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PREFACE

The 7th International Pragmatics Conference took place in Budapest, Hungary, July 9-14, 2000. There are two volumes of conference proceedings containing 87 articles selected from a total of 190 papers submitted for publication after presentation at the Budapest conference. All submitted contributions were peer-refereed by two anonymous reviewers. Since we had to work under serious time limitations, it was not possible to wait for extensive revisions, and only those papers were accepted for publication which had two positive evaluations and which required only minor formal adaptations.

The present volume is the first of two, a collection of all selected articles related to the special topic of the conference *Cognition in language use*. The diversity of current cognitive pragmatic research is reflected both in the range of topics covered in the papers and the variety of approaches. The articles in this volume provide a wide spectrum of state of the art investigations into cognitively oriented pragmatics.

I would like to thank the reviewers for their willingness to read four or five papers in a month and for their evaluations. In the preparation of the proceedings I greatly appreciated the ready cooperation of the contributors. For valuable help with the technical editing I thank my colleague Tibor SZÉCSÉNYI. My thanks are also due to my students Veronika HEGEDŰS, Lívia IVASKÓ and Attila NEMESI, who assisted me in many ways with very practical tasks involved.

It is my sincere hope that the present volume will stimulate further work on the cognition in language use, on cognitively oriented pragmatics and other related fields.

Szeged, April 2001

The editor

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Selected Papers from the 7th International Pragmatics Conference

COGNITIVE DISCOURSE ANALYSIS: SOME RESULTS[1]

Andrej A. Kibrik

1. Introduction

This paper was presented at the 7th International Pragmatics Conference as a part of the panel "Where functional and cognitive grammar models meet". Thus the main purpose of this paper is to propose an answer to that question. It should be mentioned at the very outset that the formulation of the above question is inherently ambiguous since there are multiple functionalisms and multiple cognitive linguistics on the modern scholarly scene. An enumeration of all of them falls out of the scope of this paper, and I will rather confine the discussion to the kind of functionalism and the kind of cognitive linguistics that fit best my understanding of those terms.

Language has two major functions and two corresponding modes of existence that can be called, using the computer metaphor, **off-line** and **on-line**. The on-line mode of language is communicative information transmittal. The central phenomenon belonging to thismode is natural discourse, as it unfolds dynamically in real time. The off-line mode of language is information storage. The central phenomenon of this mode is the relatively stable system of lexical semantics.

Cognitive Linguistics, as an established trend of thought we are familiar with (cf. most articles in the journal "Cognitive Linguistics"), has mostly addressed the off-line phenomena. For example, the influential work by Lakoff addresses, first and foremost, lexical semantics. So far, the practice of Cognitive Linguistics has been ignoring natural discourse data, and not being interested in discourse phenomena. (Some exceptions to this tendency have been collected in Goldberg (ed.) 1996 and van Hoek, Kibrik, and Noordman (eds.) 1999.) This practice may suggest that the communicative on-line use of language is a "less cognitive" phenomenon than information storage and conceptualization, which is of course false (see Langacker 1996: 333–334). Despite such limitation in scope, the crucial role of Cognitive Linguistics has been calling

[1] The research underlying this paper was supported by grant 459/1999 from the Research Support Scheme of the Open Society Foundation (Soros Foundation).

attention to cognitive explanation of linguistic phenomena as the central type of explanation.

Functional linguistics, on the other hand, paid a lot of attention to on-line phenomena, that is, natural discourse. Sometimes Functionalism is even identified with discourse studies (which is an exaggeration). The main import of Functionalism is empiricism, orientation toward naturally occurring data, as well as search for explanations for observed phenomena in the "ecological" context of language in use. The kinds of explanations proposed in functionalist work have never been entirely separated from cognition, but functionalist studies have often been quite unversed in cognitive analysis. (Some exceptions include Tomlin 1994, Chafe 1994, Dickinson and Givón 1997.)

In this paper I do not further inquire into intricacies of the recent history of scholarly thought that led to the formation of two such traditions as Functionalism and Cognitive Linguistics. I am convinced that these two trends of research can and should be combined, and will demonstrate concrete examples of how that could be done.

Specifically, I demonstrate a number of studies that belong simultaneously to both Functional and Cognitive Linguistics and thus eliminate that distinction. I argue for the discipline that might be called **cognitive discourse analysis**. I try to demonstrate that cognitive discourse analysis is:

- as legitimate as a cognitive approach in semantics
- useful for both cognitive agenda and functionalist discourse analysis
- building new links with related disciplines such as psychology and cognitive science
- shedding light on fundamental cognitive phenomena such as knowledge representation, memory, etc.

This paper overviews several studies by myself and my co-workers in the field of cognitive discourse analysis.

2. A model of discourse production

In this paper I operate on the basis of the following tentative diagrammatic representation of the process of discourse production, comprising four levels:

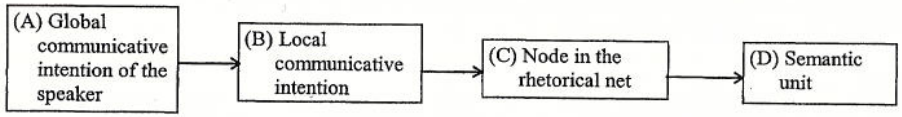

Figure 1. *A tentative four-level model of discourse production*

Arrows in Figure 1 should be interpreted as 'give rise to'. For example, the global communicative intention of a speaker can only be fulfilled if split into lower-level local communicative intentions. Each of the four functional levels depicted in Figure 1 is formally realized by a discourse constituents of a certain size. Level (A) corresponds to discourse as a whole. Level (B) corresponds to discourse macro-units, such as episodes, paragraphs, or adjacency pairs. Level (C) corresponds to discourse micro-structure

consisting of intonation units or clauses. [I presume Rhetorical Structure Theory by Mann and Thompson as the model used at this level; see discussion in section 4 below.] Finally, level (D) corresponds to the smallest formal elements – lexical or grammatical choices.

In sections 3, 4, and 5 below I will outline three empirical and cognitively based discourse studies by myself and my collaborators addressing transitions between the levels (A) through (D) (see Figure 1). These three studies address the transitions A → B, B → C, and C → D, respectively.

3. Discourse macro-structure as a reflection of knowledge representation: The global structure of Russian informational TV interviews

In a study of the **macro-structure** of Russian informational TV interviews (Kibrik in press) I present the hypothesis that discourse macrostructure is a direct mapping of the intentional structure (for a number of related approaches see Cohen, Morgan, and Pollack 1990). Discourse as a whole reflects the **global** communicative intention of the speakers, and macro-units of discourse reflect more **local** communicative intentions. Below I suggest that invisible communicative intentions (henceforth CIs) can be fairly objectively studied and can be used to explain overt discourse structure.

In an informational interview, the main communicative intention of the interviewer (Ir) boils down to filling the gaps in his/her (and the audience's) knowledge base with the help of the respondent (Rt). Therefore, in order to understand the CI structure one needs to understand the underlying knowledge representation in the Ir. There is always some set of data related to the Rt that the Ir originally has: in order for an interview to take place, the Ir's and the audience's pool of knowledge related to the Rt must not be entirely empty. At the same time, there must be some missing elements such that the Ir needs in order to complement his/her knowledge base. These missing elements predetermine the specific CIs of the Ir in the course of an interview.

I will call the fragment of encyclopedic knowledge related to the Rt, the **basic frame**. Examples of basic frames are: the Rt's experience as a cosmonaut; the Rt's professional life; the Rt's political program etc. etc. The **global CI** underlying an informational interview as a whole can be generalized in the following way:

- to fill particular gaps in the Ir's basic frame related to the Rt

This formulation is most general and can be specified in accordance with the nature of information being retrieved from the Rt. For example, frequently the Ir does not have a specific frame related to the Rt in advance, but rather has a stereotypical frame, which needs to be mapped onto a specific frame in the course of interaction.

The global CI is broken down into **local CIs**. Local CIs correspond to particular gaps in the Ir's basic frame, and thus are deducible from the global CI. The dynamics of CIs in discourse can be represented by a tree like in Figure 2 below.

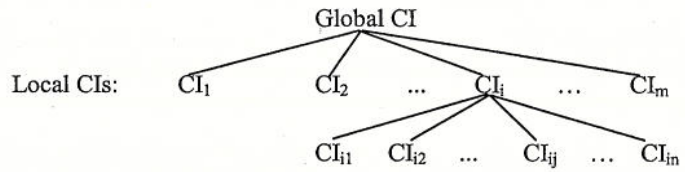

Figure 2. *The dynamics of CI deduction in discourse*

More than one level of local CIs can be distinguished, as represented in Figure 2: a local CI immediately deducible from the global CI (CI_i) can give rise to a series of lower-level CIs.

Local CIs are directly mapped onto discourse structure. To each local CI a portion of discourse corresponds, that I call a **quantum**. "Quantum" is meant to be the basic notion in the realm of discourse macrostructure, and a cover term for such concepts as "paragraph" (in expository prose), "adjacency pair" (in conversation), and the like. In interviews, a quantum contains at least a pair of interlocutors' turns: a question by the Ir plus a reply by the Rt. After the Ir's local CI is satisfied, the corresponding quantum ends, and the Ir proceeds with the next local CI and the next quantum. Frequently it takes more than one dialogic turn pair to complete a quantum.

Thus the sequence of the Ir's questions in an actual interview finds its explanation in the invisible, but powerful communicative intentions and knowledge structures.

Let us take an example. In the late 1980s, the first free (or quasi-free) parliamentary elections took place in the Soviet Union. (In the "classical" Soviet years the elections were purely fictitious since there was always only one candidate on a ballot.) Of course, a chance to choose government for the first time was extremely fascinating to many people, and the public interest to the issues of election was very high. During and after the first campaigns, interviews with candidates and newly elected congress members were very popular in the media. While the business of democratic elections was new to the public, the general understanding of the basic procedure was already there. When an interviewer conducted an interview with a newly elected congress member (deputy), s/he had in mind the basic frame NEW DEPUTY of the following design.

(1) NEW DEPUTY
  a. Campaign
  b. Sphere of interest (or expertise)
  c. Proposed program

Slot (1a) of the basic frame can be further split into lower-level slots:

(1a) Campaign of a new deputy
  a1. region
  a2. competitors
  a3. strategy

This kind of knowledge representation was consistently reproduced in multiple interviews taken from just-elected deputies in the late 1980s. An Ir, taking an interview from deputy X, would go through all slots in frame (1), including subframe (1a), and ask

the corresponding questions. After having received an answer, the Ir would proceed with the following slot of the frame. Thus we can clearly see the triad "knowledge representation — CIs — discourse quanta" and the ways how knowledge representations are ultimately mapped onto discourse structure through the mediation of CIs.

There is, however, one further complication in discourse structure and in the system of local CIs. The local CIs like those discussed above are planned, or deducible from the global CI. In the course of interaction with the Rt, the Ir occasionally encounters pieces of information that are unexpected, puzzling, worldview-changing, inconsistent, contradictory, or otherwise disturbing. In reaction to such information Irs typically pose questions that are in no way deducible from the global CI. Such questions represent local CIs that may be called **spontaneous**. Quanta resulting from spontaneous local CIs are linearly nested, or embedded, inside the planned, or deducible, quanta. After the Ir adapts the disturbing information, s/he resumes the planned local CI that was in the queue or interrupted at the time of digression. Some "worse" Irs may let the Rt to put them on a side track, and never return to the interrupted local CI, and, as a result, fail with their global CI.

This model may be illustrated with an example – an interview with the congress member Evdokija Gaer taken in June 1989, soon after her election to the congress. Below a shortened and simplified version of the interview's transcript is given. I include here only the Ir's cues since the Rt followed faithfully the Ir's leads.

(2)

A2 Ir: *Kto byl vashim sopernikom v predvybornoj bor'be?*
Who was your rival in the election campaign?

A3 Ir: *Kakim oruzhiem vy ego pobedili?*
With what arms did you beat him?[2]

B Ir: *Na protjazhenii desjatiletij my prixodili v umilenie ot kartiny,*
For decades we were being touched by the picture

kotoruju nam pokazyvali po televizoru,
shown to us on TV

kak bystro idut po puti progressa narody Krajnego Severa i Dal'nego Vostoka.
on how fast the peoples of the Far North and Far East go along the path of progress.

Nu sejchas uzhe somnitelen sam progress,
Well now the progress itself is in doubt

i voobshche vsegda li vo blago progress v takix voprosax?
and in general is the progress always beneficial in such issues?

B′ Ir: *A naskol'ko spravedlivo to chto vy skazali starshie brat'ja –*
And how justifiable is what you said "elder brothers" –

mogut li byt' sredi narodov starshie i mladshie brat'ja?
can there be elder and younger brothers among peoples?

[2] This is a joke relying on the fact that Gaer's rival was a military person.

C Ir: *Vozvrashchajas' k vashemu vystupleniju na s"ezde,*
Going back to your speech at the congress

nu nas vsegda, moe vo vsjakom sluchae pokolenie, vospityvali v ponjatii,
well we were always, at least my generation, upbrought in the notion
chto rezervacija eto uzhasno, chto eto ravnoznachno diskriminacii,
that reservation is terrible, that it is equivalent to discrimination,

a v vashem vystuplenii na s"ezde prozvuchala
and in your speech was mentioned

nu esli ne podderzhka etomu ponjatiju to vo vsjakom sluchae vot eta ideja.
well if not a support to that notion but at least that idea.

There are five quanta in this interview, and five questions posed by the Ir. The first two quanta (A2 and A3) directly correspond to slots (a2) and (a3) of the frame given in (1 – 1a). (Slot (a1) did not produce a quantum because the origin of the Rt from the Far East was widely known at that time and was the obvious reason for the Ir's interest in having this particular interview.)

The following quantum (B) corresponds to slot (b) of the basic frame: it addresses the Rt's area of expertise (the ecology of minority nations in Siberia). When replying to this Ir's question the Rt used the popular Soviet cliché "the Russian people as the elder brother of the minority peoples". This expression aroused the Ir's interest and gave rise to a spontaneous Ir's CI to check whether this paternalist attitude is a legitimate one. Hence the embedded quantum B′.

Finally, the last quantum C is clearly connected to slot (c) of the basic frame: the Ir inquires into what the Rt's suggestions are as concerns the social reforms for the minority peoples.

The correspondences between the elements of the basic frame and the quanta of the interview are summarized in (3) below.

(3)

The elements of the basic frame			The elements of the interview
NEW DEPUTY			
a.	Campaign		
	a1.	Region	*known*
	a2.	Competitors	Quantum A2
	a3.	Strategy	Quantum A3
b.	Sphere of interests (or expertise)		Quantum B
c.	Proposed program		Quantum C
Spontaneous CI: check the paternalist attitude			Embedded quantum B′

In this study, I attempt to demonstrate that discourse macrostructure cannot be explained without reference to cognitive structures of discourse participants. Communicative intentions, as the speakers dynamically unfold them in time, shape the overt discourse form and predetermine the discourse macrostructure. In order to see this connection more clearly, a relatively regulated discourse genre was selected, namely the interview. Interviews unlike e.g. ordinary conversations are essentially controlled by only one participant, namely the interviewer. Consequently, normally there is little or no conflict between separate sets of communicative intentions, and a connection between the intentional structure and the discourse structure can be seen more clearly.

The present model is intended as an explanation of the structure of interviews, but also of a broader range of discourses. Other dialogic genres can be analyzed by the same basic model, but a greater number of complicating factors must be taken into account. In particular, the problem of interacting (and often contradictory) CIs of two or more discourse participants should be addressed. When different participants have their separate CIs, the resulting discourse structure is a result of complex negotiation and compromise.

4. Children's night dream stories: A study of discourse microstructure

In a study conducted by a group of linguists and clinical neurologists, we look at **cognitive patterns of narratives** told by neurotic and normal children (in Russian). We are particularly interested in discourse **micro-structure** that we represent as a rhetorical net of clauses (elementary discourse units). The purpose of this project is to investigate discourse structures in children's night dream stories and identify differences between normal and neurotic children. The initial hypothesis is that normal and neurotic children may produce substantially divergent discourse structures, and that differences between them can be captured in terms of Rhetorical Structure Theory by Mann and Thompson (see below). If so, then discourse structure can shed light on the cognitive structures of the narrators' minds.

The data base for this study is about 100 children's night dream stories collected by neurologists according to a special methodology from just-awakened children (Korabelnikova 1997). 56 stories belong to children with diagnoses neuroses, and 47 constitute the control group of normal children. Neurotic children have different kinds of neuroses, including depression, hysteria, different kinds of phobias, asthenia, hypochondria, etc. Neuroses are always based on some kind of intra-psychic conflict, for instance between the person's desires and received social norms. Of course such internal conflict cannot be observed directly, but only through some overt behavior. Discourse is one of the kinds of such behavior.

The corpus of stories has been transcribed in accordance with a specially designed system of discourse transcription. Each story was broken into discourse units (lines) that are further used as elementary nodes in a rhetorical net.

The analytic tool we are using to describe the discourse structure is Rhetorical Structure Theory (RST) developed by William Mann and Sandra Thompson (see e.g. Mann, Matthiessen, and Thompson 1992). In my opinion, that theory is the best theory of discourse structure available at the present time. Its main advantage is that it provides a unified method for representing relations between discourse segments at all levels. RST postulates a set of rhetorical relations that are applicable to discourse units of any size – from minimal ones (normally clauses) to maximal ones (immediate constituents of discourse).

The canonical set of rhetorical relations postulated by the authors of RST includes over 20 relations such as joint, sequence, elaboration, cause, condition, concession, etc. However, that set turned out to be insufficient for our corpus, and we have supplemented it with a number of additional relations, such as begin, end, setting, discord and some other.

What does RST give us in terms of reconstruction of cognitive processes in the speaker? The fundamental idea of RST is that discourse segments are added by the speaker not randomly but in order to contribute to realization of his/her communicative intention. When we postulate a rhetorical relation between discourse units X and Y we thus claim that Y was added to X by the speaker in order to make a concrete step toward realization of his/her communicative intention. Thus RST allows us to reconstruct the cognitive processes in the speaker as s/he unfolds the underlying communicative

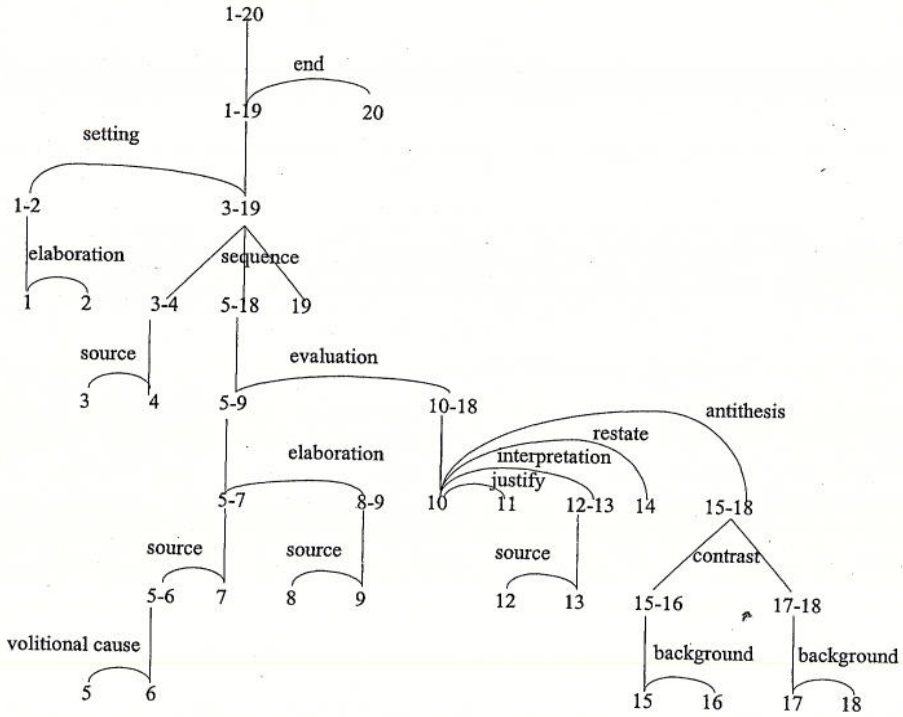

Figure 3. *A rhetorical tree depicting a typical neurotic night dream story*

intention into a rhetorical net.

By means of mere illustration, consider one rhetorical tree of a story in Figure 3. Each node in the tree in Figure 3 designates one discourse unit. There are 20 discourse units in the fragment depicted in Figure 3, and elementary discourse units cluster into larger units, until the overall fragment 1–20 is formed.

In the thesis of T. Kal'kova (2000) adversative constructions in the corpus have been analyzed. For example, the adversative particle (conjunction) *no* 'but' occurs in the neurotic texts about four times more frequently than in the texts of normal children. The rhetorical relations underlying the use of *no* include concession, contrast, and (the newly introduced relation) discord. The statistically significant difference between the

frequencies of those relations in the stories by normal and neurotic children suggests that the worldview of neurotic children contains multiple instances of incoherence and contradiction.

A. Litvinenko in her thesis (2000) compared the stories by normal and neurotic children in terms of their volume. She proposed several measurements of volume. The first measurement is the story length in elementary discourse units. The length of the story diagrammed in Figure 3 is 20. The stories by neurotics are almost twice as long on the average (25) than those by normal narrators (13.5).

Another measurement is maximal story depth, i.e., the vertical length of the maximally long branch in the RST tree of the story. The maximal depth of the story diagrammed in Figure 3 is 7. The mean and median maximal depths in younger and older groups of narrators are shown in Table 1 below.

The neurotics' stories are substantially deeper that those of normal children. Furthermore, in the normal children's stories, maximal depth does not change with age while in the neurotics' stories it grows further. The differences between the normals' and the neurotics' stories in terms of length and maximal depth are statistically significant.

	Neurotic children		Normal children	
	Younger group	Older group	Younger group	Older group
Mean maximal depth	5.81	7.53	4.12	4.5
Median maximal depth	6	8	4	4

Table 1. *Comparative depths of the neurotics' and normals' stories (after Litvinenko 2000: 74)*

The third measurement is the degree of vertical branching of the text. It captures the proportion of asymmetric rhetorical relations that complicate the flat basic structure of a narrative. Neurotic narrators produce more vertical, more branching stories than normal children that produce more flat stories. Litvinenko also pointed out some rhetorical relations that are especially common in the neurotics' stories compared to the normals' stories, in particular contrast, cause/result, and background-OUT (indication of the real-life context of the dream situation).

These results allow one to draw certain conclusions about the neurotic children's cognitive structure, such as a greater complexity of narrative thinking, more detail in visualization of events, the concern for indicating causality and connections between dreams and reality.

We also compared the stories by normal and neurotic children using different methods of discourse analysis, in particular genre-specific schemata of narratives. As is well known (Labov 1972, Chafe 1994), the classical narrative schema comprises the following elements:

- *Schema A:* beginning – setting – complication – climax – denouement – coda.

However, dream stories differ significantly from regular narratives in not having the triad "complication – climax – denouement". In dream stories, the narrative nucleus typically consists of a sequence of narrative clauses without a clear internal structure:

- *Schema B:* beginning – setting – narrative sequence – coda.

The majority of narratives by normal children follow schema B. A smaller fraction is produced in accordance with the classical schema A. However, in neurotic children's stories the following schema is very typical:

- *Schema C:* beginning – setting – complication – narrative sequence – coda.

In other words, neurotic stories typically contain a complication that is not resolved within the dream. This may be an iconic manifestation of fundamental conflicts always present in the cognitive structure of a neurotic child and not finding a resolution.

5. Referential choice in discourse and issues in working memory

This study (see also Kibrik 1996, 1999) addresses a classical issue in linguistics: **choice of referential expression** in discourse. When the speaker needs to mention referent X at a certain point in discourse s/he has a number of options, such as an (appropriate) full NP, pronoun, or zero form. That choice is certainly non-arbitrary. But it is also far from elementary: many approaches attempting to posit one factor of referential choice have failed to account for the variety of observed facts. My study is based on the following set of assumptions:

1) An adequate model of referential device selection should be able to account for every occurrence of a referential device in the sample discourse, rather than content with 90% of hits.

2) Referential device selection is directly influenced by the cognitive structures in the speaker at the moment of speech, rather than by look-back in the previous text.

3) There are potentially multiple factors determining the speaker's current cognitive structures, rather than one omnipotent factor.

4) The primary cognitive determiner of referential device selection is **activation** of the referent in question in the speaker's working memory. Activation is a matter of degree.

One element of that set of assumptions requires a more extensive commentary: the notion of working memory.

Working memory (WM; otherwise called short-term memory or primary memory) is a small and quickly updated storage of information. The study of WM is one of the most active fields in modern cognitive psychology (for reviews see Baddeley 1986; Anderson 1990: Ch. 6; for some recent approaches in psychology and neuroscience see Gathercole (ed.) 1996, Smith and Jonides 1997).

The range of classical questions about WM includes, inter alia, the following:

- CAPACITY: how much information can there be in WM at one time
- CONTROL: what is the mechanism through which information enters WM
- FORGETTING: what is the mechanism through which information quits WM

A contribution to these classical questions I propose below is a side product of a linguistic study (described in Kibrik 1996 and outlined below) that relied, in its turn, on cognitive-psychological work. At some point I discovered that the linguistic model I developed to explain and predict discourse phenomena has implications for more general cognitive issues.

Tomlin and Pu 1991 have proposed that referential choice in discourse is dependent on the current memorial status of the referent. (In somewhat different terms similar hypotheses were put forward in Kibrik 1987; Gordon, Grosz and Gilliom 1993; Gundel, Hedberg and Zacharski 1993; Chafe 1994; Givón 1995: 380ff.). This hypothesis amounts to the following:

- If a referent is currently highly activated in the speaker's working memory, then it is coded by a reduced NP (anaphoric pronoun or zero), and if the referent's activation in the WM is below a certain threshold, it is coded by a full NP.

This hypothesis presupposes that entities can pertain to WM to different degrees and, therefore, the boundaries of WM are not clear-cut. For example, Chafe (1994) distinguishes three degrees of activation of referents: active, semiactive, and inactive. In the present study, activation is interpreted as gradual closeness to the center of WM. Activation is maximal when the entity is in the center of WM, and minimal when the entity is totally out of WM; however, all intermediate degrees are possible, too.

Activation is a notion used in both neuropsychology and linguistics. When an item is in the person's working memory, it is activated. This can be a result of visual processing, or imagery, or recall, or discourse production and comprehension.

In Kibrik 1996 I developed a model of referential form selection that calculates activations of referents and thus predicts/explains referential choices made by the speaker in the course of discourse production. A number of calculable factors contribute to the integral activation score of a referent at a particular moment of time (moments of time roughly equaling clauses). In particular, the model I proposed for Russian narrative discourse includes seven factors related to the properties of either the previous discourse, such as distance to the antecedent (three different measurements of distance are used) and syntactic and semantic role of the antecedent, or stable features of the referent itself (such as animacy). The list of factors was identified empirically as necessary and sufficient to make predictions about referential choices. All the factors contribute to referential choice, but not directly. They give rise to an integral characterization of a referent at the given moment in discourse. This integral characterization is called **activation score** (AS), that is, the status of the referent in the speaker's working memory. AS varies between 0 and 1. If AS=0, the referent is completely out of the speaker's WM; if AS=1, the referent is maximally activated in the WM. All intermediate grades of activation are possible, the minimal point on this scale accepted to be 0.1.

Each factor can be realized by two or more different values. For example, linear distance to the antecedent measured in discourse units can be 1, 2, 3, or over 3. To each of the values a certain numerical activation weight corresponds, positive or negative, that can contribute to AS in individual instances.

Activation factor	Factor's value	Numerical activation weight
Rhetorical distance to the antecedent	1	0.7
	2	0.4
	3	0
	4+	–0.3

Table 2. *An activation factor, its values, and the corresponding numerical activation weights*

Table 2 provides an illustration of how activation factors are organized. The structure of the most powerful activation factor (rhetorical distance to the antecedent), including its possible values and the corresponding numerical activation weights, is shown in Table 2.

Once each factor's values is operationally identifiable at each point in discourse for each referent, one knows all the relevant numerical weights. These weights are summed up, and give rise to the current AS of the referent. The referential options available to the speaker in this situation are provided by so-called referential strategies, summarized in the chart in Figure 4. These strategies guide the choice between the full NP and the primary Russian reduced referential device: third person pronoun *on* (masculine; feminine *ona*, neuter *ono*, plural *oni*). Figure 4 demonstrates the referential strategies as developed for Russian narrative discourse in Kibrik 1996.

	full NP only				full NP most likely, *on* questionable			either full NP or *on*			*on* only
AS:	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1

Figure 4. *Referential strategies in Russian narrative discourse*

That is, if AS is maximal (1), the third person pronoun only should be used. When AS is relatively high (0.7 through 0.9), both a pronoun and a full NP are appropriate. If AS is in the middle of the scale (0.4 through 0.6), a pronoun is unlikely (probably depending on the idiolect), and if AS is low (0.3 or less), pronouns are ruled out.

In Kibrik 1999 I applied the same approach to English data, and proposed a numerical system of factors and referential strategies, similar to the one just described but different in details.

Since that model is able to calculate the activation score for each referent at any time, it can be used to inquire into several problems of working memory.

Capacity

The system of activation factors and their numerical values was developed in order to explain the observed and potential types of referent mentions in discourse. In the first place, only those referents that were actually mentioned in a given discourse unit by the author were considered. But this system was discovered to have one additional advantage: it operates independently of whether a particular referent is actually mentioned at the present point in discourse. That is, the system can identify any referent's activation at any point in discourse. For example, the AS of the referent "Margaret" can be identified for every discourse unit no matter whether the author chose to mention "Margaret" in that unit.

If so, one can find out the **grand activation** — the summary activation of all referents at a given point in discourse. Grand activation gives us an estimate of the capacity of the specific-referent portion of WM. Figure 5 depicts the dynamics of activation processes in a portion of English discourse. The activation of two major protagonists' is demonstrated, as well as grand activation. Observation of the whole

array of data like those illustrated in Figure 5 makes it possible to arrive at several important generalization.

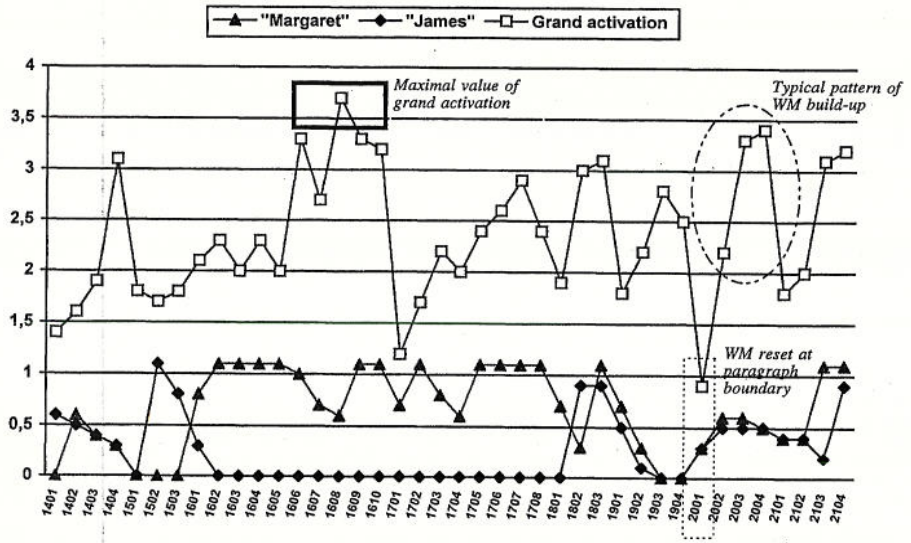

Figure 5. *Dynamics of the protagonist referents' activation and grand activation in a fragment of an English children's story*

First, grand activation varies within the range between 1 and 4, very rarely exceeds 3.5 and has the mean of a bit over 2 (remember that 1 is the maximal activation of one referent). We thus have an estimate of a very important portion of WM. Second, grand activation varies much less than activation of individual referents which fluctuates between 0 and 1 all the time; the maximal grand activation value is only about 3 to 4 times greater than its minimal value. Finally, there is a clear role of paragraphs in the dynamics of WM. The strongest shifts of grand activation are found at paragraph boundaries; it is evident in the graph in Figure 5 that grand activation values at the beginnings of all paragraphs are local minimums. One may conclude that the cognitive function of a paragraph boundary is a threshold of activation update. At the same time, in the course of a paragraph grand activation gradually builds up from a minimal value at the beginning to a maximum that always occurs toward the end of the paragraph.

Control

The question of control of WM is the question of how information comes into WM. The linguistic study outlined above allows one to suggest a coherent model of control over working memory. Several sets of facts are relevant in this connection.

First, a number of current cognitive theories connect attention and WM. The mechanism controlling WM is what is known as attention. This view is expressed and

motivated by Baddeley (1990), Cowan (1995) and, on the neurological basis, by Posner and Raichle (1994: 173). According to the latter authors, information flows from executive attention, based in the brain area known as anterior cingulate, into WM, based in the lateral frontal areas of the brain.

Second, as has been convincingly demonstrated in the experimental study by Tomlin (1994), attention is manifested in linguistic structure by grammatical roles. Tomlin has shown that in many languages, including English, focal attention is consistently coded by speakers as the subject of the clause.

Third, it has been mentioned above that antecedent subjecthood is one of the activation factors that influence referential choice in discourse. Moreover, it is one of the most powerful activation factors leading to the selection of a reduced form of reference. In both English and Russian, antecedent subjecthood can add up to 0.4 to the overall activation of a referent. In both English and Russian discourse corpora, 86% of pronouns allowing no referential alternative have subjects as their antecedents.

If we consider these three sets of facts (the first from cognitive psychology and the last two from cognitive discourse analysis) together, they lead us to a remarkably coherent picture of an interplay between attention and WM, both at the linguistic and at the cognitive level. This interplay can be formulated as follows:

- Attention controls WM, i.e. what is attended at moment t_n becomes activated in WM at moment t_{n+1}. Linguistic moments are discourse units. Focally attended referents are coded by subjects; at the next moment they become activated (even if they were not before) and are coded by reduced NPs.

The relationships between attention and WM, as well as between their linguistic manifestations, are represented in Table 3 below.

Moments of time (discourse units)	t_n	t_{n+1}
Cognitive phenomenon	focal attention	high activation
Linguistic reflection	mention in the subject position	pronominal reference
Examples	Margaret, she	*she, her*

Table 3. *Attention and working memory in cognition and in discourse*

Forgetting

There is a long debate in cognitive psychology on two competing theories of the mechanism of forgetting (for a review see, e.g., Baddeley 1986: 6–71). The first theory, sometimes called "trace decay", suggested that forgetting is merely a function of time. The second hypothesis, admittedly a more sophisticated one, proposed that information gets forgotten not simply because of the time factor but due to interference of or displacement by other incoming information.

The factor of time is captured in the model outlined above by means of the distance factors (remember that there are several distance measurements). As distance to the antecedent becomes greater, activation goes down. That is, the model developed on the basis of discourse evidence apparently is in line with the trace decay hypothesis. A limitation on the number of concurrently activated referents does not necessarily require

the concept of displacement or interference. It can be explained by the already stated limitation on the capacity of WM. Since grand activation rarely exceeds 3, three strongly activated referents is about as much as there can be in discourse at one time. And this is due not to the displacement effect but to the balanced system of activation factors that activate and deactivate referents in accordance with the limits of the WM store.

If the reasoning leading to these conclusions is correct, that means that linguistic discourse analysis can indeed contribute to explorations of the human cognitive system.

6. Conclusion

My conclusion in this paper is that differences between the cognitive and the functionalist approaches in linguistics are not fundamental and are primarily motivated by historical reasons. Differences between them are probably destined to disappear. That is only natural: while Functionalism, by definition, is interested in the functioning of language, that functioning cannot be implemented anywhere besides the human cognitive system. This paper presents several studies that eliminate ephemeral differences between those two kinds of approaches.

I would like to suggest that the established "Cognitive Linguistics" should be expanded and viewed as a part of a broader field — cognitive linguistics (with lower case initials); the latter would also include work in cognitively oriented discourse analysis, such as Chafe 1994, Tomlin 1994, Givón 1995: Ch. 8, inter alia. That kind of work most definitely can and should be termed cognitive linguistics, but for tricky historical reasons currently it is not included into "Cognitive Linguistics" in the narrow sense.

The three studies I have described in this paper have been originally studies in discourse analysis which is the core of the functionalist agenda. However, I hope to have demonstrated that they have far-reaching consequences for the cognitive theory of language and for cognitive science in general. This is my understanding of how functionalist and cognitive lines of research may and should be combined.

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THE LANGUAGE OF SPACE IN HUNGARIAN

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1. INTRODUCTION

Hungarian played an interesting role in the formation of early theories about the relationships of cognition and language. Melania Mikes (1967) has showed in her studies of Serbian-Hungarian bilingual children that the use of locative suffixes appeared earlier in the Hungarian than in the Serbian speech of the same children of ages 2-3. In the interpretation of Slobin (1973, Johnston and Slobin 1979) this is explained by the fact that in Slavic the child has to co-ordinate two linguistic devices, the preposition and the case marker, while in Hungarian coding is done exclusively at the end of the word. This was interpreted to imply that the development of spatial language justifies both the driving role of cognition, and the relative independence of specifically linguistic factors. Hungarian provides a good testing ground for some of the claims regarding the language and cognition relationship in this domain, since a formally rather homogenous field is used and acquired, thus as MacWhinney (1976) observed, summarising diary data and some of his observational files:

> "Hungarian inflections differ little in terms of formal complexity. Thus, differences in their emergence can be attributed to semantic-pragmatic factors." (MacWhinney, 1976, p. 409).

Both experimental studies (Johnston and Slobin, 1978, Landau, 1994) and analysis of longitudinal data (Choi and Bowerman, 1991, Sinha, Thorseng, Hayashi, and 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. Our studies use Hungarian data along this line of research.

In 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