep lát-tam egy csillag-ot.
 yesterday see-past.1sg a star-acc
 ‘Yesterday I saw a star.’

²⁵ In the case of ordinary noun heads, this Theta-role is extremely vague and general. Loosely speaking, it expresses that the entity denoted by the possessor is in some semantic relation (R-relation) to the entity denoted by the head.

- (b) Tegnap lát-tam egy macská-t.
 yesterday see-past.1sg a cat-acc
 'Yesterday I saw a cat.'
- (c) Tegnap lát-tam egy ház-at.
 yesterday see-past.1sg a house-acc
 'Yesterday I saw a house.'

We can assume that the possessive suffix is a two-place predicate, meaning 'X related to Y' and it forms a complex predicate with the noun in the lexicon. Therefore, we can postulate two distinct lexical forms corresponding to ordinary (and result) nouns. A simple form without an a-structure and another one in which it combines with the Px (filling one of the two argument positions in its a-structure). Compare:

- (35) (a) kalap, N 'HAT'
 (b) kalap-Px, N 'RELATED TO <HAT, _____>
 [-r]

It is the second argument that will get the POSS function in the NPs. I would like to emphasize the fact that on such an account even the non-derived heads of possessive NPs have a simple argument structure with a [-r] argument slot.²⁶

3.1.2.2. Possessors with event nominal heads

My claim is that an event nominal will always assign the POSS function to one of its arguments by itself.²⁷ Consequently, such a nominal is essentially different from ordinary and result nouns in that it has only one lexical form. Compare (36) with (35).

- (36) (a) kiabálás, N 'SHOUTING <Ag >
 [-o]
- (b) János kiabál-ás-a
 John shout-NOM-his
 'John's shouting'

²⁶ It is also very important in this connection that 'relational' nouns like *wife*, *son*, etc. simply cannot be interpreted without a(n at least implicit) possessor. I wish to thank Péter Pelyvás for calling my attention to the significance of this fact.

²⁷ This roughly corresponds to Theta-role assignment in GB. On a different assumption by Szabolesi in this framework, see the next section.

The [-o] argument of the noun will be mapped onto the POSS function. The important thing to note is that, in the lexical form, there is definitely no predicate Px in this case. The reason for this is that the event nominal does not need the 'help' of the Px to assign the POSS function. From this it follows that the status of the Px in possessive constructions with event nouns is always that of an agreement marker (cf. this with the discussion of the status of Px in other possessive NPs above). In the case of (37), for instance, the *shouter* ~ *shouting* relationship is entailed even when no explicit possessor is present in the structure. Consider:

- (37) A kiabál-ás rossz dolog.
 the shout-NOM bad thing
 'Shouting is a bad thing.'

Or the *arriver* ~ *arrival* relationship is entailed in (38).

- (38) A Budapest-re való megérkez-és mindig kellemes élmény.
 the Budapest-onto BEING arrive-NOM always pleasant experience
 'Arrival in Budapest is always a pleasant experience.'

On these grounds, we are justified in interpreting the Px attached to an event nominal as an agreement marker (agreeing for person and number with the possessor when it is present in the structure).

In addition to its intuitive appeal, the postulation of a PRO argument even in non-possessive event NPs is strongly supported by two linguistic phenomena:

- a) similar control relations in non-finite clauses and non-possessive NPs;
- b) similar anaphoric relations in non-finite clauses and non-possessive NPs.

Let us compare the following structures.

- (39) (a) Mária elkezdett kiabál-ni.
 Mary started shout-inf
 'Mary started to shout.'
- (b) Mária elkezdte a kiabál-ás-t.
 Mary started the shout-NOM-acc
 'Mary started (the) shouting.'

It stands to reason that in these examples the subject of the finite verb controls the missing argument of the infinitive in (39a) in the same way as the missing argument of the derived nominal in (39b).

(40) (a) Fontos önmagunk-kal kibékül-ni.
 important self.1pl-with become reconciled-inf
 'It is important to become reconciled with oneself/ourselves.'

(b) Fontos az önmagunk-kal való kibékül-és.
 important the self.1pl-with BEING become reconciled-NOM
 'Becoming reconciled with oneself/ourselves is important.'

The anaphoric element is bound by a PRO argument in the infinitival clause in (40a). By the very same token, we can claim that the anaphoric element is bound by another PRO argument in the domain of the NP in (40b).

In the light of these theoretical considerations, let us now see how my version of the Lexical Mapping Theory works in Hungarian NPs.

3.1.2.3. The mapping rules

My fundamental claim is that in languages like Hungarian a modified version of the Mapping Theory applies to the a-structure of event nominals.

The major difference is that nominals cannot assign SUBJ or OBJ functions to their arguments. Instead, they have POSS at their disposal, which I take to be a semantically unrestricted [-r] function (for evidence in favour of this assumption, see 3.2.2.1). Hence, the types (and specifications) of grammatical functions available to the arguments of Hungarian derived nominals can be summarized in the following way:

(41)

	-o	+o
-r	P O S S	
+r	OBL _(e)	-

That is, the NP-level counterpart of the sentence-level SUBJ and OBJ functions is POSS,²⁸ there is no counterpart of the semantically restricted OBJ_(e) (which is a function available in English but not in Hungarian) and the OBL_(e) functions have the same status as their counterparts in the argument structures of verbal predicates.

²⁸ Note that it is neutral with respect to the [+o] vs. [-o] featural distinction.

In addition, I assume that there is a parallel to the Subject Condition pertaining to clauses headed by verbal predicates. Its event nominal counterpart can be formulated in the following way:²⁹

- (42) Possessor Condition:
Every event nominal predicator must have a Possessor.

With the general principles of the Mapping Theory and my basic assumptions for (event) nominals in mind, let us now see how the arguments of nouns with a-structures are mapped onto grammatical functions. In this section, we will have a look at Hungarian NPs and in the next we will briefly consider the corresponding English phenomena.

When a non-event noun is used in a non-possessive NP, the lexical form I postulate for it is one without an a-structure; therefore, there being no subcategorized argument present, no mapping has to take place. Consider:

- (43) (a) a piros kalap
the red hat
'the red hat'

(b) kalap, N 'HAT'

²⁹ It is well known that in several languages, including Hungarian, there are exceptions to the SUBJ Condition. Consider:

- (i) Havazik.
snows
'It is snowing.'
- (ii) Sötétedik.
gets dark
'It is getting dark.'

In these sentences it is impossible to insert any explicit SUBJ argument. It is still to be explored how the exceptional behaviour of these predicates can be reconciled with the SUBJ Condition of LFG. In several such cases, nominalization is also possible:

- (iii) havaz-ás
snow-NOM
'snow(fall)'
- (iv) sötéted-és
get dark-NOM
'nightfall'

It is impossible to insert a POSS argument in NPs headed by nominals like (iii) and (iv). From this it follows that in these cases we have to refine the POSS Condition in the same manner as the corresponding SUBJ Condition.

When a non-event noun occurs in a possessive NP, its lexical form contains one open argument in its a-structure. The lexical form is a complex predicate composed of the noun and the possessive suffix. Given the fact that this argument is best interpreted as being in some R-relation to the noun (which is an extremely general semantic notion), it stands to reason that it has to be specified as [-r], and as such it will always be mapped onto the POSS function (there being no other argument present in the structure). Consider:

(44) kalap-Px, N 'RELATED TO < HAT , _____ >'
 [-r]

So here the POSS Condition is satisfied in a trivial way.

And now let us turn to some derived nominal predicate types. For convenience, I also give the verbal counterparts and their mapping rules.³⁰

A) The predicate has one argument: < Ag >.

(45) (a) Edit kocog-ott.
 Edith.nom jog-past.3sg
 'Edith jogged/was jogging.'

(b) kocog, V 'JOG < Ag >'
 [-o]

(c) mapping: SUBJ

(46) (a) Edit kocog-ás-a
 Edith.nom jog-NOM-her
 'Edith's jogging'

(b) kocogás, N 'JOGGING < Ag >'
 [-o]

(c) mapping: POSS

It is the SUBJ Condition in (45) and the POSS Condition in (46) that do not allow the argument to be mapped onto the OBL_{ag} function.

³⁰ As was pointed out by an anonymous reviewer and Katalin É. Kiss (p.c.) it is important to emphasize the fact that while the mapping of the arguments of Hungarian verbal predicates follows the nominative-accusative pattern, the argument realization in the case of derived nominal predicates is ergative. Note also that, as is well known, English nominalization follows both patterns.

B) The predicate has one argument: < Th >.

- (47) (a) Edit összecs-es-t.
Edith.nom collapse-past.3sg
'Edith collapsed.'
- (b) összecs-esik, V 'COLLAPSE < Th >'
[-r]
- (c) mapping: SUBJ

- (48) (a) Edit összecs-es-e
Edith.nom collapse-NOM-her
'Edith's collapsing'
- (b) összecs-esés, N 'COLLAPSING < Th >'
[-r]
- (c) mapping: POSS

The [-r] argument in (47) would, in theory, have a choice between the SUBJ and OBJ functions, but the SUBJ Condition forces it to be mapped onto SUBJ. The [-r] argument in (48), on the other hand, has no such choice (recall that there is only one semantically unrestricted grammatical function available to the arguments of nominal predicates) so in this case, the only choice (mapping onto POSS) is simply reinforced by the POSS Condition.

C) The predicate has two arguments: < Ag , Th >.

- (49) (a) Edit összetör-te a vázá-t.
Edith.nom smash-past.3sg the vase-acc
'Edith smashed the vase.'
- (b) összetör, V 'SMASH < Ag, Th >'
[-o] [-r]
- (c) mapping: SUBJ OBJ
- (50) (a) a váza (Edit által-i) összetör-es-e
the vase.nom Edith by-afñ smash-NOM-its
'the smashing of the vase (by Edith)'

- (b) összetörés, N 'SMASHING < Ag, Th >
 [-o] [-r]
- (c) mapping: [+r]
 (OBL_{ag}) POSS

Given that the verb in (49) is not passive, the Agent argument is not suppressed, and it is the highest in the semantic hierarchy, so it has to be mapped onto the SUBJ function. Thus the [-r] Theme argument has no choice but be mapped onto OBJ. In (50), we have two arguments with semantically unrestricted features but only one unrestricted function is available. Depending on which version of the Mapping Theory we adopt in the case of nominals, there are two viable descriptions of how mapping takes place.³¹

1. We can say that nominalization (just like passivization) suppresses the highest argument of the predicate. Then only the Theme argument remains and it will be mapped onto the POSS function. On this view, the optional 'by-phrase' is a special adjunct linked to the suppressed argument in the a-structure.

2. In accordance with the principles of the Mapping Theory, it is also possible to add further features to the specification of arguments as long as they do not clash with the features that are intrinsically associated with the semantic role of the argument. In this particular case, it is possible to add [+r] to the [-o] feature of the Agent argument, which will result in the (optional) mapping of this argument onto the semantically restricted OBL_{ag} function. This is illustrated in (50c). On this account, it is the function of the nominalizing suffix to add the [+r] feature to the highest [-o] argument, thus rendering this argument fully specified in the lexical form of the predicate.

It is also important to note that no matter which solution we adopt, we have to postulate that it is only in the transitive case that the attachment of the nominalizing suffix has the effect described above on the [-o] argument of the input predicate. The reason for this is that in the intransitive case when the sole argument of the predicate is an Agent, with [-o] specification, the nominalizing suffix should not suppress this argument (first solution) or should not specify that it is to be mapped onto an OBL function (second solution) because, as a rule, it receives the POSS function. The desired result can be achieved by formulating the relevant rule along the following lines: the function of the nominalizing suffix in either analysis described above is

³¹ Certain aspects of the following discussion have been refined as a result of some comments by an anonymous reviewer and Katalin E. Kiss (p.c.) on an earlier version of this paper.

optional and the grammaticality or ungrammaticality of the resulting constructions will be determined by independent and general principles of the grammar.

Let us see how this assumption will work in practice. A) When the input predicate is unaccusative, that is, it has a [-r] argument, the attachment of the nominalizing suffix will have no effect on this argument, given that it only targets [-o] arguments. B) When the input predicate is unergative, it has a [-o] argument. If the optional rule does not apply to it then it will be mapped onto POSS, which is the desired result. If it applies then this argument will be mapped onto an OBL function or it will be suppressed and the POSS Condition will be violated. Thus, this will prevent our optional rule from applying in this case. C) When the input predicate is transitive, with <[-o],[-r]> arguments, this optional rule has to apply in one of the ways described above, otherwise the Agent argument will be mapped onto POSS, according to the principles of Lexical Mapping, and the Theme argument will be left without any grammatical function to be mapped onto, there being no OBJ, OBJ_{theme} or OBL_{theme} functions available in Hungarian.

Although so far I have made no choice between the two theoretically possible ways of ensuring that the highest [-o] argument of the derived nominal predicate should not be mapped onto POSS, on the basis of Szabolcsi's (1990) findings about the control relations in Hungarian NPs headed by event nominals, to be discussed in 3.1.2.4, it is straightforward that the second alternative, the addition of the [+r] feature is to be preferred, as Szabolcsi argues convincingly against the suppression approach to the relevant Hungarian phenomena.

Other kinds of arguments of Hungarian verbal and nominal predicates (e.g. Locatives) are mapped onto grammatical functions in fundamentally the same manner.³² The only difference worth remarking on is that the OBL arguments of Hungarian nominals, just like their English counterparts, have to respect Rappaport's (1983) rather rigid principle of Thematic Constancy, which I will refer to as the 'Transparency Condition'. This means that the form of the OBL function of the argument of a nominal predicate must be compatible with the semantic role of that argument. Consider the following examples from Szabolcsi (1990):

- (51) (a) A folyó/mérnök eláraszt-otta a falu-t.
 the river.nom/engineer.nom flood-past.3sg the village-acc
 'The river/engineer flooded the village.'

³² For details, see 1.1.2.

- (b) a folyó által eláraszt-ott falu
 the river by flood-part village
 'the village flooded by the river'
- (c) *a falu-nak a folyó által-i eláraszt-ás-a
 the village-dat the river by-aff flood-NOM-its
 '*flooding of the village by the river'
- (d) a falu-nak a mérnök által-i eláraszt-ás-a
 the village-dat the engineer by-aff flood-NOM-its
 'flooding of the village by the engineer'

(51b) shows that the Transparency Condition does not apply to the oblique arguments of participial predicates. In the case of nominal predicates, however, the argument mapped onto the OBL_{ag} function has to be a true Agent (and not Instrumental or Natural Force); compare (51c) and (51d) in this respect. (For further details of the Transparency Condition in Hungarian NPs, see Szabolcsi 1990 and Laczko 1991).³³

An important final remark on the mapping rules in NPs is in order here. As is obvious from the foregoing discussion, on my account the attachment of the nominalizing suffix brings about a very important change in the mapping scheme of the predicate. The SUBJ and OBJ functions will not be available; instead, the POSS function will be the only [-r] function at the disposal of such derived nominal predicates. This means that we have to make reference to the category of these predicates, which is a rather unusual move in LFG. I leave the evaluation of the consequences of this assumption to future research.³⁴

³³ An anonymous reviewer criticizes me for not taking into consideration the subject function that can be associated with every noun (phrase) used predicatively (cf. *Ez kalap* 'This is a hat' and *Ez kiabálás, nem rendes emberi beszéd* 'This is shouting, not ordinary human speech'). She/He points out that it might be reasonable to assume that there are two unrestricted functions available to the arguments of derived nominals: SUBJ and POSS, and the latter is more likely to be comparable to the OBJ function available to arguments of verbal predicates. While I think this theoretical possibility is worth exploring, this is beyond the scope of the present paper. At first sight, it appears to me that, on the one hand, such an approach might complicate the principles of Lexical Mapping, and, on the other hand, it would not solve the problem of capturing the relevant control relations in the 'transitive case', which, as a matter of fact, could be a favourable aspect of this approach.

³⁴ In Laczko (in preparation) I will explore the possibility of collapsing the two mapping schemes.

3.1.2.4. Control in non-possessive NPs

In this section my aim is to summarize Szabolcsi's GB account and to point out along what lines one can seek to accommodate her empirical generalizations within the LFG framework, given that not all aspects of her overall GB analysis can be 'translated' into LFG terms. In addition, I make some general remarks on her analysis.

Let us first consider non-possessive NPs headed by nominals derived from intransitive verbs. As I have already mentioned in passing, on Szabolcsi's account even an event nominal is incapable of assigning even a Theta-role to the possessor argument without the presence of the possessive suffix. This assumption, which she does not necessarily have to make even in a GB framework, forces her to claim that there is no syntactic PRO argument in non-possessive NPs headed by event nominals; instead, there is a PRO in the Lexical Structure of the nominal predicate. Compare two of our previous examples.

(36) (b) János kiabál-ás-a
 John shout-NOM-his
 'John's shouting'

(37) A kiabál-ás rossz dolog.
 the shout-NOM bad thing
 'Shouting is a bad thing.'

According to Szabolcsi, *János* in (36b) receives both its Case and Theta-role from the noun stem + Px complex predicate; thus, there is no syntactic PRO because the nominal cannot assign even a Theta-role to it. Similarly, the examples in (39b) and (40b) also lack a syntactic PRO for this reason.

Below, I will argue for a solution that can be considered the LFG counterpart of a syntactic PRO approach in GB. Before this I would like to point out that this syntactic PRO approach could be accommodated even in Szabolcsi's GB account because it would not violate any principles of the theory. In GB, nouns are considered incapable of assigning case. However, Szabolcsi also assumes that an event nominal is incapable of assigning even a Theta-role to its argument without the presence of the possessive suffix. This is an assumption she is not forced to make in the GB framework. If she allowed event nominals to assign a Theta-role to their possessor argument then in non-possessive NPs the insertion of PRO would be legitimate. In GB, PRO must receive a Theta-role but must not receive Case. On this new account both conditions would be met. The nominal would assign a Theta-role to it but, in the absence of the possessive suffix, could not assign Case. I think

an analysis along these lines would have the welcome consequence of making the parallel she convincingly draws between infinitival clauses and non-possessive NPs headed by event nominals more complete. Intuitively speaking, the vacant position of the missing subject of an infinitive and that of the missing possessor of an event nominal can be considered equally tempting for a syntactic PRO to occupy.

Now I will outline how my assumptions central to this section, the adoption of the event nominal approach to deverbal nouns and the postulation that the POSS function is semantically unrestricted, can be accommodated in the architecture of LFG. The crucial issue is a slight modification of the treatment of control phenomena. First, I will give a brief overview of the theory of control and then I will point out what changes, following from the analysis proposed in this paper, are necessary in this theory.

Within the classical framework of LFG, Bresnan (1982c) offers a detailed discussion of various aspects of control. This short presentation is based on her study. She writes:

Control refers to a relation of referential dependence between an unexpressed subject (the *controlled* element) and an expressed or unexpressed constituent (the *controller*); the referential properties of the controlled element, including possibly the property of having no reference at all, are determined by those of the controller (317) [...] Where the referential dependence is accompanied by the complete identity of all functional features of the controller and the controlled element, we have *functional control* [...] Where the referential dependence implies no identity of grammatical features, we have *anaphoric control*. That is, functional control entails identity of f-structures of the controller and controlled elements, while anaphoric control entails mere "identity of reference" (i.e., only referential dependence) (321).

Under standard LFG assumptions only subjects of predicates can be functionally controlled. Functional control has two types. One of them is called **lexically induced control** and the other is called **structurally induced control**.

In the first case, one of the arguments of a predicate controls the subject of another predicate which serves as an argument of the 'main' predicate. This control relationship is lexically induced inasmuch as it can be represented by means of an equation in the lexical form of the 'main' predicate. Consider the following example.

(52) I want to sleep.

Obviously, the missing subject of *to sleep*, which is a non-finite argument, an XCOMP argument, of *want*, is obligatorily identified with the realized subject of *want*. In the lexical form of *want*, the following equation captures this generalization.

$$(53) \quad \uparrow\text{SUBJ} = \uparrow\text{XCOMP SUBJ}$$

This reads as follows: the predicate's subject is identical to the subject of its XCOMP argument.

In the case of structurally induced control the predicate whose 'missing' subject is controlled is not an argument but a non-finite adjunct of the 'main' predicate. For this reason, this control relation cannot be represented in the lexical form of the main predicate, given the standard assumption that only the arguments of a predicate are indicated there. Therefore, the control relationship will be brought about by a particular (functional-)structural configuration of the elements involved. Consider the following example.

$$(54) \quad \text{I went home to sleep.}$$

Naturally, the two arguments of *go* are *I* and *home*. The infinitive of purpose is an adjunct. And in this configuration the missing subject of *sleep* is identified with the subject of *go* by means of structural control.³⁵

Anaphoric control is different from functional control in that the controlled argument does have a semantic (in LFG terms: PRED) feature. In English, only non-finite verbs (infinitives, gerunds and certain participles) can have anaphorically controlled subjects. These subjects are introduced in the lexical entry of the non-finite predicate by adding the following equation: $\uparrow\text{SUBJ} = \text{'PRO'}$. These PROs can have either specific or generic interpretations. (55) below exemplifies the former, while (56) is an instance of the latter (the examples are from Bresnan 1982c).

$$(55) \quad \text{Tom felt sheepish. Pinching those elephants was foolish. He shouldn't have done it.}$$

$$(56) \quad \text{Pinching elephants is foolish.}$$

It is a very important aspect of the classical version of control theory in LFG that control relations are stated over grammatical functions. In the case of functional control, the controllee argument is always a subject and the controllers can only be argu-

³⁵ The details of representing control relations in f-structure are not relevant to the present discussion.

ments with semantically unrestricted grammatical functions: SUBJ, OBJ and OBJ2.³⁶ As regards functional control, controllees can only have semantically unrestricted grammatical functions, and these functions are subject to parametric variation across languages. For instance, as has been mentioned above, in English only the subject arguments of non-finite predicates can be anaphorically controlled.

Kroeger (1993), in his analysis of Tagalog, applies a modified version of control theory within the framework of LFG. The most important difference between his approach and the classical account is that he also allows a particular semantic argument, the Actor, to function as the controllee in a control relation even if it is not mapped onto a grammatical function, as opposed to postulating that only arguments associated with semantically unrestricted grammatical functions can serve as controllees. According to Kroeger, Actors in Tagalog are eligible to be controllees because they are always direct (non-oblique) arguments of their predicates (cf. the example and the gloss in (58)). In this respect, they differ significantly from passive Agents in English, which are generally analysed as non-direct, what is more: suppressed, arguments of their predicates. Consider the following two Tagalog examples of anaphoric and functional control from Kroeger's book (1993, 100).

(57) Anaphoric control

Nagpilit si=Maria=ng bigy-an ng=pera si=Ben.
 PERF.AV-insist.on NOM=Maria=COMP give-DV GEN=money NOM=Ben
Maria insisted on giving money to Ben.

Semantic structure:

insist <Maria_i, *give* <PRO_i, *money*, Ben>>

(58) Functional control

Nagpilit si=Maria=ng bigy-an ng=pera ni=Ben.
 PERF.AV-insist.on NOM=Maria=COMP give-DV GEN=money GEN=Ben
Maria insisted on being given money by Ben.

Functional structure:

insist *Maria* *give* *money* *Ben*
 [PRED SUBJ XCOMP: [PRED SUBJ OBJ ACTOR]]
 └──────────────────────────┘

³⁶ As was pointed out in 1.3.1, in early LFG, OBJ2 was also considered to be an unrestricted function.

These are the basic principles of the representation of control relations in LFG. It should be obvious even from this sketchy description of this part of the theory that it can be very easily and simply modified to accommodate my POSS PRO generalization over the 'intransitive' examples we have considered so far. All we have to do is to allow the PRO argument mapped onto the POSS function to be controlled. And this is something we do not have to stipulate because it follows from my basic assumption that the POSS function is semantically unrestricted. If it is unrestricted, it belongs to the very same category as SUBJ and OBJ; therefore, the argument mapped onto the POSS function should also be eligible to serve as a controllee. Thus, we can draw a parallel between the unexpressed controllee subject of a non-finite clause and the unexpressed possessor of a non-possessive NP.

It is important to note at this juncture that the proposed modification can be kept at this simple level if we postulate that control in the domain of noun phrases is always anaphoric. If we also allowed either lexically or structurally induced functional control, the changes would be much more serious and they would radically affect certain fundamental principles of control theory in LFG. In particular, the theory holds that only the open SUBJ argument of XCOMPs and XADJs can be functionally controlled. The extension of the scope of functional control to noun phrases would inevitably mean that the (unexpressed) POSS argument could be functionally controlled practically irrespective of the grammatical function that the NP headed by the derived nominal is mapped onto. Thus, the equations involving the subjects of XCOMPs and XADJs would have to be extended to the possessors of all subcategorizable functions that noun phrases are mapped onto, which appears to be a highly undesirable change, given the well-established assumptions about the nature of functional control relationships (cf. Bresnan 1982c and Kroeger 1993). For this reason, the unexpressed POSS arguments of the derived nominal in both (37) and (39b), repeated here for convenience, are best analysed as being anaphorically controlled.

(37) A kiabál-ás rossz dolog.
 the shout-NOM bad thing
 'Shouting is a bad thing.'

(39) (b) Mária elkezdte a kiabál-ás-t.
 Mary started the shout-NOM-acc
 'Mary started (the) shouting.'

The assumption that (designated arguments of) noun phrases cannot be functionally controlled will receive additional support from NPs headed by nominals derived from transitive verbs.³⁷

And now let us turn to event nominals derived from transitive verbs. Consider the following examples.

(59) Mária éneкли a dal-t.
Mary sings the song-acc
'Mary is singing the song.'

(60) (a) a dal Mária által-i énekl-és-e
the song Mary by-aff' sing-NOM-its
'the singing of the song by Mary'

(b) a dal énekl-és-e
the song sing-NOM-its
'the singing of the song'

(59) and (60) suggest that the event nominalization of a transitive verb will have a 'passivizing effect' on the a-structure of the resulting predicate. The argument corresponding to the object of the verb will have the POSS function, which I have just likened to the SUBJ function, and the argument corresponding to the subject of the verb will either be realized by an oblique argument (60a), or 'disappear' (60b).³⁸

In the previous section I have shown that there are two possible ways of achieving this distribution of grammatical functions in LFG. Both of them have been used to capture passivization phenomena at the sentence level in the Mapping

³⁷ It is noteworthy that both this paper and Rappaport (1983) associate anaphoric, as opposed to functional, control with NPs with derived nominal heads. However, there is a significant difference between them. While the present paper claims that it is (the 'missing' possessor argument of) the overall NP that cannot be functionally controlled, Rappaport's (1983) fundamental assumption is that the derived nominal predicate cannot assign an open (that is, grammatically controllable) grammatical function to any of its arguments. In her system, this follows from her assumption that all the functions that the arguments of a derived nominal are mapped onto, including POSS, are semantically restricted, whereas only arguments mapped onto unrestricted functions can serve as possible controllers. As should be clear from the foregoing discussion, I reject this approach to the POSS function, at least in the case of languages like Hungarian. Moreover, in Laczkó (1995) and briefly in section 3.2 in this paper, I point out that it is not entirely implausible to extend the semantically unrestricted analysis of POSS even to languages like English.

³⁸ On the realization of OBL. functions in Hungarian NPs, see Chapters 3 and 4 of Laczkó (1995).

Theory framework. On the one hand, we can postulate that the [-o] Agent argument will get the additional [+r] specification, and it will be optionally realized as an OBL_{ag} . On the other hand, we can also assume that the Agent argument is suppressed, that is, it cannot be expressed as an ordinary grammatical argument of the predicate, instead, it can be optionally bound by a special adjunct 'by-phrase'. The first solution was generally applied at the earlier stages of the new theory, but then the suppression account superseded it. The suppression of the [-o] argument is strictly comparable to the suppression of the external argument analysis of passive constructions in GB. Moreover, Grimshaw (1990) argues for a similar suppression account of the external arguments of derived nominals in English NPs in a GB framework.

Szabolcsi (1990) shows that Grimshaw's (1990) notion of Suppression is not applicable to the a-structure of Hungarian event nominals. One of her examples is given in (61).

- (61) a falu· cláraszt-ás-a
 the village flood-NOM-its
 'the flooding of the village'

Szabolcsi argues convincingly that the unexpressed 'subject' argument can only be interpreted as [+human]. This is in conflict with the general notion of suppression, which assumes that the suppressed (unrealized) argument is existentially quantified over and no restrictions are imposed on it (see the whole set of relevant examples in (51)). Szabolcsi points out that the data strongly suggest that the correct analysis is PRO (subject) insertion in the Lexical Structure.

While in the case of nominals derived from intransitive verbs I have argued that Szabolcsi, even in a GB framework, does not necessarily have to postulate PRO insertion in the Lexical Structure of these nominals occurring in non-possessive NPs, in the transitive case this move is forced by the principles of the theory. The reason is, as Szabolcsi remarks, that simply there is no position in the c-structure for a syntactic PRO.

Although I accept the notion of lexical PRO insertion in the transitive case in the GB framework, I have some problems concerning one aspect of the Lexical Structure Szabolcsi assumes. She claims that this structure is highly syntactic by nature; it is, in a sense, a mirror image of the structure of sentences and the argument positions also bear grammatical functions in it. On Szabolcsi's account both the 'intransitive' and the 'transitive' nominals will have the PRO inserted in the subject argument slot of their Lexical Structure. In my view, even if we accept this highly syntactic Lexical Structure with grammatical functions associated with dis-

tinguished positions, the nature of PRO insertion in the transitive, as opposed to the intransitive case, is so different that it definitely appears to query the tenability of postulating the existence of a 'subject' slot in 'transitive' structures. The intransitive case is unproblematic in this respect. It can be claimed that the unexpressed argument is a PRO inserted in the 'subject' slot in the Lexical Structure of the derived nominal predicate. We can draw a parallel between this slot and the unfilled 'subject', that is, possessor, position in the syntax of the NP headed by the derived nominal predicate. However, as Szabolcsi herself points out, there is no unfilled position in a possessive noun phrase headed by a nominal derived from a transitive predicate that could correspond to the 'subject' position filled by the PRO in Lexical Structure.

What I find most problematic about her account of this construction type is that there seems to be a discrepancy between Lexical Structure and syntactic structure. Szabolcsi appears to assume that at the former level of representation the PRO, occupying a designated position, counts as the 'subject' but at the latter, although no structure changing (movement or suppression) is postulated, it does not, what is more: could not, 'appear' at all, there being no appropriate position for it. Note also that Szabolcsi assumes that the PRO is not present in the syntactic structure of non-possessive NPs headed by nominals derived from intransitive verbs either (as I have already pointed out, this is an assumption she is not forced to make even within the GB framework). At this point the following question arises: why call this PRO in **both** 'intransitive' and 'transitive' NPs a subject? While on the basis of the possible parallel between the 'subject' slots in the Lexical Structure and the syntactic structure of 'intransitive' derived nominal predicates this may receive some justification, I think the treatment of PROs in 'transitive' constructions along the same lines is far from being convincing.

I regard it as an instance of inconsistency that there is a mismatch between Lexical Structure and syntactic structure. In Lexical Structure there is a PRO argument which is assumed to be a subject. However, there is no room for this PRO in syntactic structure; moreover, the argument occupying the 'subject', that is possessor, slot corresponds to the 'object' argument of the predicate, although, on Szabolcsi's account no suppression or movement takes place as a result of nominalization. As will be clear from the discussion below, I fully accept Szabolcsi's claim that the external argument of a transitive predicate is not suppressed in the course of nominalization in English but I find it implausible to associate the subject function (or practically any grammatical function) with it. In this connection, my view is much closer in spirit to Williams' (1987) GB account of implicit arguments. Consider one of his examples and his comment.

(62) John performed Mary's operation.

[...] the target of the control rule seems to be a particular theta role, not a particular syntactic position [...] Since the Agent argument of operation is controlled despite the fact that it is not syntactically realized, this means that implicit arguments can be interpreted as pronominal (or anaphoric) independent of any syntactic realization as a pronominal or anaphor (1987, 154–5).

And now let us compare the parallel between (63) and (37) on the one hand, and that between (64b) and (39b) on the other, from the perspective of the present paper. They seem quite strongly to call for a uniform treatment of these control relations in the 'intransitive' as well as the 'transitive' cases.

(63) A dal énekl-és-e nagyon fontos.
 the song sing-NOM-its very important
 'The singing of the song is very important.'

(64) (a) Mária elkezdte énekel-ni a dal-t.
 Mary started sing-inf the song-acc
 'Mary started to sing the song.'

(b) Mária elkezdte a dal énekl-és-é-t.
 Mary started the song sing-NOM-its-acc
 'Mary started the singing of the song.'

The problem, however, is that even if the POSS PRO analysis I have proposed for the 'intransitive' type proves tenable, it seems impossible to extend it to the 'transitive' type for the following reason. It is unclear what grammatical function the PRO argument can be mapped onto in the transitive case, given the fact that the 'object' argument is mapped onto the POSS function, and there appears to be no appropriate controllable grammatical function available. In the remainder of this section I will outline two possible ways of solving this problem.

A) Despite all appearances, we may try to extend the 'intransitive' account to cover the 'transitive' cases by slightly modifying our grammar. Notice, first of all, that there is nothing, in principle, that would force LFG to treat the 'transitive' case lexically, that is, differently from the 'intransitive' case. As I have pointed out above, the reason for this is that in the syntactic control approach I have proposed there are no PRO elements inserted in c-structure (compare this with the discussion of Szabolcsi's GB account). In theory we can assume that there is, even in the 'tran-

sitive' case, a missing possessor argument corresponding to the external argument of the input verb (cf. (63) and (64b)). However, in these constructions there is already a **realized** POSS argument: *a dal* 'the song'. The postulation of another (missing) POSS argument would result in the violation of a very strong cross-linguistic generalization whose LFG version is the Condition of Function-Argument Biuniqueness (cf. 1.1.1). This constraint rules out structures in which the same function is assigned to more than one argument of the same predicate. Consequently, the only way out is to assume that the 'realized POSS' argument does not have this function, instead, it has an OBL_{th} function, and the missing 'subject' argument has the POSS function in these constructions. In this way the formal system of control relations I have proposed for the intransitive case can be extended to the transitive type without any modification.

This might appear a rather ad hoc solution at first sight. However, in the next section I will point out briefly that an analysis, in the same vein, of *of*-constructions in English is worth exploring, and I will also point out that according to some grammarians Japanese genitives are forms that are capable of realizing both the POSS and the OBL_{th} functions. Thus, an account along these lines would not be based on a cross-linguistically unattested phenomenon. The greatest, and perhaps insurmountable, problem is that in Hungarian NPs the possessor can appear only once, in other words, it cannot 'explicitly' realize both functions at the same time. It is for this reason that below I will outline an alternative approach, which, when fully developed, may prove to be much more tenable.

B) The essence of the alternative solution I would like to propose is as follows. There is anaphoric control in both the 'intransitive' and the 'transitive' cases. The major difference between them is that in 'intransitive' non-possessive NP constructions the controllee is a PRO mapped onto the POSS functions, whereas in 'transitive' possessive NPs this PRO is inserted in the argument structure of the derived nominal predicate and no grammatical function is associated with it. The analysis of transitive predicates along these lines has been motivated by Kroeger's (1993) account of control in Tagalog. We have seen that in addition to subject arguments, he also allows Actors to serve as controllees.³⁹

On this view, then, in 'intransitive' NPs we have 'syntactic' PROs mapped onto the POSS function, while in 'transitive' NPs 'semantic' (or 'lexical') PROs. At first sight this distinction between the two types of PROs in Hungarian NPs appears to be a somewhat ad hoc solution forced upon us by independent phenomena within these NPs. However, I would like to show that such a distinction may prove to be justified by certain facts.

³⁹ And, as I have already pointed out, such an account is also very close in spirit to that in Williams (1987) within a GB framework.

As István Kenesei (p.c.) pointed out, neither my ‘invariable PRO POSS’ solution outlined in A) above, nor Szabolcsi’s (1992) ‘invariable lexical subject PRO’ account can explain the contrast (first observed by Anna Szabolcsi) between (65a) and (65b).

- (65) (a) *Elkezdődött az ugat-ás.*
 start-past.3sg the bark-NOM
 ‘The barking (has) started.’
- (b) *Elkezdődött a falu eláraszt-ás-a.*
 start-past.3sg the village flood-NOM-its
 ‘The flooding of the village (has) started.’

The difference between (65a) and (65b) is that the former allows either dogs or humans to be interpreted as the ‘barkers’, while the latter only allows humans (for instance, in the case of (65b) we cannot understand a river to be the ‘flooder’). It appears that in the type exemplified in (65b) the PRO inserted in the argument structure of the predicate is either (anaphorically) controlled or it receives an arbitrary interpretation (PRO_{arb}) with the [+human] feature. By contrast, in the type shown in (65a), the POSS PRO, when not controlled, is not restricted in this respect. I leave the investigation of this interesting contrast to further research. Here I would only like to point out that this difference in interpretation may turn out to provide independent evidence for a fundamental distinction between the two types of PROs.

Although a detailed analysis of PRO in Hungarian NPs is still to be developed, even at this stage I think it is, and will be, compatible with my general account of the syntax of Hungarian NPs headed by derived nominals. The most important aspects of this analysis are as follows.

1. PRO can only be (optionally) inserted in the position of the argument that is highest in the thematic hierarchy in the given argument structure.

2. The mapping of the arguments (including POSS) onto grammatical functions follows from my general principles outlined in the previous sections.

A) When PRO is inserted in the a-structure of an ‘intransitive’ derived nominal, it has to be mapped onto the POSS function, otherwise the POSS Condition will not be satisfied.

B) When PRO is inserted in the argument structure of a ‘transitive’ derived nominal, it must not be mapped onto a grammatical function because only POSS would be available for this purpose (given that this is the only semantically unrestricted function that the arguments of deverbal nouns can be mapped onto) but

then we would be left without any function that the [-r] argument could be associated with.

3. Either type of PROs can only be anaphorically controlled. When there is no anaphoric control in the linguistic context, the PRO (not mapped onto any grammatical function) in a 'transitive' NP will, as a rule, receive a PRO_{arb} interpretation with the obligatory [+human] feature, while the PRO in an 'intransitive' NP will lend itself to a more unrestricted interpretation. At present I have no explanation for this contrast, but it clearly provides some partial justification for distinguishing these two types of PROs.

3.2. Possessors in the English NP

3.2.1. Rappaport's account

Rappaport (1983) proposes a principled and coherent analysis in the framework of LFG. She claims that the similarity between sentences and corresponding NPs is best captured in terms of the invariance of the argument structures of verbal and derived nominal predicates, rather than in structural-hierarchical terms. On the other hand, she argues that verbs and the nominals derived from them differ in that the former are capable of assigning semantically unrestricted grammatical functions to their arguments, while the latter can only assign semantically restricted ones. As we have seen in section 1.1.1, in LFG, the SUBJ and OBJ functions are considered semantically unrestricted because practically they can be associated with any kind of argument, irrespective of its thematic role; moreover, a verb can also assign them to constituents it is not subcategorized for, e.g. to an expletive element or to an argument of the predicate of one of its arguments in various 'raising' constructions. Consider:

- (66) (a) It seems that Mary likes coffee.
 (b) There seems to be some coffee on the table.
 (c) Mary seems to like coffee.
 (d) I believe Mary to like coffee.

In (66a), (66b) and (66c), the expletives *it* and *there*, and *Mary* are grammatical subjects of *seem* but they are not its semantic arguments, while *Mary* in (66d) is a grammatical object but not a semantic argument of *believe*.

In addition, verbal predicates can even assign semantically restricted functions to their arguments relatively freely, whereas derived nominals have to observe the 'Transparency Condition'. As has already been mentioned, this means that they can

only assign those semantically restricted functions to their arguments which reflect the thematic roles of these arguments. This is how Rappaport accounts for the following contrast.

- (67) (a) John presented a book to Mary.
 (b) John presented Mary with a book.
 (c) John's presentation of a book to Mary
 (d) *John's presentation of Mary with a book

She claims that the *of*-phrase in English normally realizes the OBL_{th} function, which is typically assigned to Theme (or, in a different terminology, Patient) arguments and *to*-phrases are typically associated with Recipient (or Goal) arguments, which is why (67c) is felicitous. In (67d), on the other hand, the OBL_{th} function has been assigned to the Recipient argument, which is a violation of the Transparency Condition. As (67a) and (67b) show, verbal predicates do not have to meet such severe requirements.⁴⁰

Rappaport also assumes that the *'s* genitive realizes the POSS function and the *of*-constituent the OBL_{th} function, which is, as we have just seen, a function that is typically assigned to Theme arguments.

In order for her Transparency Condition to work, she has to prove that the POSS function is semantically restricted despite the fact that it can be assigned to arguments that bear a great variety of thematic roles. Her main arguments for the semantically restricted nature of this function are as follows.

1. POSS cannot be assigned to a non-thematic argument of the nominal predicate. Compare:⁴¹

- (68) (a) John appears to have left.
 (b) *John's appearance to have left

2. The use of POSS is governed by some (ill-understood) semantic criteria:

- (69) (a) yesterday's lecture
 (b) *the tree-top's lecture

⁴⁰ On some apparent violations of the Transparency Condition in Hungarian NPs and an explanation, see Laczkó (1991).

⁴¹ The examples in (68–70) have been taken from Rappaport (1983).

- (70) (a) knowledge of history
 (b) *history's knowledge

In what follows, however, I will show that it is not implausible to assume that the POSS function is semantically unrestricted,⁴² and, moreover, it can also be realized by *of*-constituents.

3.2.2. Towards a new approach

Although LFG was developed in the late 70s, so far it has mainly concentrated on sentence-level phenomena and, apart from Rappaport (1983), it has not been seriously concerned with the syntax of NPs. For example, in Bresnan (1982a) grammatical functions are classified in several articles but the POSS function (a most typical function within NPs) is not even mentioned. Therefore, Rappaport's paper can be considered a real breakthrough in this respect. Unfortunately, it has not been followed by very many further articles drawing on, or qualifying, her NP theory.⁴³

While I share some of Rappaport's basic insights, e.g. the importance of the application of functional principles and the need for a certain notion of transparency within the NP, I think her account has to be radically modified.

3.2.2.1. POSS is semantically unrestricted

In 3.2.1, we have seen that part of Rappaport's evidence for the semantically restricted nature of the POSS function is that it cannot be assigned to a non-thematic argument by the nominal predicate, as opposed to SUBJ and OBJ functions assigned by verbal predicates. Compare (68a) and (68b).

Although this is a contrast that calls for an explanation, it need not by itself be considered a decisive argument. On the one hand, it may well be the case that 'rais-

⁴² It is to be mentioned that Joan Bresnan, in a series of lectures at the 1987 Linguistic Institute at Stanford University, called the POSS function 'subject-like' for the purpose of describing certain anaphoric phenomena. However, the consequences of this assumption have never been seriously considered in the context of grammatical function assignment; moreover, Bresnan still accepts Rappaport's (1983) [+restricted] classification (Bresnan, p.c.). It is also noteworthy that Komlósy, independently of me, also assumes that the POSS function is unrestricted (1992, 365). However, given the fact that his study is primarily concerned with verbal predicates, he does not give any justification for this assumption. He does not mention, either, that this is a rather unorthodox view within the LFG framework and he does not refer to Rappaport's (1983) claim to the contrary.

⁴³ Iida (1987) and Saiki (1987) are among the exceptions. The former applies Rappaport's theory to Japanese genitive NPs whereas Saiki (1987) denies its applicability to the Japanese data. Laczko (1991) shows that, despite some apparent problems, Rappaport's Transparency Condition can also be claimed to hold for oblique arguments in Hungarian NPs headed by derived nominals.

ing' is a sufficient but not necessary feature of unrestricted functions.⁴⁴ On the other hand, the finite and the non-finite verbs in verbal raising constructions can be assumed to make up complex predicates, whereas the nominal derived from a 'raising' verb cannot participate in the formation of such a complex predicate. The possibility of an explanation along these lines was suggested to me by Katalin É. Kiss (p.c.). I leave the investigation of the question as to why there is no raising in NPs to further research.

Rappaport's other argument for the semantically restricted interpretation of POSS is based on examples like (69). She argues that some ill-understood semantic considerations still appear to govern (restrict) the use of this function. As regards the unacceptability of (69b), it does not prove Rappaport's point. Indeed, *tree-top* and *lecture* are incompatible in these structures. But this has nothing to do with the semantically restricted or unrestricted nature of the POSS function itself. It has to do with the semantic incompatibility of the words *tree-top* and *lecture*. Therefore, it is more appropriate to mark these examples with # (instead of the * used by Rappaport) to indicate grammatical correctness but semantic deviation. Consider the following expressions:

- (71) (a) #my green happiness
 (b) #The armchair got dressed and went to the cinema.

These examples are similar to (69b). And I think nobody would seriously want to argue that the SUBJ function is semantically restricted on the grounds that (71b) is infelicitous. In actual fact, if we consider (72a,b), the closest sentential counterparts of the examples in (69), then the SUBJ function will appear even more restricted semantically than POSS because even the equivalent of (69a) is infelicitous.

- (72) (a) #Yesterday lectured.
 (b) #The tree-top lectured.

There are two additional facts that can be taken to suggest the unrestricted nature of the POSS function.

1. Although both the SUBJ and the OBJ functions are considered semantically unrestricted, there is still at least one rather serious restriction on the use of the OBJ function: it cannot be assigned to Agent arguments. This restriction is so unexceptional that it has been built into the default featural specification of Agents: they are [-o]. In this respect, OBJ is more restricted than POSS. I have not raised this

⁴⁴ This was pointed out to me by András Komlósy (p.c.).

issue to question the unrestricted specification of the OBJ function (which I also accept) but to provide further evidence in favour of the unrestricted categorization of the POSS function.

2. In section 3.1.2.4, I have argued that there is a compelling parallel between SUBJECTS in sentences and POSSESSORS in NPs as far as control and anaphoric relations are concerned. In addition to this, it is also a significant feature of the POSS argument that it can be rather freely extracted, in its dative form, from NPs, as opposed to other arguments.⁴⁵

So far, we have assumed with Rappaport that an 's constituent always realizes the POSS function and an *of*-constituent the OBL_{th} function. In the next section, however, I will show that the *of*-phrase can also be taken to be capable of expressing the (semantically unrestricted) POSS function, in addition to the restricted OBL_{th} function.

3.2.2.2. *Of* constituents and the POSS function

Rappaport uses (70) as further evidence for the semantically restricted nature of the POSS function. However, my claim is that there are, in English, two possible realizations of the POSS function, and in most cases they are not freely interchangeable. On my account, the *of*-phrase in (70a) realizes the same POSS grammatical function as the genitive in other constructions and it simply so happens that the genitival form is not acceptable in this case. Compare also:⁴⁶

- (73) (a) the ship's funnel
 (b) the funnel of the ship
 (c) the lady's car
 (d) *?the car of the lady
 (e) *?this house's roof
 (f) the roof of this house

(73) shows that in NPs headed by ordinary (non-derived) nouns the same kind of possessive relationship is realized by either 's-phrases or *of*-phrases, which are, in

⁴⁵ For a detailed analysis of extraction from NPs, see Szabolcsi and Laczkó (1992) and Szabolcsi (1992). Szabolcsi draws a compelling parallel between possessive NPs and possessive sentences in Hungarian by deriving the latter from the combination of existential *van* 'be' and a possessive NP whose possessor is obligatorily extracted from it. The discussion of these phenomena lies outside the scope of this paper. Here I would only like to point out that Szabolcsi's extraction (movement) analysis can be accommodated by means of Functional Uncertainty in LFG. (On the principles of Functional Uncertainty, see Kaplan-Zaenen 1989.)

⁴⁶ These examples have been taken from Quirk *et al.* (1985, 1276–7).

most cases, far from being interchangeable (for a list of various criteria determining the choice between them, see Quirk *et al.* 1985).

It is also noteworthy that Quirk *et al.* (1985) provide convincing descriptive evidence that both *'s*-phrases and *of*-phrases can express both 'subjective' and 'objective' relationships in NPs headed by deverbal nouns, that is either of them can realize the 'original' subject or object of the input verb (although *'s* is more typically associated with the subjective relation and *of* with the objective).

As far as I am aware, all generative analyses so far have associated the POSS function with *'s* genitival constructions and they have invariably considered it to be semantically restricted. They have formulated this restriction in different ways. Anderson (1978) claims that the objective reading of a possessor is available if it is affected by the action denoted by the derived nominal. In addition, Rappaport (1983) points out that the prenominal possessor cannot be the Experienced (=Stimulus) argument of a predicate. Rozwadowska (1988) collapses these two constraints into the Neutral Constraint. According to her, Neutral nominals cannot occur as prenominal possessors in English. In her definition the following two features characterize a Neutral argument: A) the argument is not affected by the action denoted by the predicate; B) the argument does not have control over the action denoted by the predicate. Zubizarreta (1987) and Giorgi-Longobardi (1991) offer explanations, within their respective GB frameworks, for a contrast between English and Romance prenominal possessors, which was observed by Cinque (1980). In Romance NPs only pronominal NPs may occur in a prenominal position and the generalization is that, on the one hand, these possessors can realize unaffected arguments (contrary to the situation in English) and, on the other hand, psychological nouns behave similarly: prenominal possessors cannot express an Experienced/Stimulus argument in Romance, either. Consider the following examples.⁴⁷

- (74) (a) *the proposal's discussion
 (b) la sua discussione

While (74a) is ungrammatical in English, (74b), which contains a 3rd person singular prenominal possessive pronoun, is grammatical on both the subjective and objective readings in Italian, that is *sua* can express either the person who discusses something or the topic of discussion.

- (75) (a) il tuo desiderio
 'your desire' [you = Experiencer]

⁴⁷ These are examples cited by Taylor (1994, 206).

- (b) *il desiderio di te*
 'the desire of/for you' [you = Stimulus]

As the examples in (75) show, the prenominal pronominal possessor can only express the Experiencer argument and the Stimulus has to be realized by a post-modifying prepositional phrase.

Taylor (1994) offers a detailed criticism of the generative accounts mentioned above from the perspective of Cognitive Grammar. He points out that the empirical generalizations these analyses are based on are not complete or entirely correct, on the one hand, and their explanations contain several ad hoc elements, on the other. Moreover, Taylor claims that none of these generative approaches has succeeded in capturing the most fundamental organizing principles of the use of prenominal possessors. According to Taylor, there are two semantic requirements these possessors have to meet:

A) they have to be topical; and

B) they have to be informative (that is, relevant) as compared to the possessee.

Taylor argues convincingly that these two conditions in combination can explain the relevant nominalization phenomena across languages. While I think his relevance requirement can, to a considerable extent, be reconciled with the generative syntactic accounts based on the thematic roles of arguments, it is my conviction that the topicality condition could really shed a new light on derived nominal constructions. It appears to me that Taylor's semantic analysis and his criticism of the generative accounts so far can be taken to lend considerable support to my claims that the POSS function is semantically unrestricted and that it can be realized either prenominally or postnominally. Because I find Taylor's discussion of topicality extremely important for the purposes of the present paper, below I cite excerpts from Taylor (1994) at greater length than usual (the numbers of the examples are mine).

- (76) (a) *the event's recollection
 (b) *the problem's perception
 (c) *the picture's observation

[...]

These expressions violate both the Affectedness and the Experiencer Constraints [...] In the course of their discussion of the Affectedness Constraint (which, it will be recalled, is claimed not to hold in Romance), Giorgi and Longobardi want to show that the Italian equivalents of (76) are fully grammatical. In Italian, possessors occur prenominally only if they are pronominalized and incorporated into possessive adjectives. Giorgi and Longobardi thus need to replace the possessor phrases in (76) by possessive adjectives. Then, to establish the intended reference of the pronominalized possessors, they need to contextualize the expressions. [...] It is ironic that

Giorgi and Longobardi fail to notice that **topicalizing the possessors of the Italian sentences contemporaneously increases the acceptability of the English glosses** [the emphasis is mine, T. L.]. Here are Giorgi and Longobardi's Italian sentences, along with their English glosses.

- (77) (a) A proposito di quegli avvenimenti, il loro ricordo ancora mi spaventa
 'Concerning those events, their recollection still frightens me'
- (b) A proposito di quel problema, la sua percezione varia da individuo a individuo
 'Concerning that problem, its perception varies from person to person'
- (c) A proposito di quella fotografia, una sua attenta osservazione rivelerà molti particolari interessanti
 'Concerning that picture, its careful observation will reveal many interesting details'
- (222) [...]

Several objections may be raised in regard to the above data:

(i) Granted that the English examples are indeed acceptable, the examples merely document the acceptability of *its pursuit*, *its perception*, etc.; they say nothing of the acceptability of *music's pursuit*, *the problem's perception*. The objection misses the point. True, acceptability is enhanced if the possessor is pronominalized. Pronominalization is but one aspect of the topicalization of the respective concept. **But pronominalization does not of itself change the semantic relation between possessor and possessee** [the emphasis is mine, T. L.]. The import of the Affectedness and Experiencer Constraints is to ban from pronominal position all nominals bearing certain semantic relations to the possessee. Whether the possessor happens to be a full NP or a pronoun has no bearing whatsoever on the nature of the semantic relation [...]

(ii) Even though the English glosses in (77) are not as bad as the expressions in (76), they still remain somewhat marginal, perhaps, compared with the easy acceptability of *my recollection (of those events)*, *John's perception (of the problem)*. Again, the objection is invalid. The asymmetry in acceptability is an expected consequence of the asymmetry in inherent topicality between Experiencer and Stimulus. Given the inherent topicality of Experiencer, we may expect the one reading to be readily available, regardless of discourse context, while the other reading is sanctioned only if supported by a specially favorable discourse context (224).

I find that Taylor's arguments are valid and they refute the claim that the POSS function is semantically restricted at least in English and similar languages, if by this restricted nature we mean limitations on the thematic roles of the arguments that can be mapped onto this function. Consequently, my proposal that POSS is

unrestricted in this sense is supported by Taylor's argumentation. However, one might object to this conclusion by pointing out that even in his analysis the use of pronominal possessors is determined by (the interplay of) two general semantic features: relevance and topicality; therefore, the POSS function is semantically restricted after all. I can think of two possible answers to such an objection.

A) It seems to me to be highly unlikely that generative theories like LFG would wish to redefine their notion of the semantically (un)restricted nature of arguments radically in order to accommodate the two semantic features mentioned above. One important reason for this could be that if this redefinition took place it might affect the classification of other grammatical functions like SUBJ and OBJ, which, under general assumptions, count as semantically unrestricted. And this, in turn, might lead to the loss of several apparently valid cross-linguistic generalizations based on this widely accepted distinction between these two fundamental types of subcategorizable grammatical functions (for instance, generalizations about controller and controllee arguments, cf. section 3.1.2.4).

B) As I have already mentioned, Taylor's relevance feature might, eventually, be reconciled with a finer-grained theory of thematic roles. As far as topicality is concerned, this semantic (or rather discourse) function appears clearly distinguishable from the nature of both grammatical functions and semantic roles. Taylor's explanation of his use of the term definitely suggests this. He writes:

Admittedly, "topic", and "topicality", are notoriously difficult concepts to pin down. Here, I shall take the line that topicality pertains to discourse structure, more particularly, to "information flow" (Givón 1983; Chafe 1987), i.e., the manner in which a speaker introduces entities into a discourse against assumptions of the hearer's current state of knowledge (1994, 219).

It appears to me that the approach advocated by Taylor (1994) lends considerable independent support to my claim that in English possessive NPs headed by either derived or non-derived nouns the very same POSS function can be realized by two different means and the choice between them depends on various factors: topicality, the internal structure of the NP mapped onto the POSS function (for instance, if it contains a relative clause, it is normally the *of*-construction that is used), etc.

In the next section I will point out a favourable consequence of the assumption that the POSS function is semantically unrestricted even in English.

3.2.2.3. The POSS Condition in NPs

In section 3.1.2.2, I argued that in Hungarian NPs headed by event nominals the POSS function is as obligatory as the SUBJ function in clauses. This is expressed by the Possessor Condition in (42), repeated here as (78) for convenience.

- (78) Possessor Condition:
Every event nominal predicator must have a Possessor.

It is the argument corresponding to the subject argument of an intransitive input verb and to the object argument of a transitive input verb that will receive the POSS function in these NPs.

As far as I am aware, all previous analyses of the English NP have considered the POSS constituent optional, and thus the parallel between English and Hungarian event nominals seems to break down. However, if the assumptions briefly discussed in section 3.2 prove to be tenable, the Possessor Condition can be extended to English, too.

Let us now take some crucial examples from both languages.

- (79) (a) a vendégek(nek a) megérkezés-e
the guests(dat the) arrival-their

(b) the guests' arrival

(c) the arrival of the guests
- (80) (a) a város-nak az ellenség által-i elpusztítás-a
the city-dat the enemy by-aff destruction-its

(b) the city's destruction by the enemy

(c) (the) destruction of the city by the enemy

(d) the enemy's destruction of the city

My claim is that the *of*-phrase in (79c) and (80c) realizes the same POSS function as the *'s*-construction in (79b) and (80b). On the other hand, the *of*-phrase in (80d) expresses the OBL_{th} function.

It appears to be a general rule that, in the presence of an *'s*-constituent, the *of*-construction can only realize this function. This can be explained along the following lines. Note that (80d) cannot have a reading on which 'the city destroyed the enemy'. This reading would be available if the *of*-construction realized the POSS function and the *'s*-constituent the OBL_{th} function, or if both of them expressed POSS. The former theoretical possibility is simply not available in English, while the latter would violate a very strong cross-linguistic generalization to the effect

that the same grammatical function cannot be assigned to more than one argument within the same argument structure.

As regards my assumption that the very same grammatical function (POSS) can be realized by two different forms (*'s* genitive and *of*-constructions) and the very same form (*of*-constructions) can realize two different grammatical functions (POSS and OBL_{th}) is a commonplace in LFG theory (as opposed to GB, which derives grammatical functions from structural positions). At the end of this section I would like to point out briefly that the corresponding data from Japanese lend some support to the second half of this claim. Consider the following Japanese noun phrase (the example is from Iida 1987, 102).

- (81) Roomajin no machi no hakai
 Romans gen city gen destruction
 'the Roman's destruction of the city'

What is important for our purposes is that the 'subject' and 'object' arguments of the derived nominal are expressed in the same form; however, given the Biuniqueness Condition in LFG (or its equivalent in other theories), grammarians investigating Japanese postulate that the identical forms realize different grammatical functions. Ishikawa (1985) calls them POSS1 and POSS2, Iida (1987) considers them to express the POSS and the OBL_{th} functions, while Saiki (1987) claims that they realize the SUBJ and the OBJ functions in NPs. No matter which analysis we adopt, the point is that in each one of them the very same form is taken to realize two different functions. I regard this as partial independent justification for my assumption that the *of*-construction in English can serve as the expression of two distinct functions (POSS and OBL_{th}).

In (82), I schematically present the relevant relationships, as I envisage them, between forms and functions within Hungarian, Japanese and English NPs.⁴⁸

⁴⁸ In the discussion of an LFG treatment of some control phenomena related to event NPs in section 3.1.2.4 I mentioned the possibility that in Hungarian, too, the possessor might be interpreted as being capable of realizing both POSS and OBL_{th} functions. If this proposal proves tenable in the light of further research then Hungarian possessors will pattern with their Japanese counterparts.

(82) (a) **Hungarian:** one form—one function ————— POSS

(b) **Japanese:** one form—two functions ————

<i>Ishikawa (1985)</i>	<i>Iida (1987)</i>	<i>Saiki (1987)</i>
POSS1	POSS	SUBJ
POSS2	OBL _{th}	OBJ

(c) **English:** two forms ————

<i>s</i> — one function	—————	POSS
<i>of</i> — two functions	—————	POSS
		OBL _{th}

4. Conclusion

In this paper I have outlined a new approach, within the theoretical framework of Lexical-Functional Grammar, to action nominalization in Hungarian. I have adopted the view that derived nominals of the event type inherit the argument structure of the input verbal predicates. Postulating that the POSSESSOR function is semantically unrestricted, at least in languages like Hungarian, I have developed a theory of mapping the arguments of derived nominals onto grammatical functions. Furthermore, I have shown that an analysis along these lines may be extended to English and other similar languages.

The other major goal of the paper has been to describe the most important features of action nominalization in Hungarian and English in a broader typological context provided by Koptjevskaja-Tamm (1993) and to point out what problems any attempt to reconcile a formal theoretical approach with these typological generalizations is bound to be faced with.

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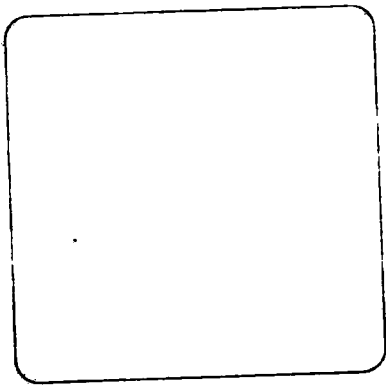
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(1) (a) A sólymaid elszálltak
the falcon-gen-pl-2sg away-flew-3pl
‘Your falcons have flown away.’

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