ADVANCES IN CONSCIOUSNESS RESEARCH



Language structure, discourse and the access to consciousness

Edited by Maxim I. Stamenov

LANGUAGE STRUCTURE, DISCOURSE AND THE ACCESS TO CONSCIOUSNESS

ADVANCES IN CONSCIOUSNESS RESEARCH

ADVANCES IN CONSCIOUSNESS RESEARCH provides a forum for scholars from different scientific disciplines and fields of knowledge who study consciousness in its multifaceted aspects. Thus the Series will include (but not be limited to) the various areas of cognitive science, including cognitive psychology, linguistics, brain science and philosophy. The orientation of the Series is toward developing new interdisciplinary and integrative approaches for the investigation, description and theory of consciousness, as well as the practical consequences of this research for the individual and society.

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Language Structure, Discourse and the Access to Consciousness

LANGUAGE STRUCTURE, DISCOURSE AND THE ACCESS TO CONSCIOUSNESS

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For Reneta and Mikhail

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tried to put together this book. I would like, however, explicitly to point out that the two enterprises (the collective volume and the conference) were realized as two completely independent ventures.

I have been quite definitely, albeit indirectly, influenced also by my involvement in putting together another collective volume, "Fractals of Brain, Fractals of Mind" (Amsterdam & Philadelphia: John Benjamins, 1996) which Earl Mac Cormac and I have edited. It might seem quite difficult, if at all possible, to find two more incommensurable topics than fractal-like textures of visual perception and the syntax/semantics interface in the on-line implementation of speech. Actually, I came to the conclusion that their proper conceptualizations complement each other. Otherwise, one would end up with quite a fragmented representation of what 'the working space of mind' looks like. I will have more to say on this topic on another occasion.

Finally, I would like to thank my wife Reneta and my son Mikhail for their kindness, warmth, support and patience which have ultimately made the production of this volume possible. This book is dedicated to them.

Introduction

Linguistic literature on the problem of language and consciousness is, by all means, not a voluminous one. One can scarcely find an article or a book explicitly dedicated to this topic.[1] One reason for this state of affairs seems to be the shyness of linguists facing a concept like 'consciousness'. It could be that they are more aware of the vagueness and the polysemies involved in this term than the specialists who work in other scientific fields.

One may find another reason for the *status quo* in the traditional stance of mapping form and meaning in linguistics that has been the (with some very good reasons for it) the following: There is a distinction in linguistic meaning if and only if there is a distinction in the corresponding formal expression. Adding a discussion on (the place of) consciousness would complicate a story which was and has been controversial in its own terms: Componentialism in form/meaning parsing is hardly compatible with our experience of conscious mental states. A possible flexible interface between form and meaning and their potential multiple accessibility to consciousness have never been discussed in a systematic way because that would require an approach which until very recently would have gone far beyond the domain of the professional competence of a linguist, a psycholinguist, or a neurolinguist (cf., however, Chapman & Ulatowska, Hillert, and Zelazo & Frye, this volume).

If we further consider the fact that even ten years ago the use of the word 'consciousness' in academic discourse was looked upon with suspicion, we can only very well understand the cautious attitude of linguists and their desire not to become involved in such risky enterprises, where one might well claim to be explaining the obscure (= syntactic and semantic structure in its virtually infinite capacity of variation and nuancing of form and meaning) with the even more obscure (= the phenomena and structure of consciousness).

The position of linguists finds support and justification in the attitude of cognitive psychologists and authors in adjacent disciplines and fields of research. For many decades they displayed quite commendable skills when it came to avoiding the use of the concept of 'consciousness' and inventing, when

they could not escape it, a whole set of euphemisms for it. In this connection, Endel Tulving recently wrote that

> [...] the students of metacognition and metamemory today still use behavioristically safe expressions, such as memory "monitoring", mnemonic "behavior", memory "search", tip-of-the-tongue "states", and tip-of-the-tongue and feeling-of-knowing "experience". Do they use these expressions deliberately in order to avoid the big bad "c" word? Or do they take it for granted that when they refer to monitoring, and judgments, and experience, everyone understands that they are indeed talking about conscious monitoring, conscious judgments, conscious experience? But if so, and if it is true that consciousness is a necessary condition of metacognitive judgments and metacognitive experiences, why not claim explicitly that conscious awareness is one of the defining attributes of the domain of metacognition? (Tulving 1994:ix)

This citation refers not only to the topic of 'metacognition', but also (with some exceptions, though) to other phenomena of cognition, emotion, imagination, and perception which are accessible to consciousness and which we experience every day of our lives.

In these circumstances, the first to take the lead with the problem of language and consciousness were the philosophers of language and mind (cf. e.g., Butchvarov, this volume; Rosenthal 1990; Dennett 1991; Searle 1992; Ellis 1995; Gennaro 1996; Newton 1996, etc.). Their orientation into the specificity, varieties and nature of natural language(s) structure, however, has not been developed in-depth (and there is nothing curious about that, since this is not supposed to be their business). There is nothing wrong in a philosopher discussing aspects of natural language structure and the ways of its accessibility in mental representation, but the linguists who follow their lead might very well be inclined to sacrifice the richness of the data or, worse, try to fit the data into some philosophical or 'cognitive' theory of the way language structure is supposed to be accessible or not accessible to consciousness (that already happened several times in the last decades with different topics, especially in semantics and pragmatics).

It remains a duty of linguists to prove that they should not only follow the lead of others and supply them with data for their theorizing, but also take the initiative in their own hands. The time has come for linguists to prove that they have a 'stronghold' in the research area of consciousness and to come forward with their own vision of the hierarchy of structures and processes in-

volved in consciousness formation which vision is most detailed, accurate and amenable to experimental verification and which ranges from the production and perception of the sounds of language up to the level of intentionality in socially shared meanings.

*****

The first article in this collection is authored by Robert de Beaugrande who provides us with an overview of the orientations and attitudes toward mind and consciousness by some of the most eminent linguists of this century—Ferdinande de Saussure, Edward Sapir, Louis Hjelmslev, Noam Chomsky, Leonard Bloomfield, J.R. Firth and Kenneth Pike. The author elaborates on this topic and comes to the conclusion that the old dualisms of mental/physical or conscious/unconscious (on the side of the mental) in the theories of 20th century linguistics must give way to the study of on-line interaction between conscious and unconscious language functioning within the context of discourse processing and social interaction. The time of the rigid 'oppositions' and *ad hoc* postulation of 'unconscious systems' should remain in the past.

In his contribution Ronald Langacker discusses the relationship between grammatical and semantic structure and the way their interface becomes accessible in the conscious mental representation in the context of cognitive linguistics. In particular, he maintains that grammatical structure pivots around a subject of consciousness that conceives but is not itself (in that role) an object of conception. To my knowledge, this article is among the first ones to address this issue that have appeared in the context of current linguistic studies (cf. also Talmy 1994). The problem concerning the relationship between the grammar of natural language and the structure of consciousness is faced explicitly and in a straightforward way. Concrete data show that the analysis of syntactic and semantic patterns can give us a systematic orientation into the way conscious mental representation is structured.

One of the most important questions in the context of contemporary psycholinguistics and neurolinguistics is the relation between implicit and explicit cognition and the implied problem of how the patterns associated with structural and lexical ambiguity resolution have *access to consciousness*. At the first approximation, 'accessible' means available for selection by some other mechanism in computer information processing (or in a cognitive mechanism, if we take the computer as metaphorically representing the mind). The problem, then, is to show how consciousness could be considered as an accessing and/or selecting and/or ambiguity-resolving process.[2] In a comprehensive overview Dieter Hillert discusses the basic models of structural ambiguity resolution (the

lexical parsing model, the structural parsing model, the multiple parsing model, and the delayed parsing model) and of lexical ambiguity resolution (the serial lexical access model, the selective lexical access model and the multiple lexical access model). The author seems inclined to accept as the most plausible one the multiple resolution parallel synchronizable on-line mapping of the two types of ambiguities. If meanings are not accessed in a single step but as a pattern over a set of units, then context determines and triggers the execution of those patterns which are relevant at a certain time with a high level of flexibility of the capacities to attune to each other different levels of processing of syntactic and semantic information.

Philip Zelazo and Douglas Frye discuss a theory that connects the development of deliberate reasoning and intentional action to increases in the ability to reflect upon cognitive structures. According to their proposal (which they name Cognitive Complexity and Control Theory), ontogenetic age-related changes in behavioral control can be explained through the acquisition of increasingly complex rule systems, where complexity corresponds to the number of levels of embedding, inherent in these systems. Higher-order rules (cf. also the Higher-Order Thought theory discussed in Stamenov, this volume) mediate reflective awareness of lower-order rules and make possible a deliberate selection of lower-order rules for use. It is argued that this theory reconciles a number of alternative accounts of goal-directed activity and its ontogenetic development, including accounts that emphasize the increase in mediation, inhibition, memory, and consciousness. The importance of one of the basic notions in contemporary theorizing on the functions of consciousness, i.e., that of control, is extensively developed in relation to the no less substantial question of the management of complexity in deliberate reasoning and action.

The psychopathology of consciousness as revealed in discourse in the case of dementia is the topic of the contribution of Sandra Chapman and Hanna Ulatowska. The authors maintain that in current studies, research in discourse is one of the richest areas in neuropsychology and neurolinguistics for elucidating the complex interactions between language and cognition, and their implementation in the brain. In this chapter, the salient discourse behaviors of patients with dementia are discussed in order to gain insight into conscious mental processing. To achieve this, the authors first describe their framework of conceptualizing consciousness. The latter then is applied to the verbal behavior of patients with dementia to discuss the implications for conscious processing in this population. Discourse phenomena are illustrated with data from individuals with dementia. Finally, the authors elucidate the implications of consciousness for neurolinguistic research in a more general perspective.

Teun van Dijk offers an analysis of the contextualization of discourse within the framework of cognitive context models. He demonstrates that at all levels of discourse structure we find traces of context, or rather of the context as subjectively construed and socially constrained by the speech participants. This 'halo of conscious mental content' (or the array of mental contents in working memory) is extremely complex. It includes the assigned relevance and importance to situations, events, etc., the roles, positions and social relations of participants, the goals, intentions and purposes of participants, the group membership and social affiliation of participants, the personal association and identification with social groups, social attitudes and ideologies, and also the setting. From the perspective of the present volume, the author contributes with a discussion of the nature, levels, categories, types and strategies of processing more or less consciously of the very complex information needed in discursive interaction. The speakers and hearers would not interact intelligibly and effectively without being capable of monitoring and controling the many discourse features that signal and ongoingly construct the context. This article explicates an important feature of verbal consciousness, viz. the flexible and context-dependent management of awareness, attention and knowledge in interactive understanding.

The paper of Ivana Marková addresses the important problem of the dialogical formation of meaning in the context of social interaction and the implications of this orientation in the more general context of humanistic and social studies. The author points out that there are two different types of epistemology. Dialogism belongs to the type of epistemology which seeks knowledge of interdependent entities and can be traced in the context of social sciences back to the seventeenth century, although it was explicitly formulated in the early 20th century by Mikhail Bakhtin and the scholars of the Prague Linguistic Circle. Marková discusses some basic concepts relevant for the epistemology of dialogism—those of complementarity and reflexivity. The former concept is further explicated by way of introducing the characteristic features of joint construction, sequentiality and act-activity dependence. The latter concept has the properties of self-other reflexive understanding, self-reflexivity, and the reflexivity between text and interpreter. This paper complements the previous one of Teun van Dijk in dealing with the wide ramifications of conscious social interaction and understanding.

The article of Panayot Butchvarov goes back to the interface between experience and consciousness, but on a different level (and in a different key)—on the level of technical philosophical description of conscious experience (but not that of the 'everyday phenomenology' of thought-to-speech actualization). What does it mean to be aware of the quale of 'red' or to feel

pain?—this has been one of the perennial questions for those philosophers who pursue an adequate description of the phenomenology of experience. One should not forget that when philosophizing about the qualities of perception, one always uses some language to communicate both the perceptual qualities, as well as their descriptions. If this is taken for granted, it is only reasonable to discuss what the relationship of language of perceptual qualities to the qualia themselves is. It is instructive to see that this author finds it appropriate to qualify perceptual consciousness as an 'adverbial' one. Of course, we deal here with a metaphor—the adverbiality of some perceptual conscious state should not be construed as immanently linguistic. The perceptual state, metaphorically, has some characteristics of a state—its sortal or qualitative characteristics, and of a verb—each state of consciousness is expressed most naturally as a psychological verb. These two aspects interpenetrate as relational and nonrelational characteristics of the perceptual state of consciousness. They fuse as adverb-like (quality-like) and verb-like characteristics. In this case, the linguistic metaphor seems to be grounded in the implicit hypothesis of isomorphism of some aspects of the structure of perceptual and conceptual states of consciousness besides the figure/ground relational juxtaposition.

In the last contribution, Maxim Stamenov explores some aspects of the 'Higher-Order Thought (HOT) theory of consciousness' and the presuppositions and implications of the latter for our modeling of conscious verbal representation in the context of the current understanding of the nature of the interface between syntactic and semantic structure in linguistics. A new, dual-focus theory of the mental processing of language structure and of verbal consciousness is proposed (cf. pp. 337-338), which seems to represent a radical departure from the current ways of conceptualization of both how syntax/semantics interface is enacted in the mind and how the 'focus of consciousness' performs.

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As mentioned earlier, there is at present little research in linguistics, psycholinguistics, neurolinguistics and the adjacent disciplines which explicitly addresses the problem of the relationships between language and consciousness. The present collective volume seems to be the first one dedicated to a discussion of some of the aspects of this topic. Its aim is to prove that linguists can make a significant contribution of their own to consciousness studies and, in this way hopefully, provide a basis and an incentive for future research and development in this area.

Notes

1. Cf. e.g., Jackendoff 1987; Chafe 1994; Talmy 1994; cf. also the first issue of the journal *Pragmatics & Cognition* for 1996 (Vol. 4) specially dedicated to a discussion of some of the aspects of this topic with keynote articles by Ray Jackendoff and Wallace Chafe.

2. For further orientation in the context of psycholinguistics cf. Boland & Cutler (1996); cf. also Block (1995) for an analysis of the validity and significance of distinctions of a comparable type in the context of the philosophy of mind. He (re)introduced the difference between Access consciousness (A-consciousness) and Phenomenal consciousness (P-consciousness) in the discussion about the nature of consciousness in the philosophy of mind.

References

Block, Ned. 1995. "On a Confusion About a Function of Consciousness". *Behavioral and Brain Sciences* 18:227-289.

Boland, Julie E. & Anne Cutler. 1996. "Interaction with Autonomy: Output models and the adequacy of the great divide". *Cognition* 58:309-320.

Chafe, Wallace. 1994. *Discourse, Consciousness, and Time: The flow and displacement of conscious experience in speaking and writing*. Chicago: University of Chicago Press.

Chafe, Wallace. 1996. "How Consciousness Shapes Language". *Pragmatics & Cognition* 4:35-54.

Dennett, Daniel. 1991. *Consciousness Explained*. Boston: Little, Brown & Co.

Ellis, Ralph D. 1995. *Questioning Consciousness: The interplay of imagery, cognition, and emotion in the human brain* (Advances in Consciousness Research, 2). Amsterdam & Philadelphia: John Benjamins.

Gennaro, Rocco. 1996. *Consciousness and Self-Consciousness: A defense of the higher-order thought theory of consciousness* (Advances in Consciousness Research, 6). Amsterdam & Philadelphia: John Benjamins.

Jackendoff, Ray. 1987. *Consciousness and the Computational Mind*. Cambridge, Mass.: MIT Press.

Jackendoff, Ray. 1996. "Preliminaries to Discussing How Language Helps Us Think". *Pragmatics & Cognition* 4:197-213.

Newton, Natika. 1996. *Foundations of Understanding* (Advances in Consciousness Research, 10). Amsterdam & Philadelphia: John Benjamins.

Rosenthal, David. 1990. "Why Are the Verbally Expressed Thoughts Conscious". Center for Interdisciplinary Research (ZiF), Research Group on Mind and Brain, University of Bielefeld, Report No. 28.

Searle. John. 1992. *The Rediscovery of the Mind*. Cambridge, Mass.: MIT Press.

Talmy, Leonard. 1994. "The Windowing of Attention in Language". In Masayoshi Shibatani & Sandra Thompson (eds), *Essays in Semantics*. Oxford: Oxford University Press, 235-289.

Tulving, Endel. 1994. "Foreword". In Janet Metcalfe & Arthur Shimamura (eds), *Metacognition: Knowing about knowing*. Cambridge, Mass.: MIT Press, vii-x.

The 'Conscious and Unconscious Mind' in the Theoretical Discourse of Modern Linguistics

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1. Long-standing dualisms and human language

Since antiquity, common sense has customarily subscribed to a dualism between the 'mental' versus the 'physical'—the world of 'subjective thoughts in the mind' versus the world of 'objective manifestations out there'. Under various labels, 'mentalism' and 'physicalism' have waged endless debates seeking to establish the absolute predominance or superiority of the one world over the other, as if it were somehow illegitimate or inadmissible to acknowledge their continual interaction in human life. This forced choice has been a serious impediment to attaining a reliable consensus about many human phenomena, including language.

Within the 'mental' side, a less conspicuous and pervasive dualism has persisted between 'conscious' versus 'unconscious'. These terms have been used a bit vaguely at times, but the core meaning would seem to be that certain knowledge, skills, or activities either are or are not readily accessible to ordinary awareness or controllable by deliberate effort. Unlike the supposedly obvious division between 'physical' and 'mental', this division is typically hard to specify, the more so since the 'unconscious' domain is by definition not presented either for outward inspection or for inward introspection. At most, we can concur that some human capacities must have an 'unconscious' base just because the requisite knowledge must be 'there in the mind' but is not presented to us in this way.

Not surprisingly, these long-standing dualisms have been readily applied to human language. Both the 'physical' actions of speakers and hearers and the 'mental' capacities that make these actions possible have been topics of copious

discussion right down into modern times. Moreover, language seems to be a prime instance of a substantial chunk of human knowledge that is largely 'unconscious' in the sense that ordinary introspection can make you 'consciously aware' of only a small part of your language at any given moment. Moreover, you can introspectively detect important contrasts between more or less 'conscious' uses of language, say, between polished oratory in the marketplace and spontaneous conversation in the home.

Furthermore, language might be a leading modality for moving between the conscious and the unconscious. Merely talking about things might bring them into consciousness, such as motives, desires, emotions, mental images, day-dreams, or personality traits. Talking might thus supply you with otherwise inaccessible insights into your 'mind', 'thoughts', 'ideas', and so on. But because the unconscious resists direct access, it is hard to determine how and how far such transactions affect or shape what they brings forth. When 'thoughts' or 'ideas' get put into language, are they simply dressed up in a transparent coating, or are they fundamentally transformed into something quite different from what they were before, or are they created for the first time?

The long-standing dualisms and the issues they raise have passed down into the 'science of language' consolidated in our own century under the heading of 'modern linguistics'. Despite their plainly disputatious and divisive history, the dualisms seem to pop up whenever linguists pose the question of 'what is language?' On one side, the 'mentalists' have described the 'mind' and in particular the 'unconscious' as the natural home of language, so that the task of linguistics would be to produce a description of what speakers of a language know about it. On the other side, the 'physicalists'—also termed 'mechanists' or 'behaviorists'—have abjured all reference to the 'mind', 'conscious' or not, and set themselves the task of describing only the observable behavior of speakers.

Yet neither approach has been able to satisfactorily dispose of the question of how language relates to the 'mind' and interacts with its contents of 'thoughts' or 'ideas'. As we shall see, prominent linguists have adopted various *rhetorical strategies* for confronting or avoiding the question, depending on how these concepts were enlisted in the *explanatory work* of declaring what language is and how it should be described. Somehow, the results were always a bit inconclusive. Using the 'mind' or the 'unconscious' in an explanation is naturally risky because they are themselves so infernally hard to explain; yet leaving them out altogether creates disquieting gaps.

I shall illustrate these factors by sketching the treatment of 'consciousness' and some related terms in several influential discourses in 'modern linguistics'. In a book-length analysis of those works, I undertook to

show that the role of discursive strategies in the evolution of linguistic theories is far more decisive than has been widely appreciated: how language about language tends to position itself on fundamental issues, such as in what sense linguistics counts as a 'science' and what its object and methods of investigation should be (Beaugrande 1991). But since then I have come to appreciate that terms relating to 'consciousness' played a noteworthy part even though they were not part of the officially defined terminology like 'phonemes' or 'semantics'.

2. 'Consciousness' in the discourse of mentalist linguistics

2.1. *Ferdinand de Saussure*

Ferdinand de Saussure, or rather the version of him that was reconstructed by his students in the authoritative text *Cours de linguistique générale* (1916) was one major linguist who lent a strong impetus to 'mentalism'. Though he evidently did not have an official theory or even a clear definition of 'mind' or 'consciousness', he felt free to expropriate them unofficially for his peculiar but highly regarded agenda of 'explanatory work'. He seemed to treat a linguistic theory as an instrument for purifying and isolating 'language' into a suitably austere theoretical construct. He doubtless hoped this tactic would eliminate the messy problems that crop up in giving exact descriptions of the ordinary uses of language for the purposes of daily life. But what he attained was a precariously delicate or forbiddingly denatured conception of 'language' that has raised unending and partly unsolvable problems for tasks of description ever since (Beaugrande 1994a, 1994b). He thus launched his 'general linguistics' with a paradoxical rhetoric many other linguists would later repeat: propounding a program which was expected to make our explanatory work easier but which in fact made it considerably harder.

It is not difficult to infer Saussure's basic rhetorical motivation for focusing 'general linguistics' on 'language in and for itself' ('langue') as an abstract, uniform system as opposed to the 'uses of language' ('parole'), which are more concrete and diverse. He urgently needed this dichotomy because he vowed that ìlinguistics must be carefully distinguished" from "other sciences that sometimes borrow from its data, sometimes supply it with data", among which he mentioned 'political history', 'psychology', 'anthropology', 'sociology', 'ethnography', 'prehistory', and 'paleontology' (1966 [1916]:6, 102f, 147, 9, 224).

Since then, linguistic theorizing has been grappling with the problem that we do not encounter 'language by itself' in real life but only various uses of language. The question '*what* is language?' soon leads into the question '*where* is language?', and mentalism proffered a convenient answer: language subsists in the 'mind' as a stock of potential knowledge apart from its actual uses. Saussure conceded that "language is not complete in any speaker", but suggested in return that language "exists perfectly only within a collectivity"—in 'the *collective mind* of speakers', wherein 'logical and psychological relations' 'form a system' (1966:14, 99f, emphasis added [hereafter e.a.]). This conception of 'language' should be the concern of 'synchronic linguistics', whereas 'diachronic linguistics' should "study relations that bind together successive terms not perceived by the collective mind" (1966:99f). Specifically, Saussure resolved to see language as an abstract mental "system based entirely on the opposition of its concrete units" and "on the mental opposition of auditory impressions" (1966:107, 33). So 'the only definition we can give' for 'the unit' of 'language' would be: "a slice of sound which, to the exclusion of everything that precedes and follows it in the spoken chain, is the signifier of a certain concept" (1966:104). This notion of a language or a unit of language linking 'sound' with some mental entity such as a 'concept' had important consequences, as we shall see in a moment.

In the discourse of Saussurian linguistics, his sparse notion of 'language' created by dichotomizing between 'langue' versus 'parole' and between 'synchronic' versus 'diachronic' encouraged him to assign the organization of language to a domain in the mind of which speakers are not 'conscious'. We see this rhetorical move in several passages expatiating on specific aspects of language (e.a.):

(1) On 'linguistic creativity': "Any creation must be preceded by an *unconscious comparison* of the material deposited in the storehouse of language, where productive forms are arranged according to their" "relations" (1966:165).

(2) On the 'types of syntagm' that human 'memory holds in reserve': "When the time for using them" arrives "we bring in the associative groups of associations. When a Frenchman says *marchons*, he *thinks unconsciously* of diverse groups of associations that converge on the syntagm." "This process" consists of "eliminating mentally everything that does not help to bring out the desired differentiation at the desired point" (1966:130).

(3) On 'voiced' and 'voiceless laterals': "Speakers are *not conscious* of the difference" (1966:47).

(4) On the 'prohibition of sudden widespread change' in 'historical transmission': "Reflection does not enter into the active use of an idiom—speakers

are *largely unconscious* of the laws of language; and if they are unaware of them, how could they modify them? Even if they were aware of these laws, we may be sure that their awareness would seldom lead to criticism, for people are generally satisfied with the language they have received." (1966:72).

Most of these moves attribute 'unconscious' factors to speakers, as in (2-4), e.g., what they do when speaking (2), rather than to the language itself, e.g. how new creations get started (1). But in one move where the English translation says 'speakers' in (3), the French original says 'the language (*langue*)', as if the distinction were unimportant; but a 'language' could be (or not be) 'conscious' of something only in a metaphorical sense, as best exemplified in the discourse of Edward Sapir (section 2.2).

Such moves might cast language investigators in the role of expounding conscious descriptions of a largely unconscious system. But, depending on the topic, Saussure vacillated about how and how far a conscious linguistic description either can claim to match the 'unconscious' mental reality in the minds of speakers (5-6) or else cannot claim to (7-8) (e.a.):

(5) On why 'phonologists' should not 'neglect the auditory side': "Auditory impressions *exist unconsciously* before phonological units are studied" and *enable* "*the observer*" *to* "*single out subdivisions* in the series of articulatory movements" (1966:38).

(6) On 'grammar': "the sum of the *conscious and methodical classifications* made by the grammarian who studies a language state without bringing in history must *coincide with the associations*, *conscious or not*, that are set up in speaking. These associations fix word-families, inflectional paradigms, and formative elements (radicals, suffixes, inflectional endings, etc.) in our *minds*" (1966:137f).

(7) On 'analogy': "No complicated operation such as the *grammarian's conscious analysis* is presumed on the part of the *speaker*." (1966:167).

(8) On 'associative relations': "The words have no fixed order of succession, and it is by a *purely arbitrary act that the grammarian groups them* in one way rather than in another; in the *mind of speakers* the nominative case is by no means the first one in the declension, and the order in which terms are called depends on circumstances." (1966:127).

In move (6), where 'speakers' and 'grammarians' are envisioned to 'coincide', 'our minds' could strategically subsume both groups. A similar 'ambiguity' be-

tween 'speaker' and 'grammarian' was later institutionalized by Chomsky (cf. section 2.4).

Saussure's peculiar brand of mentalism was shaped by his use of the term 'thought'—or, interchangeably, 'idea' and 'concept'—to cover the meaning of language and its sounds, as in these moves (e.a.):

(9) On 'the reciprocal delimitation of units': "The characteristic role of language" is "to serve as a link between sound and *thought*" (1966:112).

(10) On 'linguistic value': "Language" is "*organized thought* coupled with sound"; "each linguistic term is a member, an 'articulus' in which an *idea* is fixed in a sound and a sound becomes the sign of an *idea*." (1966:111, 113).

(11) On the notion of 'substance': "Linguistics then works in the borderland where the elements of sound and *thought* combine: their combination produces a form, not a substance." (1966:113).

(12) On 'speaking [*parole*]': "Within the act, we should distinguish between (1) the combinations by which the speaker uses the language code for expressing his own *thought;* and (2) the psychophysical mechanism that allows him to exteriorize those combinations." (1966:14).[1]

(13) On the 'signifiers needed by thought': "The linguistic fact can therefore be pictured in its totality—i.e., language—as a series of contiguous subdivisions marked off on both the indefinite plane of jumbled *ideas* and the equally vague plane of sounds." (1966:112).

A bit ironically, as we begin to notice in sample (13), Saussure's vision of 'thought' or 'ideas' evidently clashed with his search for strict order in language. Some of his discourse moves frankly denied that 'thoughts' or 'ideas' can have order (e.a.):

(14) "Psychologically, our *thought*—apart from its expression in words—is only a *shapeless and indistinct mass*." (1966:111).

(15) "Without language, *thought* is a *vague, uncharted nebula*. There are no *pre-existing ideas,* and *nothing is distinct* before the appearance of language." (1966:111f).

(16) "*Thought, chaotic by nature*, has to become ordered in the process of its decomposition. *Neither are thoughts given material* form nor are sounds transformed into mental entities." (1966:112).

(17) "The somewhat *mysterious* fact is rather that '*thought*-sound' implies divisions, and that language works out its units while taking shape between two *shapeless masses*." (1966:112).

Moreover, Saussure's search for strict order made him uneasy about language change, which (as we saw above) he consigned to 'diachronic linguistics' as the 'study of relations that bind together successive terms not perceived by the collective mind'. He variously associated changes with 'deteriorations', 'vicissitudes', 'damage', 'disturbance', 'breaking', and 'effacement' (Saussure 1966:87, 152ff, 161). Or, he conjured a dark vision of 'diachronic facts' 'setting a blind force against the organization of a system of signs', or of a 'great mass of forces constantly threatening the analysis adopted in a particular language-state' (Saussure 1966:89, 169). Intriguingly, he also argued that 'sudden widespread change' would be 'prohibited' because speakers cannot 'modify' the 'largely unconscious laws of language' (4). Yet in his favorite comparison between 'the functioning of language' and a 'game of chess', he remarked that 'language premeditates nothing' and 'the pieces of language are shifted, or rather modified, spontaneously and fortuitously', as in a chess game played by 'an unconscious or unintelligent player' (1966:88f)—which puts the 'unconscious' in just the opposite role of fomenting change.

Why should Saussure's mentalism both emphasize a close tie between language and thought and yet insist that thought alone is disorderly? And why should he claim that the unconscious both shields language from change and foments change? From the standpoint of rational theory, he was being inconsistent; but from the standpoint of argumentation, he was responding to diverse rhetorical pressures within his explanatory work. To give his 'science' clear boundaries, he adhered to the long tradition of holding the knowledge of language to be special and clearly distinct from other kinds of knowledge, which in his view could best be described as a stringently ordered system holding still while we assign it an equally stringent description. He sought this stringent system in the way that 'language works out its units', each unit being an 'arbitrary' bond between 'thought' and 'sound' (17). Since he could see no comparable system of units in 'thought', he conjectured that thought must be 'vague' and 'chaotic by nature' (15-16), leaving him confronted with a 'mysterious fact' (17).

Now, if the Saussurian 'sign' is a link between a 'sound' and a 'thought' (or 'idea' or 'concept'), or, as he eventually said, between 'signified' and 'signifier' (Saussure 1966:65ff, 71, 75, 111ff), how could such a set of links be so well organized in between two disorganized 'planes'? He evaded this problem with his famous conception that "the bond between the signifier and the signified is *arbitrary*" (1966:67). He then felt free to shelve any "argument about a system of symbols", on the pretext that "language is a system of arbitrary signs and lacks the necessary basis, the solid ground for discussion" (1966:73). The conception

also helped him shore up several other of his more problematic conceptions, such as the 'value' of the sign (18), the centrality of 'difference' and 'opposition' (19), and 'social' basis of the 'linguistic system' (20) (e.a.):

(18) "Not only are the two domains that are linked by the linguistic fact shapeless and confused, but the choice of a given slice of sound to name a given idea is completely *arbitrary*. If this were not true, the notion of value would be compromised, for it would include an externally imposed element." (1966:113).

(19) "*Arbitrary* and differential are two correlative qualities": "a segment of language can never in the final analysis be based on anything but its nonco-incidence with the rest" (1966:118).

(20) "The *arbitrary* nature of the sign explains in turn why the social fact alone can create a linguistic system. The community is necessary if values that owe their existence solely to usage and general acceptance are to be set up; by himself the individual is incapable of fixing a single value." (1966:113).

But surely 'arbitrariness' does not *explain* the conditions under which 'social facts can create a linguistic system'; if anything, it makes a real explanation all the more urgent. If Saussure had not enlisted arbitrariness to rationalize his reluctance to provide such an explanation, he would have had to face the 'social fact' that the *use* of language and its signs and is certainly *not* arbitrary. Ironically, failing to face this fact increases the prospect that the *description of language* rather than language itself will be arbitrary—a prospect Hjelmslev would later officially incorporate into linguistic theory (cf. section 2.3).

Further explanatory work would have been entailed in resolving the contradiction between orderly language versus disorderly 'thought'. There, Saussure would have needed a very different theory showing how the human mind works in ways that are *not* 'chaotic' or 'confused'; then he would not have been under such pressure to hastily declare all the bonds 'arbitrary'. Without such a theory, we are left with no way to explain how 'language' can have evolved in the mind and attained the high degree of order it has. We might recall here his irritable insistence that "the question of the origin of speech" "is not even worth asking; the only real object of linguistics is the normal, regular life of an existing idiom" (1966:71f). His glib justification that "no society in fact has ever known language other than as a product inherited from preceding generations" (1966:71) oddly implies that language didn't originate at all.

The role of 'consciousness' was naturally implicated in all these problems. Having consigned the social practices and manifestations of language to

'parole', Saussure had no home left for his 'langue' except the minds of speakers. And since casual introspection could easily alert him that what speakers would report about their language would not resemble the stringent system he sought, he specified that home to be in the 'unconscious mind'. So the latter was credited with whatever language was conceived to do: lauded in some contexts for preserving the order and stability of language and scolded in other contexts for disrupting them and permitting 'change' to creep in. The contradiction is conveniently resolved: if you cannot become conscious of the 'laws of language', neither can you consciously undertake to either perpetuate or transform them.

2.2. *Edward Sapir*

The heartier mentalism of Edward Sapir assigned a different role to 'consciousness', 'mind', and 'thought' for several major reasons. He drew no brittle dichotomy between language by itself ('langue') versus language in use ('parole') but avowed: "language exists only in so far as it is actually used—spoken and heard, written and read" (1921:154f). He also drew no dichotomy between static ('synchronic') versus dynamic ('diachronic'), but foregrounded the 'dynamic habit of language' (1921:230) and its 'drift' over time. For him, "it goes without saying that the mere content of language is intimately related to culture", i.e., to "the socially inherited assemblage of practices and beliefs that determines the texture of our lives" (1921:219, 207). And "it is perfectly true that the history of language and the history of culture move along parallel lines" (1921:219).

Yet Sapir remained an unabashed mentalist, and performed numerous discourse moves that invoked both the 'unconscious' and the 'conscious' on such diverse topics as these (e.a.):

(21) On 'the essential nature of speech': "Language" is "the most massive and inclusive art we know, a mountainous and anonymous work of *unconscious* generations" (1921:219f).

(22) On language types: "In defining the type to which a language belongs, one must be careful not to be misled by structural features which are mere survivals of older stages, and which have no productive life and do not enter into the *unconscious* patterning of the language." (1921:147nf).

(23) On the 'value' of 'linguistic forms' 'for 'understanding some of the more difficult and elusive problems in the psychology of thought and in the strange, cumulative drift in the life of the human spirit': "This value de-

pends chiefly on the *unconscious* and unrationalized nature of linguistic structure." (1921:vf).

(24) On historical change: "The historical study of language has proven to us beyond all doubt that a language changes not only gradually, but consistently, that it moves *unconsciously* from one type towards another." (1921:121).

(25) On 'linguistic drift': "The analysis is certain to be *unconscious*, or rather unknown, to the normal speaker." "The drift of language is constituted by the *unconscious* selection on the part of the speakers of those individual variations that are cumulative in some special direction." (1921:161, 155).

(26) On sound change: "the central *unconscious* regulator of the course and speed of sound changes" lies in the "shifting about without loss of pattern or with a minimal loss of it". "Phonetic changes may sometimes be *unconsciously* encouraged in order to keep intact the psychological spaces between words and word forms." (1921:182, 186).

(27) On 'alternation': "It could only have been produced by an *unconscious* mechanical adjustment such as may be observed in the speech of many today"; later it may have undergone a "rise in *consciousness* as a neatly distinct vowel" (1921:174f)

(28) On 'foreign sounds': they are "changed through *unconscious* assimilation to our English habits of pronunciation"; or, "individual variations arising at linguistic borderlands" through "the *unconscious* suggestive influence of foreign speech habits" may get "incorporated into the phonetic drift of a language" (1921:197, 200).

(29) On the 'fundamental forms' of 'language': "These may shape themselves in a hundred ways regardless of the material advancement or backwardness of the people who handle the forms of which, it need hardly be said, they are *in the main unconscious*." (1921:124).

(30) On the 'auditory-motor system': "The auditory-motor associations are probably always latent at the least, that is, they are *unconsciously* brought into play. Even those who read and think without the slightest use of sound imagery are, at last analysis, dependent upon it." (1921:20).

(31) On 'linguistic structure' in the sentence: "We feel instinctively, without the slightest attempt at *conscious* analysis, that two sentences fit the same pattern, that they are really the same fundamental sentence." (1921:85).

(32) On the 'sentence' as an "outgrowth of historical and unreasoning psychological forces rather than of a logical synthesis": "This is the case, to a greater or less degree, in all languages, though in the forms of many we find a more coherent, a more consistent, reflection than in our English

forms, of that *unconscious* analysis into individual concepts which is never entirely absent from speech, however it may be complicated and overlaid with irrational factors." (1921:90).

(33) On 'our instinct for appropriate rhythms': "Neither common feeling nor the poet's choice need be *at all conscious*"; "it is probable that rhythm is an *unconscious* determinant even with those who set little store by its artistic use" (1921:160f).

(34) On 'poetic verse' in various languages: "each of these rhythmic systems proceeds from the *unconscious* dynamic habit of the language, falling from the lips of the folk" (1921:230).

(35) On 'literary artists': "The greatest—or shall we say the most satisfying—literary artists" "are those who have known *subconsciously* to fit or trim the deeper intuition to the provincial accents of their daily speech". Others "are *unconsciously* striving for a generalized art language that is related to the sum of all known languages" (1921:224f).

(36) On the 'psychic uses of language': "Its flow not merely parallels that of the *inner content of consciousness*, but parallels it on different levels, ranging from the state of mind that is dominated by particular images to that in which abstract concepts and their relations alone are at the focus of attention, which is ordinarily termed reasoning." (1921:14).

(37) On 'the cerebral equivalent of speech': "The most rarefied thought may be but the *conscious* counterpart of an *unconscious* linguistic symbolism." (1921:16).

(38) On how 'language tickets off experience' for 'communication': "The single experience lodges in an *individual consciousness* and is, strictly speaking, incommunicable." (1921:12).

Like Saussure, Sapir suggested that speakers are 'unconscious' in respect to their language as it subsists, evolves, and gets put to use. But Sapir's vision is much less static, cheerfully ascribing to the 'unconscious' the dynamic guidance over how a language maintains its 'essential nature' (21) and 'type' (22); how the language (or the 'human spirit') undergoes 'drift' and 'change' (23-26) or admits 'alternations' (27) or 'foreign sounds' (28); how the 'forms of language shape themselves' (29); how the 'auditory-motor system' is 'brought into play' (30); how 'sentences' are 'structured' (31-32); and even how language is exploited by poetry (33-35). He also sets up a 'conscious' counterpart as a domain of 'inner content' (36) and 'rarefied thought' (37), but he noted elsewhere that it might be 'strictly speaking', 'incommunicable' without language (38).

Evidently, the 'unconscious' envisioned by Sapir could act to offset the potential arbitrariness suggested by such locutions as 'anonymous' (21), 'elusive', 'strange', and 'unrationalized' (23), 'shifting about' (26), 'in a hundred ways' (29), or 'unreasoning' and 'irrational' (32). The 'unconscious patterning of the language' (22) is cast as a 'regulator' (26) making 'adjustments' (37) and exerting 'influences' (28) to keep things 'consistent' (24, 32), 'coherent' (32), 'appropriate' (33), and 'intact' 'with a minimal loss' (26). This role is much more optimistic than the neutral one invoked by Saussure, who seems to have assigned language to the 'unconscious' merely to separate it from use.

Regarding the possible correspondence between the 'conscious classifications' of linguistics and the 'unconscious associations' of speakers, which troubled Saussure in (5-8), Sapir briskly justified two of his main linguistic conceptions—the 'inner system of sounds' and the 'word'—on the grounds that ordinary speakers can bring them from unconscious into conscious as a 'psychological mechanism' or 'reality':

(39) "Back of the purely objective system of sounds that is peculiar to a language and which can be arrived at only by painstaking phonetic analysis, there is a more restricted 'inner' or 'ideal' system, which though perhaps equally *unconscious* as a system to the naïve speaker, can far more readily than the other be *brought to consciousness* as a finished pattern, a psychological mechanism." (1921:55).

(40) "Linguistic experience, both as expressed in standardized written form and as tested in daily use, indicates overwhelmingly that there is not, as a rule, the slightest difficulty in *bringing* the word *to consciousness* as a psychological reality." (1921:33).

For 'the word', Sapir added an anecdote of his "personal experience of having taught intelligent young Indians to write their own language according to the phonetic system which he employed": they "determined the word" "with spontaneous and complete accuracy in hundreds of pages of manuscript Nootka text" (1921:34). "Such experiences with naive speakers and recorders do more to convince one of the definitely plastic unity of the word than any amount of purely theoretical argument" (*ibid.*). One such 'argument' might be the complicated disquisitions about the 'sign' cited above from Saussure, who felt "defensive on noting that there has been much disagreement about the nature of the word, and a little reflection shows that the usual meaning of the term is incompatible with the notion of a concrete unit" (1966:105).

Sapir's heartier mentalism also adopted a fundamentally different view of 'thought' as an exquisitely organized domain, witness such terms as 'psychology of thought' in (23) and 'rarefied thought' in (27), plus 'think' in (30). He did so by programmatically asserting the functional unity of language and thought (e.a.):

(41) "*Language* and our *thought grooves* are *inextricably interrelated*, are in a sense, one and the same." (1921:217f).
(42) "*Language*, as a structure, is on its *inner face* the *mould of thought*." (1921:22).
(43) "The feeling entertained by so many that they can *think*, or even *reason*, *without language is an illusion*." (1921:15).
(44) "*Linguistic morphology* is nothing more or less than a *collective art of thought*, an art denuded of the irrelevancies of individual sentiment." (1921:218).

Yet he occasionally vacillated. In some discourse moves, he drifted toward Saussure's position in suggesting that language is more orderly after all (45-46). In others, he uncoupled the origin of language from thought and hinted that, in some primitive version, language may have preceded thought (47-48); here, he might even suggest that thought is the higher side (48-51) (e.a.):

(45) "*Language* and *thought* are not strictly coterminous. At best *language* can but be the outward facet of *thought* on the highest, most generalized, level of symbolic expression." (1921:15).
(46) "*Languages* are more to us than systems of *thought* transference. They are invisible garments that drape themselves about our spirit and give a predetermined form to all its symbolic expressions." (1921:221).
(47) "The growth of *speech*" is "in a high degree dependent on the development of *thought*. We may assume that *language* arose *pre-rationally*—just how and on what precise level we do not know—but we must not imagine that a highly developed system of *speech symbols* worked itself out before the genesis of *distinct concepts* and of *thinking*" (1921:17).
(48) "*Language* is an instrument originally put to uses lower than the conceptual plane, and *thought* arises as a refined interpretation of its content." (1921:15).
(49) "*Language* is primarily a pre-rational function. It humbly works up to the *thought* that is latent in" "its classifications and its forms; it is not, as is

generally and naively assumed, the final label put upon the finished *thought*" (1921:15)

(50) "From the point of view of *language*, *thought* may be defined as the highest latent or potential content of *speech*, the content that is obtained by interpreting each of the elements in the flow of *language* as possessed of its very fullest conceptual value." (1921:14f).

(51 "It is almost as though at some period in the past the *unconscious* mind of the race had made a hasty inventory of experience, committed itself to a premature classification that allowed of no revision, and saddled the inheritors of its *language* with a science they no longer quite believed in nor had the power to overthrow. Dogma, rigidly prescribed by tradition, stiffens into formalism. *Linguistic categories* make up a system of surviving dogma—dogma of the *unconscious*." (1921:100).

Though uncharacteristically rebuking 'the unconscious' for promulgating a 'dogma' in (51), Sapir also cited 'consciousness' as a threshold below which language and thought falsely appear to be separated:

(52) "The symbolic expression of *thought* may in some cases run along outside the fringe of the *conscious* mind, so that the feeling of a free, *non-linguistic stream of thought*" "would mean that the auditory or equivalent visual or motor centers in the brain, together with the appropriate paths of association, that are the *cerebral equivalents of speech*, are touched off so lightly during the process of *thought* as *not to rise into consciousness*." (1921:16, e.a.).

But this move is gratuitous if the 'unconscious' is indeed the congenial home of language (21-35). Perhaps Sapir is using 'consciousness' in (52) in the more special sense of the introspective awareness (or 'feeling') speakers have of their language and thought, as opposed to the actual status of these two domains.

As we can see, Sapir's mentalism differed starkly from Saussure's, even though they concurred that the 'unconscious' is heavily implicated in the explanatory work of accounting for language. The chief motive was surely their opposed conceptions of language. Saussure was determined to work with a sparse, stringent conception of 'language by itself' removed from language use in social contexts, so he put it into the 'unconscious mind' as a particularly abstract home. Sapir, in contrast, was determined to work with a rich conception of 'language' as an engaged and guiding force in the life of a community and culture, and argued that this guidance was 'unconsciously' enacted, both in the short term in the minds of speakers and in the long term of language 'drift'.

Moreover, only Sapir pursued the ambitious prospect of devising a 'conceptual classification of languages' reflecting 'the translation of concepts into linguistic symbols' and distinguishing 'radical concepts' from 'relational' and 'derivational concepts' (1921:138, 136). That project naturally encouraged him to view thought as highly organized and by no means 'chaotic' or 'confused'. And, quite unlike Saussure and his successors, Sapir did not hesitate to align that order with the order of reality and of culture.

A further factor in the respective mentalisms of Saussure and Sapir arose from the rhetorical pressure to delimit the boundaries of linguistics as a science. Addressing the question of 'what use is linguistics?', Saussure had pondered whether 'the field' might be 'part and parcel' of 'psychology' (1966:6f); his position was noticeably uneasy and at times contradictory:

(53) "Everything in language is basically psychological" (1966:6).
(54) "Synchronic linguistics will be concerned with the logical and psychological relations that bind together coexisting terms and form a system in the collective mind of speakers." (1966:99f).
(55) "We have seen in considering the speaking-circuit that both terms involved in the linguistic sign are psychological and are united in the brain by an associative bond." (1966:65f).
(56) "The study of speech is twofold: its basic part—having as its object language, which is purely social and independent of the individual—is exclusively psychological." (1966:18).
(57) The psychologist "studies the sign mechanism in the individual": this 'method' "does not reach the sign, which is social" (1966:17).
(58) The 'sound-image' "is not the material sound, but the psychological imprint of the sound, the impression that it makes on our senses" (1966:66).
(59) "A succession of sounds is linguistic only if it supports an idea. Considered independently, it is material for a physiological study." Conversely, "considered independently, concepts" "belong to psychology; they become linguistic only when associated with sound images" (1966:103).

If some of these moves seem ready to hand over all of linguistics to psychology (53-56), other moves seem to ward off such a prospect by confining psychology to the study of the 'sounds' and the 'individual', the latter being the opposite of 'social' (56-58). The scheme in (59), exploiting Saussure's two-sided concept of the 'sign', seems best for guaranteeing linguistics a place of its own, in between and set apart from both psychology and physiology; but the ironic implication is

that these two fields are relegated to studying 'shapeless masses' (17) (compare Hjelmslev in section 2.3).

Sapir was confronting much the same pressures as Saussure, whom his book on *Language* nowhere mentions; the two linguists were probably reacting independently to the general discussions of the time over the borders of linguistics. Sapir too disclaimed the ambition to proceed in either a 'psychological' or 'physiological' framework (60-63), but felt he did need to 'justify' doing so because these two frameworks are so 'essential to the functioning of language in the individual' (62-63). He too invoked 'arbitrariness' between these two domains (62, 64), the domain of 'elements of consciousness' and the domain of 'elements localized in the auditory, motor, and other cerebral and nervous tracts'—a dual scheme resembling Saussure's 'sound' plus 'thought', or, for Sapir, 'speech sound' plus 'element of experience' (65). And Sapir's 'accepting language as a fully formed functional system' (62) recalls Saussure's insisting on the 'inherited' quality of language to block off the question of origins. But only Sapir foresaw a resolution with 'modern psychology', which he credited with "having shown us how powerfully symbolism is at work in the unconscious mind" (1921:16); the source here turned out to be Freud (66).

(60) "This little book aims to give a certain perspective on the subject of language rather than to assemble facts about it. It has little to say of the ultimate psychological basis of speech." (1921:v).

(61) "This introduction to the study of speech is not concerned with those aspects of physiology and physiological psychology that underlie speech." "It is, rather, to be an inquiry into the function and form of the arbitrary systems of symbolism that we term languages." (1921:11).

(62) "We have no recourse but to accept language as a fully formed functional system within man's psychic or "spiritual" constitution. We cannot define it as an entity in psycho-physical terms alone, however much the psycho-physical basis is essential to its functioning in the individual." (1921:10f).

(63) "From the physiologist's or psychologist's point of view we may seem to be making an unwarrantable abstraction in desiring to handle the subject of speech without constant and explicit reference to that basis. However, such an abstraction is justifiable. We can profitably discuss the intention, the form, and the history of speech" "as an institutional or cultural entity, leaving the organic and psychological mechanisms back of it as something to be taken for granted" (1921:11).

(64) "Language" "consists of a peculiar symbolic relation—physiologically an arbitrary one—between all possible elements of consciousness on the one hand, and certain selected elements localized in the auditory, motor, and other cerebral and nervous tracts on the other" (1921:10).

(65) "The outward, or psycho-physical, aspect of language is a vast network of associated localizations in the brain and lower nervous tracts." "However, the speech sound localized in the brain" "is very far from being an element of language. It must be further be associated with some element or group of elements of experience" "before it has even rudimentary linguistic significance. This 'element' of experience is the content or 'meaning' of the linguistic unit" (1921:10).

(66) "A more general psychology than Freud's will eventually prove" "the mechanisms of 'repression of impulse' and of its symptomatic symbolization" "to be as applicable to the groping for abstract form, the logical or esthetic ordering of experience, as to the life of the fundamental instincts" (1921:157n).

As (66) signals, this Freudian conception of the 'unconscious' is rather different, in its emphasis upon 'instincts', from the one implied by Saussure and elsewhere by Sapir (e.g., for sound changes). Still, Sapir did portray one change of word-forms in Freudian terms as steered by 'unconscious desire' and 'unconscious hesitation' (1921:157, 163, 161).

In sum, we have seen in sections 2.1 and 2.2 that two influential early versions of mentalism in linguistic theory both asserted that much of language persists in the domain of the unconscious mind, but they projected totally disparate views on the organization of the mind. For Saussure, the mind would be in total chaos apart from language (14-17), which obliged him to see the 'divisions' and 'units' of language as a 'mysterious fact' he evaded by invoking 'arbitrariness' and dismissing 'the question of the origin of language'. For Sapir, the mind apart from language would at worst be deprived of its 'highest, most generalized, level of symbolic expression' (45).

A bit disappointingly, perhaps, Saussure's sparse conception of the language system was more widely accepted in mainstream linguistics than Sapir's rich one. The sparseness expediently freed the linguist from the challenges of explaining the organization of language in relation to the organization of reality and culture, and of keeping up to date on cognitive and sociocultural research. But these expediencies seem much less attractive today than they did in early linguistics. They may indeed have favored the defeat rather than the success of

the central project of modern linguistics: producing a complete formal description of a natural language. The notion of a language being an abstract system of 'oppositions' enabled adequate coverage in phonology and some parts of morphology, but not in syntax, semantics, or pragmatics, which have long since take different directions (Beaugrande 1994a, 1994b).

2.3. *Louis Hjelmslev*

I shall pursue the prospects for success or defeat of two further mentalist projects. The first would be Hjelmslev's 'glossematics', which he intended to stand staunchly within the tradition of Saussure, yet also intended to emphatically 'mark its difference from previous kinds of linguistics' (1969 [1943]:80). He seemed to want to be more Saussurian than Saussure himself by setting new standards in an antecedent discourse (*Prolegomena*) to a '*Theory of Language*' so stringent and austere as to require the most elaborate intellectual preparations.

An ironic consequence of this ambition was an uneasiness toward mentalism, which Hjelmslev probably suspected of not being properly 'linguistic'. He opened his *Prolegomena* with a mentalist praise of language so ebullient in metaphor and so inconsistent with the rest of the book that we may suspect he wanted a caricature he could swiftly leave aside:

(67) "Language is the instrument with which man forms thought and feeling, mood, aspiration, will and act". "Before the awakening of our consciousness language was echoing about us, ready to close around our first tender seed of thought." "It lies deep in the mind of man, a wealth of memories inherited by the individual and the tribe, a vigilant conscience that reminds and warns." (1969:3).

As with Sapir, language was suggested to precede or enable 'thought' and even 'consciousness', though presumably for the 'tender' human infant rather than for the whole human race. The image of language also being a 'a vigilant conscience' outdoes Sapir in suggesting that language can think on its own and arrive a different ideas about ethics and modes of conduct than the thinking speaker.

Starkly set against such a Sapirian rhetoric was Hjelmslev's emphatic adoption of Saussure's pessimistic rhetoric about the disorderly quality of the mind apart from language. He introduced the Danish term *mening*, translated as "purport", for the pool of meanings which is 'naturally common to all languages' and upon which 'linguistic form' 'lays arbitrary boundaries' 'in a given lan-

guage' (1969:50, 74, 77). Here too, his rhetoric waxed un-characteristically metaphoric:

(68) "The form is projected onto the purport, just as an open net casts its shadow down on an undivided surface." (1969:57).
(69) "This purport" "exists provisionally as an amorphous mass, an unanalyzed entity"; "subjected to many different analyses", it "would appear as so many different objects" (1969:50f).
(70) "Each language lays down its boundaries within the amorphous 'thought-mass' and stresses different factors in it in different arrangements, puts the centers of gravity in different places and gives them different emphasis. It is like one and the same handful of sand that is formed in quite different patterns, or like the cloud in the heavens that change shapes in Hamlet's view." (1969:52).
(71) "The purport is inaccessible to knowledge, since the prerequisite for knowledge is an analysis of some kind; the purport can be known only through some formation, and thus has no scientific existence apart from it." (1969:76).
(72) "We have been led to view a great number of special sciences outside linguistics as providing the science of linguistic content-purport." (1969:103).
(73) "An exhaustive description of the linguistic content-purport actually requires a collaboration of all the non-linguistic sciences; from our point of view, they all, without exception, deal with a linguistic content." (1969:78).

When Hjelmslev also envisioned as 'expression-purport' a 'phonetic sphere' being 'an amorphous zone' wherein 'phonemes' are 'arbitrarily included', we can recognize him re-enacting Saussure's moves of isolating the 'linguistic' by assigning 'sounds' to 'physiology', and 'concepts' to 'psychology' (59), two fields Hjelmslev also mentions (1969:54, 51). Again, the implications impend that the fields—for Hjelmslev indeed, 'all the non-linguistic sciences'—are being delegated to study 'shapeless masses' (17); and that the oddity of situating orderly language between disordered 'masses' is being papered over with the concept of 'arbitrariness'. In fact, Hjelmslev defined 'arbitrariness' in a truly radical way:

(74) "A theory in our sense, is in itself independent of any experience. In itself it says nothing at all about the possibility of its application and relation to empirical data." (1969:14).

This statement by far overshoots Saussure's notion of 'arbitrariness' and in effect turns it from a predicament within the language into an privileged instrument for theory-building.

Presumably, both of Hjelmslev's metaphor-laden rhetorical forays into mentalism—his enthusiastic praise of language and his grim vision of 'purport'—were intended to set aside large expanses of explanatory work that 'a linguistic theory' would *not* be expected to achieve. A strong motive here could have been that Hjelmslev was even more anxious than his mentalist predecessors at the prospect of encroachments from neighboring disciplines. It was on precisely this point that his own project was claimed to differ from all others so far:

(75) "Language, conceived as a sign system and as a stable entity, was expected to provide the key to the system of human thought, to the nature of the human psyche." "Considered thus, language, even when it is the object of scientific inquiry, becomes not an end in itself, but a means." (1969:4).

(76) "The physical and physiological, psychological, and logical phenomena per se are not language itself, but only disconnected, external facets of it, selected as objects of study, not for language's sake, but for the sake of the phenomena towards which language is oriented." (1969:4).

(77) "Thus the physical and physiological description of speech-sounds easily degenerates into pure physics and pure physiology, and the psychological and logical description of signs into pure psychology, logic, and ontology, so that the linguistic point of departure is lost from view." (1969:4).

(78) "The danger is a real one because it is in the nature of language to be overlooked, to be a means and not an end, and it is only by artifice that the searchlight can be directed on the means of knowledge itself. This is true in daily life, where language normally does not come to consciousness, but it is equally true in scientific research." (1969:4f).

(79) "What came to make up the main content of conventional linguistics—linguistic history and the genetic comparison of languages—had neither as aim nor as result a knowledge of the nature of language." (1969:5).

Taken together, these passages constitute a blanket indictment of linguistics for betraying its own enterprise by 'overlooking the nature of language' and threatening to 'degenerate' into neighboring fields, a derisive term that recalls their assignment to study 'shapeless and amorphous masses'.

Following up this indictment, Hjelmslev could present himself as a valiant rescuer with a new plan claiming absolute and exclusive 'scientific' status:

(80) "To establish a true linguistics", we "must attempt to grasp language, not as a conglomerate of non-linguistic (e.g., physical, physiological, psychological, logical, sociological) phenomena, but as a self-sufficient totality, a structure sui generis. Only in this way can language in itself be subjected to scientific treatment" (1969:5f).

(81) "What is required is the construction of a linguistic theory that will discover and formulate the premises of such a linguistics, establish its methods, and indicate its paths." (1969:6).

(82) "Linguistics must be assigned the special task of describing the linguistic form, in order thereby to make possible a projection of it upon the non-linguistic entities which from the point of view of language provide the substance. Linguistics must then see its main task in establishing a science of the expression and a science of the content on an internal and functional basis." (1969: 79).

(83) "Such a science would be an algebra of language operating with unnamed entities, i.e., arbitrarily named entities without natural designation, which would receive a motivated designation only on being confronted with the substance. Since linguistics is faced with this main task, whose solution has till now been almost completely neglected in all study of language, it must be prepared to face a most comprehensive work of thought and research." (1969:79).

It was no coincidence that this proposal for an 'algebra of language' insisted on its own 'arbitrariness' over and above Saussure's 'arbitrary bond between sound and idea', since as we saw, Hjelmslev's definition of 'arbitrariness' made 'theory' 'independent of any experience' and of its 'application and relation to empirical data' (74).

The bond between 'signifier' and 'signified' got renamed the 'sign function' relating 'expression' and 'content'; this relation was said to "constitute a purely operative definition and a formal one in the sense that in this context, no other meaning shall be attached to the terms 'expression' and 'content'" (1969:48). Saussure's mutual dependence between language and thought was aired, but only to assure us that 'except by artificial isolation, there can be no content without an expression':

(84) "If we think without speaking, the thought is not a linguistic content"; "if we speak without thinking, and in the form of series of sounds to which no content can be attached by a listener, such speech is an abracadabra, not a linguistic expression." (1969:49).

"Saussure's *Gedankenexperiment*" of "trying to consider expression and content each alone" was therefore "meaningless" (1969: 49f).[2]

Among the mentalists we have looked at so far, Hjelmslev adopted the most detached solution to the problem of how to relate language to consciousness. He began his book by asserting the relation in enthusiastic Sapirian tones but then simply walked away without any aggressive moves such as the physicalists like Bloomfield and Firth issued to deny such concepts as 'mind' and thought' (sections 3.1-2). Instead, he proposed to set up a 'linguistic theory' so formal and abstract that it simply made no reference to the contrast between mind versus behavior, mental versus physical; and, for good measure, he shunted off both sides—as 'amorphous masses'—from linguistics into psychology and physiology respectively (76-77), or into an unidentified consortium of 'non-linguistic sciences' (73).

Ironically, his proclaimed ambition to 'grasp language as a self-sufficient totality' (80) obliged him, on the contrary, to stay fairly clear of language throughout his *Prolegomena*, presenting a formal method for data ('text') analysis without applying it to any real data or texts. This detachment was authorized by his own radical definition of 'arbitrariness', but was understandably regarded by many linguists as a debilitating shyness at a time when both mentalists like Sapir and physicalists like Pike were busily working to develop fieldwork methods for previously undescribed languages. The daily problems of how to identify and describe either conscious or unconscious knowledge of language can hardly be resolved by a 'theory' that is 'independent of any experience' or 'application to any data' (74).

2.4. *Noam Chomsky*

A far more expansive and convoluted mentalist project—still in progress now, though most of its original energy has evaporated, even among its melting crowd of apostles and apologists—was later proposed by Noam Chomsky. Though widely trumpeted as 'revolutionary', the project was largely an amalgamation of the work of his predecessors coupled with some startling new rhetoric of claims about what it all meant and how linguistics should proceed. He took over Saussure's strict separation of 'language by itself' from language in use but under the new labels 'competence and performance' which intentionally rendered the opposition between mind versus behavior more openly programmatic. Through these two terms, a mentalist allegiance was built directly into the avowed object of description: no longer 'language' but the speaker's mental 'competence'.

Although Saussure, Sapir, and, most emphatically, Hjelmslev all regarded their projects as new departures in linguistics, Chomsky's confrontational rheto-

ric went far beyond them in his two best-known books—*Syntactic Structures* (1957) and *Aspects of the Theory of Syntax* (1965)—in fundamentally denying the scientific status of his predecessors and competitors, especially in linguistics as practiced in the US. No doubt he felt that mentalism had gone so far into eclipse by then that an aggressive advocacy was warranted. But, here too like Hjelmslev, he pushed his own arguments so far as to convert language into a sparse undescribable abstraction, about which we can make antecedent theoretical pronouncements regarding how a 'scientific' theory should be constructed—more *Prolegomena*, if you like—but we soon get into difficult problems when we turn in earnest to the description of real language data.

Chomsky's solution to the dilemma of getting between theory and description once more reminds one of Hjelmslev, this time of the latter's radical definition of 'arbitrariness' in (74), but was far more aggressive. Chomsky not merely foresaw a theory being '*independent of* any experience' of 'empirical data' but proclaimed that the theory *could not be produced from* experience or empirical data (e.a.):

(85) "There is, first of all, the question of how one is to *obtain information* about the speaker-hearer's competence, about his knowledge of the language. Like most facts of interest and importance, this is *neither presented for direct observation nor extractable from data by inductive procedures of any known sort*." (1965:18).

(86) "*No adequate formalizable techniques are known for obtaining reliable information* concerning the facts of linguistic structure (nor is this particularly surprising). There are in other words, *very few reliable experimental or data-processing procedures for obtaining significant information* concerning the linguistic intuition of the native speaker." "Furthermore, there is *no reason to expect that reliable operational criteria for the deeper and more important theoretical notions of linguistics*" "*will ever be forthcoming*" (1965:19).

(87) "Once we have *disclaimed an intention of finding a practical discovery procedure* for grammars, certain problems that have been the subject of intense methodological controversy simply do not arise." (1957:56).

The early third quote (87) attracted far less notice than the later two (85-86), but it shows us the rhetorical force of all three most clearly. By setting the task of describing an austere abstraction, Chomsky did not, like Hjelmslev, ask linguists to "face a most comprehensive work of thought and research" (83), but offered them a rationale for avoiding 'problems' and shunning the labors of con-

ducting 'observations' and applying 'formalizable techniques' or 'experimental procedures'—mostly labors that mentalists have long sought to push out of linguistics into physiology and psychology anyway, as we saw in sections 2.2-3.

Chomsky's own move was to push the physiological issues of articulation ('phonetics') and the psychological issues of concepts ('semantics') out of the 'grammar' and into a new domain he called 'language universals'; whether they should be studied by the disciplines of physiology and psychology and how has remained unclear, since he vowed that "the main task of linguistic theory must be to develop an account" of them (1965:28).

Chomsky was much readier than Hjelmslev to apply his 'theory' to language data, but again saving labor was the main rhetorical appeal. Instead of making observations, use yourself as a model of 'competence' and make up your own data:

(88) "The problem for the grammarian is to construct a description, and, where possible, an explanation, for the enormous mass of unquestionable data concerning the linguistic intuition of the native speaker, often himself." (1965:20).

Still more labor can be saved with a 'generative' solution to the problem of how to relate the whole language to the many different uses of the language: devise a compact rule-system for 'describing the structure' of all 'grammatical' sentences. This idea is reminiscent of two discourse moves from Chomsky's predecessors, one of them I have already cited:

(31) "We feel instinctively, without the slightest attempt at conscious analysis, that two sentences fit the same pattern, that they are really the same fundamental sentence." (Sapir 1921:85).

(89) "The power or wealth of a language consists of the morphemes and tagmemes: sentence-types, constructions, and substitutions." (Bloomfield 1933:276f).

A 'transformational' approach promised to save labor still further by postulating rules that convert one sentence-type into another, justified by the Sapirian 'instinctive feeling' (which Chomsky called 'intuition') that 'they are really the same fundamental sentence'. So the rules you might devise for one batch of sentences could turn out to 'explain' large numbers of additional sentences.

Like Saussure, Chomsky found the unconscious mind to be a most congenial home for the abstract language system attributed to the speakers of a language (e.a.):

(90) "Obviously, every speaker of a language has mastered and internalized a generative grammar that expresses his knowledge of his language. This is not to say that he is aware of the rules of the grammar or even that he can become aware of them, or that his statements about their intuitive knowledge are necessarily accurate." "Any interesting generative grammar will be dealing, for the most part, with *mental processes that are far beyond the level of actual or even potential consciousness*." "Thus a generative grammar attempts to specify what a speaker actually knows, not what he may report about his knowledge." (1965:8).

The question that had so troubled Chomsky's mentalist predecessors of whether the linguistic description corresponds to the speaker's knowledge of the language was finessed by simply introducing a 'systematic ambiguity' into the technical terminology so as to make the two domains identical:

(91) "Using the term 'grammar' with a systematic ambiguity to refer, first, to the native speaker's internally represented 'theory of his language' and, second, to the linguist's account of this, we can say that a child has developed and internally represented a generative grammar." (1965:25).

Through this move, 'linguist's account' was automatically merged, under the elastic term 'theory', with the 'native speaker's internal representation' of the language. To push this attractive and labor-saving merger onward, Chomsky drew an explicit parallel—already hinted at in (91)—between what children do when learning a language and what linguists do when constructing formal rules out of English sentences and then using the rules to describe many more sentences:

(92) "On the basis of such data, the child constructs a grammar—that is, a theory of the language of which the well-formed sentences of the primary linguistic data constitute a small sample." (1965:25).

A noticeable problem crops up here: the child does yet know the language, whereas the formal linguist both knows the language and already has a theory about how to describe it. So, to make the child resemble the linguist more closely, Chomsky (1965:25) stipulated a further mental 'precondition': the child 'possesses a linguistic theory that specifies the form of the grammar of a possible human language'—whence the famous 'hypothetical language acquisition device'. This rhetorical move provided yet another rationale for saving labor: lin-

guists could describe 'acquisition' by casually observing themselves constructing grammars, instead of painstakingly observing real children.

A further problem here, calling for further moves, was that the child was claimed to somehow 'internalize a grammar of well-formed sentences' while listening to everyday talk, which doesn't give much priority to well-formedness. Again, the 'unconscious' factor was strategically invoked (e.a.):

(93) "Much of the actual speech observed consists of fragments and deviant expressions". So "a child must have the ability to 'invent' a generative grammar that defines well-formedness" "even though the primary linguistic data [may] be deficient" (1965:200f).

(94) "The structure of particular languages may very well be largely determined by factors over which the individual has *no conscious control* and concerning which society may have little choice or freedom." (1965:59).

(95) "Language acquisition is based on the child's discovery of what from a formal point of view is a deep and abstract theory—a generative grammar of his language—many of the concepts and principles of which are only remotely related to experience by *long and intricate chains of unconscious quasi-inferential steps*." (1965:58).

As we see, the rhetorical move of untying 'competence' from 'direct observations', 'inductive procedures', and 'formalizable techniques', created fresh problems in explaining how 'competence' can be either acquired by a speaker or described by a linguist—whether or not we accept Chomsky's claim that the two are doing the same thing. Chomsky reneges on his claim somewhat, without noticing it, when he attributes to the linguist some higher power for seeing through to the 'deep and abstract theory' sealed off from the speaker's consciousness:

(96) "We present no new information to the hearer and teach him nothing new about his language but simply arrange matters in such a way that his linguistic intuition, previously obscured, becomes evident to him." (1965:22).

(97) "Surface similarities hide underlying distinctions of a fundamental nature; it may be necessary to guide and draw out the speaker's intuitions in perhaps fairly subtle ways before we can determine what is the actual character of his knowledge of his language or of anything else." (1965:24).

So we are back after all with Saussure's old problem of whether the "conscious and methodical classifications made by the grammarian" "coincide with the unconscious associations set up in speaking" (6)—and no nearer to a solution. If

the two don't coincide, then Chomsky's whole mentalist terminology about 'competence', 'knowledge of the language', 'internalized grammar', and so on, is merely metaphorical or misleading and represents no great advance over Hjelmslev's non-mentalist 'glossematic' terminology, for which no such coincidence was claimed. But if the two do coincide, then the relation between what people say and what the 'grammar' can describe should not be so plainly indirect and unreliable—people wouldn't bother to 'internalize a grammar' that they could use for 'performance' only in such roundabout and inefficient ways. To retort that people *must* internalize such a grammar because they are *compelled* to by an 'innate theory' is no solution: it merely pushes the problem back a step by shifting the same inefficiency from people's strategies for constructing a grammar over into their genetic programming—out of their unconscious into their genome.

And so Chomsky's project did not decisively profit after all from its own labor-saving rhetoric. Its chances of success look scant today, though, thanks to its expansionist recruitment of supporters in the 1960s and early 1970s, it is fading away only gradually as it becomes harder to ignore that after thirty years of intense research, we still have no complete 'generative grammar' covering any language. Indeed, we are further than ever from even having a consensus about how to construct such a grammar, or from a convergence of data descriptions (Beaugrande 1994a, b) (see section 4). And the rhetorical moves that once projected the 'grammar' to be an 'internalized' mental reality—especially the ones regarding language acquisition by children—have lost much of their credibility in the face of more 'reliable information concerning the facts of linguistic structure', drawn from new 'discovery procedures', 'observations', and 'experiments': all the sources Chomsky once invited us to 'disclaim' (85-87).

3. 'Consciousness' in the discourse of physicalist linguistics

3.1. *Leonard Bloomfield*

In mentalism, the strategic value of the notion of 'consciousness' and related terms is easy to recognize. The issue has naturally been quite different in physicalism, which, from the 1920s through the 1950s, dramatically advanced all across the sciences in the English-speaking world, proclaiming a 'unified science' with physics and physical discourse be the universal model. Its natural offshoot in the human sciences was 'behaviorism', profoundly affecting much of linguistics in the UK and the US.

In the influential books of Saussure and Sapir, mentalism had been taken as a general orientation rather than proclaimed as a doctrine bearing this name; and both books had freely used the term 'mechanism' in connection with language.[3] The influential monograph by Leonard Bloomfield, in contrast, openly declared a conflict between "two theories about human conduct, including speech" (1933:32). In these passages, he did not expressly cite Sapir, who was his older colleague (by five years) and decisively helped his career, though he did cite him in support of the complaint that "psychologists generally treat language as a side issue" (1933:512); and the term 'spirit' in (99) certainly has a Sapirian sound.

(98) "Adherents of *mentalistic* psychology believe that they can avoid the difficulty of defining meanings because they believe that prior to the utterance of a linguistic form, there occurs within the speaker a non-physical process, a 'thought, concept, image, feeling, act of will', or the like." "For the *mentalist*, 'language is the expression of ideas, feelings, or volitions'. The *mechanist* does not accept this solution. He believes that 'mental images, feelings', and the like are merely popular names for various bodily movements." (1933:142).

(99 "The *mentalist* theory, which is by far the older and still prevails both in the popular view and among men of science, supposes that the variability of human conduct is due to the interference of some non-physical factor, a 'spirit or will or mind' that does not follow the patterns of succession (cause-and-effect sequences) of the world." "The *materialistic* or, better, *mechanistic* theory supposes that the variability of human conduct, including speech, is due only to the fact that the human body is a very complex system. Human actions" are "part of cause-and-effect sequences exactly like those we may observe, say, in the study of physics and chemistry" (1933: 32f).

Bringing the conflict into the foreground responded to the pressure upon linguistics from 'unified science'—for which Bloomfield (1949) wrote the treatise on *Linguistic Aspects of Science*—to align itself with the natural sciences rather than with the human sciences. Naturally, a conspicuous target of opposition here was psychology, which had still seemed quite close for Saussure and Sapir and had strongly influenced Bloomfield's own early book *Introduction to the Study of Language* (1914):

(100) "We have learned" "that we can pursue the study of language without reference" to "any one psychological doctrine and that to do so safe-

guards our results and makes them more significant to workers in related fields" (1933: xv).

(101) "I believe that mechanism is the necessary form of scientific discourse": and "an exposition which stands on its own feet is more solid and more easily surveyed than one which is propped at various points by another and changeable doctrine" (1933:xvi).

In retrospect, it is quaint to see Bloomfield implying that 'mechanism' is either not a 'doctrine' or else not 'changeable', when mechanism is precisely the doctrine most responsible for making his book seem dated today.

With psychology thus put aside, physicalism was much more favorable than mentalism toward a physiological approach (102-103). But Bloomfield's optimism here sounded a trifle uneasy, hedged with reservations (104) or with prophecies of a brighter but distant future (105):

(102) "Thanks to the sciences of physiology and physics we know enough about the speech event" to say: "the gap between the bodies of the speaker and the hearer—the discontinuity of the two nervous systems—is bridged by the sound waves" (1933:25f, emphasis removed).

(103) "Physiologically, language is not a unit of function, but consists of a great many activities, whose union into a single far-reaching complex of habits results from repeated stimulations during the individual early life." (1933:37).

(104) "Descriptions of speech sounds" can be "made in terms of a speaker's movements: more refined physiological observation may show that some of them are wrong" (1933:127).

(105) "We may expect the physiologist to get better results when he looks for correlations between points of the cortex and physiological activities concerned in speech." (1933:36).

Whereas Sapir had cited 'the frequent experience of fatigue in the speech organs' after 'intensive thinking' (1921:19) in support of his argument that language and thought are identical, Bloomfield seized upon the same phenomenon to reduce 'thinking' to 'talking to ourselves' and "suppressing the sound-producing movements and replacing them by very slight inaudible ones" (1933:28).

Yet like Saussure and Sapir, Bloomfield could not quite dismiss the relation between linguistics and psychology. Instead, he proposed his own 'division of scientific labor' handing the general 'mechanism' of 'stimulus' and 'response' over to both physiology and psychology, and limiting the linguist to the 'speech-

signal', while proposing an intermediary domain of 'linguistic psychology' (among whose concerns he mentioned 'stuttering' and 'aphasia'):

(106) "The mechanism which makes people say certain things in certain situations" is "a phase of our general equipment for responding to stimuli, be they speech-sounds or others. These mechanisms are studied in physiology, and, especially, in psychology. To study them in their special bearing on language is to study the psychology of speech, *linguistic psychology*. In the division of scientific labor, the linguist deals only with the speech-signal; he is not competent to deal with problems of physiology or psychology. The findings of the linguist" "will be all the more valuable for the psychologist if they are not distorted by any prepossessions about psychology" (1933:32).

The unflattering hint that psychology is prone to foster 'prepossessions' and 'distortions' might remind us of Saussure's and Hjelmslev's ironic invitations to psychology to study a 'shapeless and amorphous mass', and harkens back to Bloomfield's own conversion away from the 'psychological doctrine' in his early book and doubtless to his irritation when the 'doctrine' turned out to be 'changeable' (100-101). But now he was merely the standard-bearer of another 'doctrine' that proposed to solve the problems of describing mental entities by converting them all, as if by the stroke of a magic pen, into 'bodily movements' (98).

Yet the price of his new doctrine with its powers of conversion proved unexpectedly high in the long run. After stripping away their *meaning*—a mental entity Bloomfield insisted "cannot be analyzed within the scope of our science" (1933:161)—the observable events and bodily movements associated with language threaten to become a 'shapeless mass' of external details after all. After conceding that "we do not understand the mechanism" postulated in (106) (1933:31f), he attained an alarming vision of just such a 'mass':

(107) "The occurrence of a speech (and, as we shall see, the wording of it) and the whole course of the practical events before and after it, depend upon the entire life-history of the speaker and the hearer." (1933: 23).

(108) "We could foretell a person's actions (for example, whether a certain stimulus will lead him to speak, and, if so, the exact words he will utter), only if we knew the exact structure of his body at the moment, or, what comes to the same thing, if we knew the exact make-up of his organism at some early stage—say at birth or before—and then had a record of

> every change in the organism, including every stimulus that had ever affected the organism." (1933:33).

Here, Bloomfield has lost sight not just of the criteria for defining the aspects specific to language, but also of the consensus of a language community, Henceforth each speaker or hearer now figures merely as an individual 'organism' with a explosively long and adventitious 'bodily history' of collecting 'stimuli' and 'responding' to each one in turn. It's hard to imagine how we could ever finish describing just one act of speech, or indeed, how we could even get started.

Not surprisingly, Bloomfield's monograph made no mention of either 'conscious' or 'unconscious' sectors of language. Had he done so, he would probably have said that the 'unconscious' is a pool of prior 'stimulus-response pairings' stabilized by 'conditioning' into 'habits', whereas the 'conscious' is the set of currently impinging 'stimuli' plus the 'responses' to be made. This behaviorist scheme would imply that both language and language use are largely 'unconscious'; even the current act of speech would be predetermined by the 'history' of the 'organism', so 'conscious' deliberations about what to say would seldom be relevant. Certainly, Skinner's (1957:311) book on *Verbal Behavior* took such a position, even casting the speaker as a mere 'interested bystander'; but Bloomfield's monograph never spelled it out, and perhaps wisely so.

His work went in many directions, with its greatest impact on linguistic fieldwork and later on language teaching. Aside from studies of phonetics and articulation, the research program inspired by the 'mechanism' reflected in such rhetorical moves as (98-108) was not so much defeated as never really begun in earnest because it lacked the 'mental' criteria for handling the 'mass' of physical data it soon would have encountered. Some of Bloomfield's immediate successors, who excluded 'meaning' even more rigorously than he had, retreated from all the physical data in a speech situation over to the 'distribution' of language units in transcribed texts (e.g., Harris 1951); and that project suffered quite a visible defeat, helping to set the stage for the resurgence of mentalism in Chomsky's project.

3.2. *J.R. Firth*

J.R. Firth, another adherent of a behaviorism foregrounding "the bodily system, personality, and language through life" (1957 [1934-51]:188), did invoke 'consciousness', but usually just to urge its exclusion from linguistic theory. He not merely applauded Malinowski's (1944:84) admonition about 'mental states'

(109, 114) and banned 'thoughts', 'ideas', 'mind' (110-13); he also decried the terms 'expression' (freely used by Saussure, Sapir, and Bloomfield) and 'communication' (used by Sapir and Bloomfield, but not by Saussure) (112-14) (e.a.). He officially claimed to forswear the "duality of mind and body, idea and word" (1930-37:20) and to take no sides in the conflict over 'materialism' versus 'mentalism' (115); but he was probably just trying to dissociate himself from the emphatic crusade of Bloomfield (98-101), whom he regarded as a rival (e.a.).[4]

(109) "All *mental states* which are postulated as occurrences within the private consciousness of man are thus outside the realm of science." (1968 [1952-59]:158).

(110) "General linguistics" "does not mean the study of the use of language as an instrument of *thought*" (1968:206).

(111) We must "regard language as a mode of action rather than as a counter-sign of *thought*" (1968:148).

(112) "The easy definition of language as what we *think* with, as a vehicle for the expression of our feelings or the *communication* of *ideas*, is a euphemistic over-simplification of the facts of life. Speech behavior involves your whole organism and takes in the recurrent situations of your daily life." (1964 [1930-37]:135).

(113) "The older conceptions of language as 'the *expression of thought* by means of speech sounds', or 'outward manifestation of inward workings of the *mind*', or '*expression* for the sake of *communication*, *thought* made apprehensible' [quoted from Sweet, Tylor, Whitney, and Hermann Paul] are based on a now somewhat discredited psycho-physical dualism, speech being only an external manifestation of inner psychical processes. The American behaviorist, Watson, on the contrary, says that there is no such thing as '*thinking*'. There is only 'inner speech' or the incipient activity of laryngeal and other speech processes." (1964:150).

(114) "If we regard language as *expressive* or *communicative*, we imply it is an instrument of inner *mental states*. And as we know so little of inner *mental states,* even by the most careful introspection, the language problem becomes more mysterious." "By regarding words as acts, events, habits, we limit our inquiry to what is objective and observable in the group life." (1964:173).

(115) "The main purpose is the exposition of linguistics as a discipline and technique for the statement of meanings without reference to such dualisms and dichotomies" as "language and *thought*". "I must not be taken to exclude the concept of mind, or to imply an embracing of materialism to avoid a foolish bogey of mentalism." (1957:192).

Curiously, though, when Firth's deliberation on how to 'determine what are the units of speech' leads into the notion of 'phonemes', we find an utterly uncharacteristic mentalist claim:

(116) "The patterns of language in the 'unconscious' background are just as important as the patterns of speech we make and hear. Perhaps the patterns are the important things." (1964:183).

This isolated moment in Firth's discourse reminds us that it was precisely the 'reciprocal delimitation of units' that had helped lead Saussure into a mentalism where he saw 'the characteristic role of language' to be 'serving as a link between sound and thought' (9-11) and matched up 'phonological units' with 'unconscious auditory impressions' (5). Apparently, linguistic theorizing can't quite dispense with the 'unconscious' even when the official doctrine sternly demands that it should.

3.3. *Kenneth Lee Pike*

Kenneth Lee Pike was a pupil of Sapir's but was also much influenced by Bloomfield, and sought an intermediary position. Especially in his early work, he was a resolute behaviorist, yet in his *Unified Theory of the Structure of Human Behavior* (published in 1967 but spanning the years from 1945 to 1964), we find a number of citations leaving some room for mentalism, as if sustaining a counterpoint in the name of others. The quotes did not banish 'thought', 'concepts', and 'thinking' but mildly allowed that they are less identical with language than Sapir would claim (117-119). Also, the quote from Cassirer about 'chaos' being brought to 'order' by 'linguistic' means (120) recalls Saussure's vision (14-17); and the quote from Mead (121) recalls Sapir's vision of 'language ticketing off experience' for 'communication' (38).

(117) "Much more exciting, because implying 'a complex dynamic process', is the extensive discussion of Vygotsky (1939), for whom 'units of thought and speech do not coincide', even though they 'show unity but not identity'; thought is 'there simultaneously, but in speech it has to be developed successively'." (1967:640).

(118) "Concepts can be formed and operated upon without awareness of the subjects as to their criteria for these, so that 'behavioral attainment' and 'verbal attainment' may be different tasks (Bruner, Goodnow & Austin 1956)." (1967:639).

(119) "For the ability to think even where there are incapacities for speech, with the suggestion that the difference is due to the physiological and psychological structures of the different performances, note Goldstein (1948)." (1967:544).

(120) "The chaos of immediate impressions takes on order and clarity for us only when we 'name' items and so permeate them with the function of 'linguistic thought and expression' in which the world of impressions" "acquires a new intellectual articulation" (see Cassirer 1953) (1967:639).

(121) "The perception of objects as enduring is not possible without language (Morris 1946: quoting George Herbert Mead)." (1967:678).

Pike found it 'fitting to close the volume' with Mead's precept (121), doubtless because a 'unified theory' would be rhetorically motivated to link language closely to other human faculties and activities rather than to isolate it. Significantly, Pike was among the first prominent linguists who expressly "abandoned the distinction between 'la langue' and 'la parole' proposed by de Saussure" (1967:536).

On a direct descriptive level, Pike, like Firth, granted the mental aspect of 'phonemes' but aired it as a problem for observation. He proposed to resolve the problem by postulating 'congruent systems', such that the observable 'manifestation mode' (the physical) could serve as a correlate for the 'inaccessible' 'thought sequence' (the mental):

(122) "The phonemes in a thought sequence" "would be equated with the phonemes of the same sequence spoken aloud or heard, but with variants conditioned by their occurrence in the congruent system of thought for which the manifesting physical elements are neither articulatory" "nor auricular, but are neurological. This activity in the brain would be assumed to constitute the manifestation mode of those particular variants of the phonemes of a thought sequence, even though this activity is not accessible to observation in phonemic detail, and in spite of the fact that the person thinking may have no proprioceptive sense of the details" (1967:311).

On a less direct level, Pike moved away from Bloomfield and nearer to Sapir by postulating an active role for the 'conscious' and the 'unconscious'—less active for 'morphemes' (123) and more so for 'tagmemes' (124). He tended to associate this factor with the size of units, the speed and fluency of the performance, and the response of listeners (125) (e.a.):

(123) "Ordinarily, a morpheme (except in a hypostatic dictionary listing) is below the threshold of participant awareness and shorter than a unit of 'present' focus of utteremic size and character", "unless it happens to be manifesting a complete uttereme under *conscious* attention (as in 'Boy!') or is under the immediate scrutiny of the analyst" (1967:175).

(124) "The tagmeme, through the membership of its manifesting class, is very important to human behavior, since" "it is here that deliberate *conscious* choice is frequently exercised as to alternative purposes or goals to be pursued or meanings to be suggested to others, although at other times the factor of choice does not reach the threshold of awareness. When an author is hunting for the right word, the process of choice or selection becomes highly *conscious*; it can be made *conscious* even if it was not so before" (1967:197).

(125) "When one speaks rapidly the attention is likely to be focused only on the higher layers of choices and purposes, with the internal elements representing a highly intricate *unconscious* selection of alternatives within them larger patterns. Selection of items within the smaller layers is likely to become *conscious* when one's activities are disapproved by other persons in the culture, or when disputes arise or when motives are challenged or under new situations." (1967:197).

His most ambitious 'larger but incomplete model scale analogy' was concerned with 'epistemological attitudes or actively held belief systems' that 'provide integrating organization' and again had to be linked up with 'manifest behavior':

(126) "Without a belief system (conscious or unconscious, vague or organized concerning the nature of the world around him, and concerning his own person) the individual could not act purposively." "If one wishes to discover the nature of a particular adult's epistemological attitudes, or belief systems, or character, one can do so only by examining his overt behavior" "which manifests or constitutes the manifestation of these underlying attitudes" (1967:533f).

But the tidy parallel we could assume for 'phonemes' would hardly apply here, and Pike quickly 'returned to linguistics' without showing just how to get from 'overt behavior' over to a 'belief system'.

Still, a move like (123), with its reference to 'hypostatic listing' and to 'scrutiny of the analyst', signals that Pike had hit upon a genuinely new sensibility for linguistic investigation. Thanks to his dual allegiance as an official physi-

calist with greatest admiration for his mentalist teacher Sapir—to whom the ponderous *Unified Theory* was dedicated—Pike recognized the threshold between 'conscious' and 'unconscious' as a factor that can affected by linguistic investigation itself. Sapir's anecdote about the Nootka transcribers, and Chomsky's cheery proposal to 'arrange matters' so as to make 'linguistic intuition evident' (96) leave in place the ambition, already projected by Saussure, to merely provide a 'conscious' description of people's knowledge of language, 'conscious or not' (6). Only Pike's meticulous attention to the behavior of speakers as they move in and out of the role of 'informants' is likely to reveal a more complex transaction, whether you are 'observing' and 'testing' other people (127-28) or being your own informant (129):

(127) "Too rigorous a direct attempt to observe a person might indeed change his reactions" by making him "self-conscious" (cf. Zipf 1935:12) (1967: 191).

(128) "Such a test leads to a different kind of indeterminacy by changing the structure of the informant and rendering any further tests less reliable at any point where such a test assumes that the speaker is still linguistically naïve." (1967:238).

(129) "Linguists find it necessary to exercise caution in utilizing themselves as their own informants, since their analytical procedure can easily modify the system they are studying without their being conscious of the fact that a shift in the data is going on at the very time they are working." (1967:159).

To me, these prospects, situated at the interface between mind and behavior, are far more significant than either mentalism or physicalism can appreciate as long as it claims to be the sole scientific framework for linguistics. The linguists who assigned language to the 'unconscious mind' were encouraged by their own mandate to describe 'language by itself', to view this mind as an essentially static and stable construct, uniform all across the 'collective mind' (Saussure's term). The physicalist linguists who denied the consignment language to the 'mind' hoped to derive stability and uniformity from the 'complex of habits' formed in 'early life' (Bloomfield's terms in (103)). Neither side was prepared to concede that *the phenomenon of language may be continually evolving, both consciously and unconsciously, in the human mind and body all the time*, including the time when you set about investigating it. But that is precisely the point reached by Pike's 'tagmemics', which began in the 1940s as a project for doing more expansive and detailed fieldwork on previously undescribed tone-

languages without even a bilingual interpreter as informant, and ended up as a new sensibility toward the whole epistemology of language study.

4. Conclusion

Returning to the issues briefly aired in Section 1, we can conclude that the old dualisms have not been altogether serviceable for 'modern linguistics', and that our attempts to deploy them to make our explanatory work easier have in the long run made it considerably harder. If language existed in the 'collective unconscious mind', then it should persist unaffected by the conscious communicative behavior of speakers, just as Saussure and Chomsky were eager to assume. But in return, all the evidence we could glean from that behavior would be merely inferential for a theory of the language. This leeway has excused us for decades from contemplating the prospect that Saussure's abstract 'langue' and Chomsky's purely grammatical 'competence' are merely *technical fictions hedged round with rhetorical moves* to make us believe they will enable much explanatory work to get done without leaving the tidy preserve of 'language by itself'. In practice, they have instead stymied our explanatory work as soon as we have ventured beyond the prim domains of phonology, morphology, and basic phrase structure. The license granted by mentalism to postulate 'unconscious systems' of 'oppositions' or of 'underlying structures' has only obstructed our efforts to obtain either wide coverage of real data, or a consensus among linguists or a convergence among data descriptions. Yet we have hardly done better by the mandate of physicalism to attend only to 'overt behavior', because we then cannot reliably agree about which bits of behavior are meaningful and what their meanings might be.

The way of the future, already quite evident in more recent linguistics (e.g., 'cognitive linguistics' and 'critical linguistics') and in adjacent areas such as 'cognitive science' and 'discourse processing', is to transcend the old dualisms, giving due credit to both physical and mental, and to both conscious and unconscious, and to their continual interactions in human life, as far as we can determine them with empirical means. A central issue will be the principled flexibility and evolution of these interactions, ranging from the unconscious motor programs that make the production of speech sounds so quick and easy over to the self-conscious use of technical language for explaining, say, new discoveries in cosmology or particle physics, including phenomena we cannot observe at all with current technology and can only put into language—or, harder still, for explaining such things in everyday language.

An important corner of this work will be the transactions whereby people, including linguists, make their thoughts or their knowledge of language more conscious for purposes of utterance, observation, and description. When 'thoughts' get put into language, they are not simply dressed up in a transparent coating, but neither are they miraculously snatched out of a 'shapeless mass' into a world of pure form. They exploit an organizational system that is already richly interfaced with the conceptual system (Beaugrande 1996). And when knowledge of grammar is made conscious, it can be most reliably described if people apply to the same sorts of tasks to which it is unconsciously applied—to react normally to real discourse and not to decide the formal 'grammaticality' of isolated unrealistic sentences we have just invented to prove a technical point of grammar.

The research program we face today no doubt seems far more ambitious and untidy than those carved out by the linguists whose discourse we have been engaged with here. But we may be rewarded with a reverse trade-off. Whereas the moves to make things easier have often ended up making them harder, perhaps our resolve to face the full hardness of our tasks may make it easier in the long run to progress toward a wide coverage of real data, a consensus among linguists, and a convergence among data descriptions.

Notes

1. The issue of excluding the 'psychophysical' from linguistics was to be a preoccupation of the mentalists, including Saussure, Sapir, and Hjelmslev (cf. sections 2.2-3).

2. If Hjelmslev was alluding here to the *Cours*, he was being unfair to Saussure, who actually said: "The linguistic entity exists only through the associating of the signifier with the signified; whenever only one element is retained, the entity vanishes." (1966:102f).

3. Saussure (1966:87, 103, 108, 111, 121, 133, 161, 165); Sapir (1922:11, 55, 62, 100, 121, 125, 161, 174, 187); compare samples (12), (27), (39), (57), (63), and (66).

4. In Bloomfield's book, Firth remarked, "you will meet once more all the old scheme of rhetoric and the technique of the eighties of the last century amid a highly individual terminology bristling with neologisms" (1957:15).

References

Beaugrande, Robert de 1991. *Linguistic Theory: The discourse of fundamental works*. London: Longman.

Beaugrande Robert de. 1994a. "Function and Form in Language Theory and Research: The tide is turning". *Functions of Language* 1(2):1-38.

Beaugrande, Robert de. 1994b. "New Horizons for Functional Theories of Language: The 'warrant' for large-corpus linguistics". Paper at the Sixth International Congress of Systemic Functional Linguistics, Gent, Belgium, Aug. 1-5, 1994.

Beaugrande, Robert de. 1996. *New Foundations for a Science of Text and Discourse*. Norwood, NJ: Ablex.

Bloomfield, Leonard. 1914. *An Introduction to the Study of Language*. New York: Holt.

Bloomfield, Leonard. 1933. *Language*. Chicago: University of Chicago Press.

Bloomfield, Leonard. 1949. *Linguistic Aspects of Science* (International Encyclopedia of Unified Science I/4). Chicago: University of Chicago Press.

Bruner, Jerome, Jacqueline Goodnow & George Austin. 1956. *A Study of Thinking*. New York: Wiley.

Cassirer, Ernst. 1953 [1923-29]. *Philosophy of Symbolic Forms*. New Haven: Yale University Press.

Chomsky, Noam. 1957. *Syntactic Structures*. The Hague: Mouton.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge, Mass.: MIT Press.

Firth, John. 1964 [1930-37]. *Tongues of Men* and *Speech*. Ed. by Peter Strevens. London: Oxford University Press.

Firth, John. 1957. *Papers in Linguistics 1934-1951*. London: Oxford University Press.

Firth, John. 1968. *Selected Papers of J.R. Firth 1952-1959*. Ed. by Frank R. Palmer. London: Longman.

Goldstein, Kurt. 1948. *Language and Language Disturbances*. New York: Grune & Stratton.

Harris, Zellig. 1951. *Methods in Structural Linguistics*. Chicago: University of Chicago Press.

Hjelmslev, Louis. 1969 [1943]. *Prolegomena to a Theory of Language*. Madison: University of Wisconsin Press.

Malinowski, Bronislaw. 1944. *Freedom and Civilization*. New York: Roy.

Pike, Kenneth. 1967 [1945-64]. *Language in Relation to a Unified Theory of the Structure of Human Behavior*. The Hague: Mouton.

Sapir, Edward. 1921. *Language*. New York: Harcourt, Brace, & World.

Saussure, Ferdinand de. 1969 [1916]. *Course in General Linguistics*. Trans. by Wade Baskin. New York: McGraw-Hill.

Skinner, Burrhus Frederick. 1957. *Verbal Behavior*. New York: Appleton-Century-Crofts.

Vygotsky, Lev S. 1939. "Thought and Speech". *Psychiatry* 2:29-54.

Zipf, George Kingsley. 1935. *The Psycho-Biology of Language*. Boston: Houghton Mifflin.

Consciousness, Construal, and Subjectivity

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Terms like *consciousness*, *awareness*, and *attention* are notoriously hard to pin down. Their shifting, overlapping senses invite a study in semantic fields analogous to the classic description done by Jost Trier (1934) for *Wîsheit*, *Kunst*, *List*, and *Wissen* in medieval German. I have not attempted such a study, nor would I claim the background and competence needed to carry it out. Brief comments on some uses of the terms will nonetheless help to identify the particular kind of *non-(consciousness/awareness/attention)* that concerns us.

1. Consciousness

In what I judge intuitively to be its basic meaning, *consciousness* pertains to the canonical mental state of an individual who is awake, apprehends the surroundings via sensory input, and engages in thought that is to some degree self-monitored and goal-oriented. *Unconsciousness* is then the opposite, non-apprehending state of, say, a person in a coma. For someone sleeping the term *unconscious* sounds like an overstatement, with respect to both degree and to ease or reversibility. There is, I think, little problem describing a sleeping person as *non-conscious*, except that the expression would normally be preempted by *asleep*. In any case, we will only be concerned with the linguistic and cognitive activity of individuals who are *conscious* in this primary sense.

A person who is *conscious* can nevertheless engage in various actions that are said to be *unconscious*. Here we should probably recognize a continuous spectrum of possibilities. At one extreme lie complex activities, normally subject to conscious control, which become so *automatized* that they essentially 'run in the background' without active monitoring. For example, I have often

driven to school virtually on 'automatic pilot', being so preoccupied with other matters that the driving itself never became the *focus of attention*; though I must have been observing the road, making decisions, and so on, this all remained at the very periphery of *conscious awareness*. At the other extreme are simpler and highly frequent actions, such as blinks and nervous tics, that are not usually under volitional control, and which we may be unaware of altogether. The gestures that accompany speech range widely along this spectrum (McNeill 1992). In fact, the same can be said for speech itself. So much of linguistic structure resides in pre-packaged units of various sizes (lexical items, collocations, formulaic expressions, conventional ways of phrasing things, etc.), that even the production of 'novel' sentences is largely automatized. Relative to a sentence's full structural complexity, the number of decisions made through conscious 'constructive effort' tends to be fairly small (Pawley 1985; Langacker 1987a: 1.2, 1988).

Let us concentrate on activities that have at least the potential to be the focus of attention—if not automatized (or not carried out in automatized fashion), they can occupy the center of conscious awareness. Even these activities have certain facets of which we are *un*aware. For one thing, we have no conscious access to the nature of the cognitive processing involved. I take it as axiomatic that mental experience consists in neurological occurrences: having a particular experience resides in a particular kind of neural activity, whose occurrence *constitutes* the experience. In principle, then, the same experience can be described either phenomenologically, i.e., from the standpoint of the experiencer, or else in terms of the constitutive neural processing. Of course, we are a long way from being able to specify the complex pattern of neurological activity that constitutes a given experience. The basic data for linguistic analysis presents itself phenomenologically, and the descriptive constructs devised by linguists aim primarily at that level.

Suppose, then, that a person has a particular experience, e.g., seeing a human face. Starting with the stimulation of certain receptor cells in the retina, this experience is created and constituted by a complex train of electrochemical activity involving countless neurons in many parts of the brain. If we represent the experience as *E*, and the neurological activity as *NA*, the fact that *NA* constitutes *E* can be given by the formula $NA >> E$. Importantly, the symbol >> does not indicate a relationship between separate entities, but rather that the same occurrence is describable on either of two levels: in terms of neural processing and phenomenologically. (In the same way, the formula $L >> B$ would indicate that a certain piece of leather constitutes a belt, without implying that the leather and the belt are separate objects.) The essential point for present pur-

poses is that the experiencer has no conscious access to the processing activity. The person merely has the phenomenological experience of seeing a human face, with no awareness (*qua* experiencer) that any neurological activity is involved and no knowledge of what its character might be. It is only from the standpoint of an outside observer that the occurrence is describable on two levels. A philosopher thinking about the nature of consciousness might pen the formula $NA >> E$, but the experiencer is only aware of E.

I would argue, in fact, that awareness or apprehension of NA is never part of the experience E that NA constitutes. Suppose a clever philosopher figures out that the particular experience (E) of seeing her husband's face resides in the occurrence of a particular sequence of neurological activity (NA). She knows the precise formula $NA >> E$, and being a highly dedicated philosopher as well as a clever one, she now recalls the formula every time her husband's face comes into view. However, recalling the formula is not the same as the experience E—experience E is the experience of seeing her husband's face. Nor is recalling formula NA the same as the occurrence of NA, which constitutes the experience of seeing a face, not that of recalling a formula. When the philosopher sees her husband's face, so that $NA >> E$ occurs, the co-occurring experience of recalling the formula constitutes another, more complex, experience E', residing in a different pattern of neural activity, NA'. Our philosopher thus has two experiences—$NA >> E$ and $NA' >> E'$—representing distinct *levels of conceptual organization*, one of which pertains to the other (E' being the conscious apprehension of $NA >> E$). As a fully general matter, consciously examining an experience E (as opposed to merely having it), or thinking about the nature of its constitutive processing NA, must always reside in a distinct, higher-order experience $NA' >> E'$.

A conscious experience E thus has at least one unconscious facet to it, namely NA. Should the experiencer gain some conscious awareness of NA, that awareness defines a higher-order experience E' that in turn is constituted by the unconscious processing NA'. Similar reasoning applies to an additional facet of conscious experience we are normally unaware of, which is our main interest here. The basic idea is simple enough: a *conceptualization* resides in the mental activity of a *conceptualizer*, who either actively or passively determines its character; however, the *content* of a conceptualization—what one is actually aware of—makes no inherent reference to the conceptualizer's active or passive role in shaping it. Let us use the formula $C \rightarrow T$ to indicate that a *conceptualizer* (C) entertains a particular thought (T). The essential point is that C's entertaining of T does not imply that C is consciously aware of C, of $C \rightarrow T$, or how C determines the specific nature of T. Any such realization by C constitutes a

higher-order thought T', which refers to $C \rightarrow T$ in some fashion. Thus, if $C \rightarrow T$ is a philosopher imagining her husband's face, the specific realization that she is doing so implies the higher-order relation $C \rightarrow T'$, where T' makes reference to $C \rightarrow T$. Collapsing the formulas, the overall event of imagining the face and being consciously aware of so doing can be given as follows: $C \rightarrow [\ \ldots\ C \rightarrow T\ \ldots]_{T'}$.

One must therefore distinguish between merely having a certain conception—e.g., seeing a flash, imagining a face, or mentally reciting the alphabet—and observing or monitoring the process of doing so. The former experience is represented by T in the formula $C \rightarrow T$, and the latter by T' in the more complex formula $C \rightarrow [\ \ldots\ C \rightarrow T\ \ldots]_{T'}$. Of course, C's role in this latter is also implicit, barring the still higher-order experience of being aware that one is aware of entertaining T: $C \rightarrow [\ \ldots\ C \rightarrow [\ \ldots\ C \rightarrow T\ \ldots]_{T'}\ \ldots]_{T''}$. What concerns us, though, is the status of C at a particular level of organization, regardless of how many levels are involved. At a given level, $C \rightarrow T^{(\prime)}$, the role of C is outside the scope of conscious awareness. Although a conceptualization resides in the mental activity of a conceptualizer, and does not exist independently, the conceptualizer does not *per se* figure in its content (T).

To reflect this asymmetry, I refer to C as the **subject of conception** and to T as the **object of conception**. The formula $C \rightarrow T$ can be recast as $S \rightarrow O$. To the extent that S functions exclusively as the subject of conception, and is not itself conceived, it is said to be **subjectively construed**. Maximal subjectivity thus attaches to an *implicit conceptualizing presence*, a center of consciousness directed at other entries. Conversely, O is *objectively construed* to the extent that is well-delimited, clearly apprehended, and rendered salient as the specific focus of attention. The hackneyed example of the theater affords both specific illustration and a convenient metaphor for these cases. If I attend a play, have a good seat, and become totally absorbed in the production (to the point of losing self-awareness), I construe the actors with a high degree of objectivity, whereas my own role is quite subjective. Metaphorically, it is useful to regard the subject of conception as being *offstage*, outside the general locus of attention. The object of conception is then the specific focus of attention *onstage*. Accordingly, the onstage region is called the **objective scene**.

The *S/O* asymmetry is most evident in the case of vision. As the critical components of our viewing apparatus, the eyes can be thought of as the subjects of visual perception. They are so arranged, however, that our gaze is directed outward and the eyes themselves cannot be seen (without the use of external devices such as mirrors). Hence their visual construal is fully subjective. To a lesser extent the viewer as a whole is subjectively construed. We can ob-

viously direct our gaze to particular parts of the body and examine them more or less objectively, but we cannot see the entire body the way another viewer does. When looking elsewhere, we can only see a few portions of our own body, with little acuity, at the very margins of the visual field. Even the portions we see are thus construed with a low degree of objectivity.

I take no position concerning the extent to which perception metaphorically structures other domains of experience. I do however claim that the notions subjectivity and objectivity are important for conception in general. Every conception has a *subject*, a center of awareness from which and with respect to which the content of that awareness is apprehended, whether or not (or to whatever extent) the subject figures in that content. Like the perspective point of a painting, the locus of the subject determines the specific configuration assumed by the content and provides its coherence, even when implicit and fully offstage. A revealing characterization of conceptual structure must therefore take into account the subject's locus and determining role. Its importance for linguistic analysis then follows directly from (i) the identification of semantic structure with conceptual structure, and (ii) the further claim that semantic structure and grammatical structure are indissociable.

Points (i) and (ii) are fundamental tenets of *cognitive grammar* (Langacker 1987a, 1990a, 1991). It claims that lexicon and grammar form a continuum fully describable as assemblies of **symbolic structures**, each consisting in the symbolic association between a **semantic structure** and a **phonological structure** (its two **poles**). All grammatical constructs are thus attributed a semantic value, for without conceptual structure there is no grammar—grammar reduces to the structuring and symbolization of conceptual content. Our purpose in what follows is to explore some ways in which semantic and grammatical structure are organized around a subjective center of consciousness. The relevant conceptualizers are the speaker and secondarily the addressee, who entertain the conceptions that constitute the meanings of linguistic expressions. Even when they are offstage and unmentioned, at the very margins of conscious awareness, the speech event participants have a central role in semantic structure and hence in grammar.

In creating an expression, the speaker entertains a conception that is understood as constituting its meaning, and the addressee does likewise in reconstructing the speaker's intent. It is crucial that we put aside the standard metaphor treating thoughts as pre-existing objects (e.g., *The thought just popped into his head*)—entertaining a conception is not just a matter of serving passively as a receptacle for it (cf. Reddy 1979). A conception resides in the conceptualizing activity of its subject, which can never be predicted or even repli-

cated in full, precise detail. Its content and character reflect countless specific options chosen from ranges of potential alternatives. While certain conceptions may seem identical, and may well be equivalent for particular purposes, in principle a sufficiently fine-grained examination would always reveal some differences.

2. Construal

A basic motivation for conceptualist semantics is the under-determination of meaning by objective circumstances. Presented with a situation, we are clearly capable of entertaining innumerable distinct conceptions with respect to it. Even knowing which facet of a situation is being considered, hence knowing the essential *content* of the conception, does not enable one to predict the specific form it will take. The reason is that a conception embodies more than just content, but also a particular way of **construing** that content. Distinct conceptions result from construing the same content in alternate ways. The subject of conception cannot avoid choosing, for construal is inherent in conception, and thus in the meanings of linguistic elements and the expressions assembled from them. In selecting a particular element or expression, the speaker necessarily imposes a particular construal on the content evoked.

Of course, the speaker is usually not conscious of doing so. The speech event participants are mainly concerned with the content of expressions and how it bears on the situation under discussion. In apprehending expressions, we are generally aware of neither the fact that we are imposing a particular construal, nor the specific choices we are making in the process of doing so. We remain non-cognizant of other possibilities for the same reason that most ambiguities go unnoticed: mental experience is constituted by what *does* occur, not by what *could* (but does not) occur; it consists in actual conceptions as opposed to potential alternatives. The non-consciousness of construal (its 'invisibility'; cf. Langacker 1993a) can also be explicated with reference to the asymmetry captured by the formula $S \rightarrow O$. Construal is intrinsically subjective, residing in tacit decisions made by S for purposes of apprehending O. It is roughly analogous to adjusting the focus on a pair of binoculars: it affects the viewing apparatus (part of S), thereby determining the precise appearance of what is viewed, but it is not itself a target of observation (O). To the extent that we ever recognize the existence or the effects of construal, such awareness represents a higher level of conceptual organization: $S \rightarrow [\ \ldots\ S \rightarrow O\ \ldots]_{O'}$.

For present purposes, a brief enumeration of certain facets of construal will be sufficient. First, we have the ability to conceive and portray a situation

at varying levels of specificity and detail. The expressions in (1), for example, could be used to describe the same entity, in a progressively finer-grained manner:

(1) *a thing* > *an animal* > *a cat* > *a kitten* > *a gray kitten* > *a dark gray kitten with white markings*

We can also entertain one conception against the **background** of another. Under this broad rubric fall such diverse phenomena as presupposition, previous discourse, and the relation between the source and target domains in metaphor. For instance, the sentences in (2) contrast semantically because they construe the same target conception against the background of different source domains, respectively involving a building and a plane (Lakoff & Johnson 1980).

(2)(a) *An anonymous reviewer demolished my argument.*
(b) *An anonymous reviewer shot down my argument.*

A third facet of construal is **scope**, i.e., the extent of the conceptual content an expression evokes. Within its **overall scope** (the full extent of its content), there are often grounds for positing a limited **immediate scope** comprising the content most directly relevant for a particular purpose or at a particular level of organization. Thus in (3), *upstairs* defines the immediate spatial scope for the following locative:

(3) *The kitten is hiding upstairs in the hall closet.*

Whereas the sentence's overall scope subsumes the entire house, for purposes of interpreting *in the hall closet* only the upstairs region is considered.

An expression's immediate scope was previously referred to as the *on-stage region* (or the *objective scene*). It can be characterized as the *general locus of attention*, hence the region within which focused observation is possible. The specific *focus* of attention—the entity an expression *designates*—is called its **profile**. The noun *lid*, for example, evokes as its content the schematized conception of a container with its cover, and from this conceptual **base**, (its scope) it selects the cover for its profile. Expressions with the same content can differ semantically and grammatically because they profile different aspects of it. For instance, the noun *square* and the adjective *square* have the same conceptual base; it comprises four line segments joined pairwise at their endpoints to form a polygon, together with a multifaceted relationship involving its sub-

parts (parallelism of opposite sides, equal length of all sides, perpendicularity of the angles). The noun and the adjective impose different profiles on this common base: The noun profiles the polygon *per se*—a kind of **thing**—whereas the adjective profiles the complex **relationship** among its parts. It is in fact an expression's profile that determines its grammatical class (Langacker 1987a, 1987b, 1991).

Profiling is one of numerous kinds of **prominence** involved in construal. Just one other kind will be mentioned here, namely, the relative prominence conferred on the participants in a profiled relationship. Relational expressions accord the status of *primary figure* to one of their participants, called the **trajector**, and often evoke a *secondary figure*—called a **landmark**—with respect to which the trajector is located and evaluated. Continuing the theater metaphor, trajector and landmark status can be thought of as primary and secondary spotlights of **focal prominence** that can be directed at various entities in the scene. A *subject* can be characterized as the trajector at a given level of organization, and an *object* as the landmark. Thus in (4)(a), *the reviewer* manifests the clausal trajector, and *my paper* the landmark. In (4)(b), on the other hand, *my paper* is the clause-level trajector, whereas *the reviewer* is not accorded focal prominence.

(4)(a) *The reviewer misunderstood my paper.*
(b) *My paper was misunderstood by the reviewer.*

However, *the reviewer* represents the trajector of the verb stem *misunderstand* in both sentences, and *my paper* its landmark. *The reviewer* is also the landmark of *by* in (4)(b).

Construal additionally comprises various factors conveniently grouped under the rubric of **perspective**. It is here that the role of a subjective center of consciousness is most apparent. Analogies to vision also suggest themselves with special force in this domain, as indicated by the term *perspective* itself. In fact, analogs in visual perception can be found for most if not all aspects of construal (Langacker 1993b, to appear). It is therefore convenient to use the word **viewing** in regard to any kind of conceptualization. This usage is not however meant to convey any particular stance concerning the role of visual perception in general cognition.

3. Vantage point

Viewing implies a **vantage point**, the position from which the scene is observed. While I believe that the content of every conception, even the most ab-

stract, is apprehended from some vantage point, we need not pursue that issue here. It suffices to recognize that an assumed viewing position is pivotal to the semantic value of many kinds of expressions. Naturally, the most obvious examples involve space and vision. In (5)(a), for instance, *behind* profiles a spatial relationship between its trajector (*the squirrel*) and its landmark (*the tree*) such that the landmark occupies and possibly blocks the line of sight leading to the trajector from the viewer's vantage point.

(5)(a) *The squirrel is behind that tree.*
(b) *Jill can't see the squirrel, since it's behind the tree.*

The default-case vantage point is that of the speaker, or of both speech event participants. It is of course possible to specify an alternate viewer and thus an alternate vantage point, as in (5)(b). The viewing relations in such expressions involve two levels of organization. Suppose we represent the single-event viewing relation in (5)(a) by means of the formula $S \rightarrow [TR - SQ]$, where S, TR, and SQ respectively indicate the viewing subject (the speaker), the tree, and the squirrel. The analogous relation in (5)(b), with Jill as the viewer, can then be given as $J \rightarrow [TR - SQ]$. Yet the speaker is also an active viewer in (5)(b) by virtue of conceptualizing the entire situation $J \rightarrow [TR - SQ]$. We thus have the higher-order viewing relationship $S \rightarrow [J \rightarrow [TR - SQ]]$.

These examples illustrate perhaps the most fundamental respect in which semantic and grammatical structure are organized around a subjective center of consciousness. By nature, the subjective center is implicit, not itself a target of conception. The privilege of being symbolized is however reserved for entities that function as targets—to be explicitly mentioned (profiled at some level of organization) is to be put onstage and construed objectively. It follows that entities should tend to be made overt through morphological coding to the degree that they are distinct from the subject and apprehended from a certain 'distance'. I suggest, in fact, that the subject of conception necessarily remains implicit when it functions exclusively in that capacity. This rough correlation between objectivity and extent of morphological coding might be interpreted as a special case of the distance-based iconicity discussed by Haiman (1983, 1985), in particular, the principle that "the linguistic separateness of an expression corresponds to the conceptual independence of the object or event which it represents" (Haiman 1983:783). However, Haiman was primarily concerned with the relation between *two expressions*, hence between two objectively construed entities, whereas the focus here is on the relation between what is overtly expressed and what cannot be.

The subjective center of consciousness remains implicit in both (5)(a) and (5)(b). In the two formulas $S \rightarrow [TR — SQ]$ and $S \rightarrow [J \rightarrow [TR — SQ]]$, only the bracketed material is directly coded morphologically; there is no explicit mention of the primary conceptualizers (the speaker and the addressee), even in (5)(a), where they serve as a point of reference for determining the profiled spatial relationship. Of course, Jill is also a conceptualizer in (5)(b). The sentence pertains to what she can see, and she is also the reference point for the locative relationship in the second clause. She is not, however, *exclusively* a subject of conception—for the speech event participants, she functions as a *target* of conception whose visual experience is being discussed. In her role as object of conception, at this higher level of conceptual organization, Jill is put onstage as a focal participant and directly coded by the subject nominal.

While in (5)(b) Jill is both a viewer and a point of reference with respect to the *behind* relation, there is no particular reason to think that the speech event participants actually adopt her vantage point for purposes of computing that relation. That is, they do not effect a **mental transfer**, shifting the center of consciousness to see the relationship 'through Jill's eyes'. Such transfers do however occur. One manifestation of mental transfer involves the use of *tomorrow* in lieu of *the next day*. I would describe *tomorrow* as specifically identifying its temporal reference point with the center of consciousness. Thus in (6)(a), the day in question is the one subsequent to the actual time of speaking, even though the adverb belongs to the subordinate clause describing someone else's previous statement. By contrast, *the next day* is necessarily anaphoric. It takes as its reference point a previously mentioned day which is not the day of the current speech event. Hence (6)(b) implies that Jack would arrive on Wednesday—if today is Friday, it cannot be interpreted as meaning that he will arrive on Saturday.

(6)(a) *Jack said he would arrive tomorrow.*
(b) *Jack phoned on Tuesday and said he would arrive the next day.*

Consider now the contrast in (7):

(7)(a) *Jill was excited on Tuesday, since Jack was arriving the next day.*
(b) *It was Tuesday. Jill was excited. Jack was arriving tomorrow.*

In both examples, Jill was aware on Tuesday that Jack was arriving on Wednesday (it may now be Friday). The difference is that (7)(a) describes the entire situation from the actual vantage point of the speech event participants, with *the next day* referring back to *Tuesday* as its reference point, whereas the

last sentence in (7)(b) effects a mental transfer, at least for purposes of specifying the day of Jack's arrival. The use of *tomorrow* indicates that the speaker (or writer) is not only describing Jill's role as a center of consciousness but actually adopting it—as Jill sees it, Jack's arrival is just one day removed from 'right now'.

Let us use an asterisk to indicate the **active** center of consciousness, i.e., the one the subject (*S*) adopts for a particular purpose. The default is naturally for the active center of consciousness to coincide with the *actual* locus of the subject: S^*. A straightforward example like *Jack will arrive tomorrow* is then represented by the formula $S^* \rightarrow [(EV)_T]$, where *EV* is an event, the parentheses stand for a time frame, and *T* identifies the frame as tomorrow. The portions of (7)(a) that concern us can thus be given as follows: $S^* \rightarrow [J \rightarrow [(EV)_{ND}]]$. The formula specifies that Jill (*J*) is a viewer who envisages an event occurring the next day (*ND*), but that the actual subject of consciousness retains its own vantage point, not adopting Jill's by mental transfer. This transfer does however occur in the final sentence of (7)(b): $S \rightarrow [J^* \rightarrow [(EV)_T]]$. Here the speaker makes Jill's vantage point the active center of consciousness for the purpose of temporally locating the envisaged event.

I have suggested that the subject of consciousness is necessarily implicit when it functions exclusively in that capacity. How does this square with the existence and prevalence of first- and second-person pronouns, which overtly mention the individuals whose conceptualizations constitute the meanings of linguistic expressions? A moment's reflection reveals that there is no inconsistency. Forms like *I* and *you* do not occur in every expression, but only when the speech event participants wish to talk about themselves or each other. Needless to say, they have frequent occasion to do so—by nature, and virtually as a matter of definition, people are most concerned with themselves and those they interact with. But to the extent that we think and talk *about* ourselves, we are not just the *subjects* but also the *objects* of conception. It is in the latter role that the speaker and addressee earn explicit mention by means of personal pronouns.

Consider the pronoun *I*. If *S* is the speaker and $S^* \rightarrow$ represents the speaker as the active subject of conception, the meaning of the pronoun can be given as $S^* \rightarrow [\mathbf{S}]$, where boldface indicates profiling. In other words, *I* puts the speaker onstage as an object of conception and profiles the speaker *in that capacity*. (The form of the pronoun—*I* as opposed to *me*—further symbolizes its status as clause-level trajector.) This implies a certain 'distancing', a measure of conceptual separation analogous to the one that occurs onstage in the 'divided self' phenomenon (Talmy 1985):

(8)(a) *He finally understood himself.*

(b) *She forced herself to keep going.*

The separation seems less drastic in the case of *I*, perhaps because only one facet of the self is onstage and objectively construed. To clearly apprehend the separation between the two facets of the self would require a higher-order conceptualization with yet a third facet coming into play as the active center of consciousness: $S^* \rightarrow [S \rightarrow [\mathbf{S}]]$.

There are, then, expressions in which the speech event participants are implicit and subjectively construed, and others in which they additionally function as explicitly coded objects of conception. We also find intermediate cases where they remain implicit despite their central role in an overtly coded, onstage relationship. Thus, if we are sitting at a bar and I see Jack making his way in our direction, I can say either of the following:

(9)(a) *Jack is coming over to us.*
(b) *Jack is coming over.*

I have argued (Langacker 1985) that this formal contrast correlates with a difference in objectivity. In (9)(a), explicit mention of the speech event participants puts them onstage as specific objects of conception. We can represent this by means of the following formula, where the arrow in italics indicates the spatial path traversed by Jack: $S^* \rightarrow [S \leftarrow J]$. On the other hand, (9)(b) describes the spatial path with respect to the actual, subjectively construed locus of consciousness, which lies offstage at the very periphery of awareness: $S^* \rightarrow [\ \leftarrow J]$.

This type of contrast is not limited to real events occurring at the moment of speaking. In (10), for example, the speaker recalls a past occurrence:

(10)(a) *I was sitting at the bar, when Jack came over to me.*
(b) *I was sitting at the bar, when Jack came over.*

S is describing an earlier event from the external, offstage vantage point of the present moment. The second clause of (10)(a) is thus comparable to (9)(a), except that here the distancing implied by explicit mention of the self is more tangible, since the conceptual separation is identified with an actual separation in time. This temporal distancing has the further consequence that subjective construal involves a kind of mental transfer, from the speaker's present locus of consciousness to a previous one; however, because the transfer is simply a matter of recalling an earlier experience, it is so easy and natural that we hardly

notice it. The second clause in (10)(b) can thus be represented by the formula $S \rightarrow [S^* \leftarrow J]$, indicating that S adopts S's own previous vantage point (which is thereby subjectively construed) for purposes of describing the spatial path. (Alternatively, to underscore S's role as a conceptualizer at that earlier moment, we could use the more elaborate formula $S \rightarrow [S^* \rightarrow [\leftarrow J]]$.)

4. Viewing arrangement

Viewing implies more than just a vantage point, but a whole **viewing arrangement** of which vantage point is only one facet. Another facet is *scope*, the extent of the conceptual content an expression evokes. If we draw the analogy to visual perception, an expression's overall scope corresponds to the full extent of the visual field. Assuming a fixed vantage point, the latter is determined by standing and facing in a certain direction, so that a particular, limited segment of the surrounding world is made visually accessible. Scope is comparable because the content an expression evokes—though quite extensive and only fuzzily bounded—is nonetheless limited and determined by immediate concerns (the direction in which we metaphorically face). The analogy can actually be pushed considerably further in ways that seem revelatory with respect to linguistic phenomena. Apparent linguistic analogs can be found for three more levels of visual focusing.

First, while standing and facing in a certain direction, we can select different portions of the overall field of view for heightened awareness by turning our head from side to side or up and down. Within the field of view, there is a certain region—determined by the direction of our gaze—that serves as the *general locus of attention* permitting fine-grained observation. Those of us who wear glasses can identify this region with that delimited by their frame: if we want to see something in fine-grained detail, we have to turn our head so that it falls within the segment of the visual field that the frame of the glasses subtends. The linguistic construct corresponding to this notion is the *immediate scope* (or *onstage region*). Metaphorically, I think of the immediate scope as being delimited by a **viewing frame** (like the frame of my glasses) which can be directed from place to place within the overall scope of conception.

Suppose the body and head are oriented in a certain direction, so that the viewing frame delimits a particular region. We then have a further degree of visual flexibility: by rotating the eyeballs, we choose the specific *focus of visual attention*, which is thereby rendered salient and perceived with the greatest acuity. This is analogous to the linguistic phenomenon of selecting a *profile*

(the *conceptual referent*), impressionistically describable as the focal point within the immediate scope. For example, in viewing a scene comprising a lamp suspended over a table, one can look at either the lamp or the table (so that the other recedes to the margins of the onstage region), or else one can keep them both in focus by way of specifically observing their spatial relationship. In terms of the analogy, these choices would correspond to such linguistic expressions as (11)(a)-(c), which respectively profile the lamp, the table, and the continuation through time of their spatial configuration.

(11)(a) *the lamp above the table*
(b) *the table below the lamp*
(c) *The lamp is above the table.*

The final level of visual focusing is *figure/ground* organization. While the figure within a scene may in general coincide with the focus of visual attention, in at least one kind of situation a distinction can usefully be drawn. If, in the previous example, I am specifically attending to the *relationship* between the lamp and the table (not to either one *per se*), I have the option of observing where the lamp is in relation to the table—so that the lamp stands out as the *figure* with respect to the focused relation—or of doing just the opposite. The linguistic analog of such choices is *trajector/landmark*, inherent in the construal imposed by relational expressions. I could thus say either *The lamp is above the table* or *The table is below the lamp*, depending on whether I opt for the lamp or the table as figure within the profiled relation.

An expression of any size thus presupposes a multifaceted viewing arrangement. As distinct facets, it may include an overall scope, an immediate scope delimited by a viewing frame, a profile, as well as trajector/landmark alignment (in the case of relational profiles). One application of these notions is in the domain of tense and aspect. A tense marker imposes a viewing arrangement comprising: a temporal viewing frame whose *subjective* duration (that of the viewing itself) is given by the time of speaking; a presumed vantage point equated by default with the actual locus of the speech event; and the temporal analog of the direction of gaze. By adjusting the latter, the viewing frame can be made to subtend an *objective* conceptual expanse having various possible positions vis-à-vis the vantage point. A 'true' present tense is analogous to simply opening one's eyes and gazing straight ahead. Temporally, the profiled relationship is identified with the *immediate* portion of the ongoing world being viewed, i.e., the portion subtended and delimited by the viewing frame, with which it is therefore co-extensive. By contrast, a past or future tense is compa-

rable to a shift in gaze to a non-immediate location. The viewing frame subtends a span of time distinct from the time of speaking, and more extensive owing to the greater viewing distance. As the onstage focus of attention, the profiled event must occur objectively within this time span, and thus subjectively within the confines of the viewing frame. Since *recall* or *imagination* is involved (rather than immediate observation), the duration of an event's conception—its subjective occurrence—is not determined by that of its actual occurrence.

These properties of the imposed viewing arrangements account for certain aspectual restrictions on the use of tenses (Langacker 1987b, to appear). For example, a **perfective** verb—characterized as being temporally bounded—does not normally permit a 'true' present (i.e., one actual event, occurring just now), since there is no intrinsic equivalence between the duration of a bounded event and that of the viewing frame delimited by a speech event describing it. We do however find present-tense perfectives in the case of performatives, where the profiled event and the speech event are the same by definition. In past and future tenses, perfectives are unproblematic because the profiled event is non-immediate and need only appear within the viewing frame. Since the event is either being recalled or imagined (as opposed to being observed right now in its actual occurrence), its *conceptual* duration is controlled by the speaker and hence can always be made to fit within the viewing frame. We also find present-tense perfectives in the so called 'historical present':

(12) *I'm watching TV last night when my boss* ***calls*** *and* ***complains*** *about my attitude.*

I analyze the historical present in terms of mental transfer to an assumed vantage point in the past. Granted the special viewing arrangement, the present-tense morphology has its usual value, indicating temporal coincidence between the profiled event and the viewing frame defined by the speech event. Such coincidence is possible because the profiled event is being *recalled*, as opposed to being directly observed in real time. Its conceptual duration can thus always be made to coincide with the time of speaking.

An additional facet of canonical viewing arrangements, so basic it tends to be taken for granted, is that the viewer occupies a *fixed* vantage point from which the surroundings can be observed and changes detected. This standard feature is rendered most evident by expressions which lack it. Talmy (1988) has presented a particularly striking example:

(13) *There is a house every now and then through the valley.*

Interpreted relative to a fixed viewing position, the sentence makes no semantic or grammatical sense. A house does not flash in and out of existence (*every now and then*), nor does it move *through the valley*. The sentence does however make perfect sense when construed in relation to the actual or imagined experience of a moving observer. It is the observer who travels *through the valley*, and *every now and then* pertains to the frequency of a house (a different one each time) appearing in the observer's viewing frame. The observer and the observer's motion are subjectively construed—they are not mentioned, and the sentence is not specifically about them. Yet this movement of the subjective center of consciousness is pivotal to the conceptual and grammatical coherence of the sentence.

Consider also sentences like (14)(a), appropriately uttered when traveling along the road in question:

(14)(a) *This road is getting narrower and narrower.*
(b) *A tree came rushing toward me at 75 miles per hour.*

Presumably the road itself has fixed dimensions—it is not physically shrinking from moment to moment. From the viewer's perspective there is however a change. Only a small segment of the road appears within the viewer's field of vision at a given moment, a segment that continually changes as travel proceeds. The sentence equates the viewing frame with the visual field, and construes *this road* as referring to the portion of the road which appears in the frame. The segments that successively fill this **role** (Fauconnier 1985) can perfectly well vary in width, so the sentence accurately describes the situation as it presents itself to the viewer. Slightly different are examples like (14)(b), uttered by a careless driver lucky enough to survive. Here too the viewer was in motion, but the sentence adopts the fiction of a fixed vantage point. With respect to this canonical (albeit counterfactual) viewing arrangement, it describes what appeared in the viewing frame.

Different still are cases of purely *subjective* motion (Langacker 1986), as exemplified by the contrast between (15)(a) and (15)(b):

(15)(a) *That roof slopes steeply upward.*
(b) *That roof slopes steeply downward.*

The sentences differ semantically (even when taken as describing the same roof and the same slope) because the adverbs *upward* and *downward* indicate opposite directions. But where does the directionality come from? The roof of course is static, and neither the viewer nor anyone else is necessarily conceived

as moving physically along it. The motion must rather be attributed to the very process of conceptualizing the scene. It is the conceptualizer (the viewer) who, in building up a complete image of the spatial configuration, *scans mentally* along the expanse of the roof in either an upward or a downward direction. Yet the viewer is not aware of doing so—only the roof and its shape function as focused objects of conception. The motion is *subjectively* construed. It inheres in the manner of conception but does not serve as its target.

5. Subjectification

In the foregoing example, the conceptualizer's subjective motion follows a path defined by the subject's spatial extension. Because the subject (or a portion of it) occupies each point along that path, and does so successively through time so far as the viewer's *conception* of it is concerned, there is still a tenuous sense in which the subject is conceived as moving. Other expressions exhibit a further degree of emancipation from the presumed original value involving objectively construed motion by the grammatical subject. Consider the *gonna* construction (Langacker 1986). Sentence (16) is ambiguous:

(16) *Janet was going to feed her dog.*

On the one hand, it may indicate that Janet was moving along physically with the intention of feeding her dog when she reached the end of the requisite spatial path. That is, the sentence may describe *objectively construed* motion through *space* on the part of the *subject*. On the other hand, it may be understood as indicating *subjectively construed* motion through *time* on the part of the *conceptualizer*. The latter mentally scans through time to locate the envisaged event with respect to a temporal reference point, and further conceives the event as somehow being controlled or provisionally assured by the circumstances obtaining at that earlier time. This mental scanning and provisional assurance as assessed by the speaker are subjective counterparts of the objectively construed physical motion and intention on the part of the subject in the other interpretation.

The *gonna* construction arises from the formally identical physical motion construction by the process of **subjectification**, which figures in many instances of grammaticalization (Langacker 1990b). In subjectification, some facet of an objectively construed situation is replaced by a subjectively construed analog that is part of the very process of conceptualization itself. Corre-

sponding to physical motion by the subject is mental scanning by the conceptualizer, who of course is not consciously aware of engaging in such activity, but only of its effects on the content functioning as the target of conception. Likewise, the notion of the subject having a certain intent is replaced by the conceptualizer's ease in passing mentally from the circumstances of the temporal reference point to the actual occurrence of the envisaged event. Observe that this analysis does *not* claim that the *subject* harbors any intent or metaphorically moves along a temporal path. It thus accommodates sentences like those in (17), for which any such claim would be problematic.

(17)(a) *It's gonna rain tomorrow.*
(b) *There's gonna be a major earthquake within five years.*

This semantic analysis accounts for the construction's grammatical behavior. The *gonna* construction exhibits **transparency**: *gonna* imposes no restrictions on its subject, allowing as its subject any nominal eligible to serve as the subject of the infinitival complement. This transparency falls out from the characterization of subjects and objects in cognitive grammar, together with the claim that the only motion involved is subjectively construed motion on the part of the conceptualizer. A sentence like (16) profiles the temporal relationship wherein a certain event (Janet feeding her dog) lies downstream in the flow of time from the reference point (some point in the past). That relationship is assessed by means of mental scanning on the part of the speaker/conceptualizer, who subjectively traces a path from the reference point to the envisaged event. Now motion is a factor that usually enhances the likelihood of an entity being chosen as a subject (hence *Janet* is the subject in the physical-motion sense of (16)). It has this effect, however, only when the mover and the motion are objectively construed and function as targets of conception. Subjective motion by the speaker/conceptualizer provides no motivation whatever for its selection as a profiled participant.

In fact, a subjectively construed entity *cannot* be selected for this purpose. By the characterization offered in cognitive grammar, subjects and objects are nominals which respectively specify the trajector and the landmark of a relationship profiled at a given level of organization. Since trajector and landmark status is a matter of *focal prominence*, the entities selected must by definition be onstage and objectively construed. This characterization has the further consequence that the choice of trajector and landmark (hence the choice of subject and object) is not inherently tied to any particular semantic role—the spotlights of focal prominence can in principle be directed at virtually any ele-

ment within the scene. There are of course strong tendencies, resulting in degrees of prototypicality: the primary spotlight tends to be attracted by a mover or an energy source, by concrete entities rather than abstractions, by an integral whole as opposed to a part, by a person in preference to an inanimate object, etc. Still, these tendencies can all be overridden, and a nominal specifying a non-prototypical trajector or landmark still qualifies as a subject or object.

Owing to subjectification, the entity that 'moves' in the *gonna* construction is offstage, subjectively construed, and ineligible to be a focal participant. English clauses do however require a trajector, so what will be chosen to function in this capacity? Possible candidates include the temporal reference point as well as the envisaged event (construed as a *thing* by conceptual reification), but abstract entities like these are quite atypical of clausal trajectors and are poor candidates at best. Among the onstage entities that figure in the profiled relationship, the best (most 'subject-like') candidate will in fact generally be the primary participant in the envisaged event being temporally located—in a sentence that profiles the relationship specifying the temporal location of Janet feeding her dog, the most salient subject-like entity is Janet herself. The *gonna* construction chooses this option and confers trajector status (i.e., the status of primary figure in the profiled temporal relation) on the same entity which functions as trajector in the event being located (manifested by the infinitival complement). This option is coherent and unproblematic granted the characterization of subjects and objects in terms of focal prominence, only incidentally (though preferentially) associated with particular semantic roles. Moreover, it conforms to a pervasive pattern of **metonymy** languages follow in their choice of focal elements (see Langacker 1984)—in effect, the subject of *gonna* stands metonymically for the infinitival complement (the entity that participates most directly in the profiled temporal relationship).

The construction's *transparency* in regard to its subject follows as a consequence. *Gonna* merely profiles the temporal relationship between a reference point and a subsequent process (an event or situation), imposing no substantive restriction on its nature. Because *gonna* accepts as its own trajector the trajector of the envisaged process (which stands for this process metonymically), it imposes no significant restrictions on its own subject. Anything able to be selected as trajector of the infinitival complement is also capable, *ipso facto*, of serving as the trajector and subject of *gonna*. This includes so called 'dummy' elements like *it* and *there*, as well as 'idiom chunks', all of which I analyze as meaningful (Langacker 1995).

A precisely analogous explanation can be given for why the English modals are transparent. Their evolution from *force-dynamic* verbs (Talmy

1985; Sweetser 1990) has also involved subjectification, so that the notion of force they still embody is offstage and subjectively construed. I have argued (Langacker 1991, part II) that their grammatical behavior is best accounted for by positing that the English modals profile only the event or situation that is being modally qualified, the 'modal force' itself—though crucial—remaining an unprofiled facet of their conceptual base (recall that profiling is conceptual *reference*, not *importance*). Thus, in a sentence like (18), the modal *must* profiles a *schematic* process identified by the remainder of the clause as the situation of Zelda being home already.

(18) *Zelda must be home already.*

The force-dynamic component of the modal's meaning, in the case of *must* a notion of irresistible force, does not inhere in the objectively construed onstage relationship. It resides instead in what the conceptualizer experiences in moving mentally from the current conception of accepted reality to one in which the profiled situation is also accepted as part of reality. It is less an object of conception than a facet of the conceptualizing activity, hence subjectively construed.

I thus interpret an **epistemic** modal as indicating the force-dynamic experience of the conceptualizer (primarily the speaker) in working toward an augmented conception of reality, one that will incorporate a situation not yet assimilated to conceived reality either because it has not yet occurred or because the conceptualizer has not yet definitely learned about it. The nature of this offstage force-dynamic experience distinguishes the modals from one another, even though it cannot be profiled, a privilege reserved for objectively construed entities. The trajector of the modal (and thus of the clause as a whole) must also be objectively construed. For the same reasons discussed above in regard to *gonna*, the optimal candidate is the primary participant in the schematic process whose potential reality is being assessed—the process that is profiled and is specified by the remainder of the clause. Hence an English epistemic modal takes for its own trajector and subject the trajector of the process being modally qualified. The modal itself imposes no restrictions on the trajector's nature, for only the potential occurrence of the process is at issue. Anything which could be the subject of the modally qualified verb is therefore allowed as the subject of the modal. It follows that epistemic modals are transparent, as seen in (19):

(19)(a) *It may rain tomorrow.*

(b) *Tabs may have been kept on demonstrators.*

Although it is less obvious (and sometimes denied), **root** modals also exhibit transparency. Sentences with root modal force can thus occur with 'dummy' subjects:

(20)(a) *Tabs may not be kept on demonstrators.*
(b) *There must be progress by tomorrow, or else.*

Here the force is one which tends in some way toward the envisaged event's actual occurrence (not just the conception of its occurrence in a view of evolving reality). It inheres in the *social interaction* between the speech event participants, being a prime example of language as *activity* directed toward the accomplishment of certain goals. Canonically, the speaker directs the modal force at the addressee, coded as the subject:

(21) *You may leave now, if you like.*

That however is only one of the ways in which the force can be manifested: the speaker may only be reporting someone else's directive, as in (22)(a); the target of force may be other than the addressee, as in (b); it need not be the subject, as shown in (c); and so on.

(22)(a) *You must leave now, she says.*
(b) *Zelda must not teach that class.*
(c) *Women must not be harassed in this office.*

The essential point, though, is that the modal force is in large measure subjectively construed. It is one that the speaker and addressee exert and feel, either directly or vicariously. It is not so much a specific object of conception as a facet of an interactive experience tending toward the realization of that object.

It may be helpful to compare this analysis to the not dissimilar one proposed by Sweetser (1982, 1990), following Talmy (1985). According to Sweetser, root modals involve force dynamics metaphorically transferred to the domain of social interaction, and epistemic modals, to the domain of reasoning. So far so good—this metaphorical transfer is Sweetser's main concern, and it seems consistent with the account sketched above. An important difference is however suggested by the paraphrases she offers (Sweetser 1990:61) for modal sentences, e.g., for the root sense of *may* and the epistemic sense of *must*:

(23)(a) *John may go* = "John is not barred by (my or some other authority) from going"
(b) *You must have been home last night* = "The available (direct) evidence compels me to the conclusion that you were home"

If taken seriously, the paraphrases indicate that the modal force and even the speech event participants are put onstage as specific foci of attention, hence objectively construed. Both paraphrases intimate that the force-dynamic relationship is profiled by the overall expression ("is not barred", "compels"), and the second implies that the speaker is onstage as a focal participant ("compels me"). For me this is problematic because the characteristic feature of grammaticized modals is precisely that the speech event participants and the modal force are offstage and subjectively construed. Their subjectivity explains why the speaker and addressee are not explicitly mentioned (unless they also happen to function as objects of conception), as well as the transparency of modals. In short, the analysis based on subjectivity is not only defensible (and I think preferable) in semantic terms, but also accounts for the overt form and grammatical properties of modal sentences.

6. Egocentricity

Analyzed in this fashion, the modals can be seen as manifesting a fundamental respect in which semantic and grammatical structure are **egocentrically** organized. Major facets of grammatical organization reflect how the overall situation evoked by a sentence presents itself to a subjective center of consciousness, canonically identified with the speech event participants (primarily the speaker, secondarily the addressee). Unless they happen to talk about themselves (certainly not an uncommon occurrence), the interlocutors remain implicit and unmentioned in accordance with their role as subjects (rather than objects) of conception. They do however serve as a point of origin (or 'perspective point') for both nominal and clausal structure. 'Distance' and independence from the subjective point of origin is highly consequential in determining the extent to which elements of the evoked situation receive explicit coding. With increasing objectivity comes the potential for focused awareness and the likelihood of being directly mentioned.

The English modals belong to a set of elements that I refer to as **grounding predications**. The term **ground** is used for the speech event, its participants, and its immediate circumstances (e.g., the time and place of

speaking). While many (if not all) linguistic elements evoke the ground in some fashion, those identified as grounding predications are special in various ways: they are highly grammaticized; their reference to the ground is essential and obligatory; they nonetheless construe the ground *subjectively*; and they specify the relation a profiled thing or process bears to the ground with respect to fundamental notions reasonably described as 'epistemic' (e.g., reality, immediacy, identification). For clauses, the elements analyzed as grounding predications in English are 'tense' and the modals. For nominals, they include demonstratives, articles, and certain quantifiers.

The most basic and universal lexical categories are **nouns** and **verbs**, which I respectively characterize as profiling *things* and *processes* (in abstract senses of those terms—see Langacker 1987b). Their 'maximal projections', **nominals** (i.e., noun phrases) and **finite clauses**, are likewise basic and universal kinds of syntactic constituents. I have argued at length (1991, parts I-II) that nominals and finite clauses show extensive parallelism in their internal organization. A crucial respect in which they are parallel is that a nominal or a finite clause, to qualify as such, must incorporate a grounding predication. That is, in addition to profiling a thing or process, they specify the epistemic relationship the designated entity bears to the ground (this is called the **grounding relationship**). Since the ground is centered on the speech event participants, a grounding predication assures that the speaker and addressee are within the *overall scope* of a nominal or a finite clause, even when they remain offstage and implicit. I propose that they are properly regarded, almost literally, as 'viewing' the nominal or clausal content from their position within its scope as established by the grounding element.

Semantically, and in large measure formally, nominals and finite clauses evidence a 'layered' structure in which the lexical head functions as the innermost layer, and the grounding element as the outermost one. Semantically, the lexical head provides a conceptually autonomous 'core', to which (lapsing here into a process metaphor) other elements are successively 'added', until a full nominal or finite clause is formed by adding a grounding predication. Phonologically, the lexical head has substantial segmental content, while outer layers tend to be progressively 'lighter' and less able to be manifested autonomously. Thus grounding predications are often symbolized by clitics, affixes, ablaut, or even zero. With respect to linear order, grounding elements are often farthest from the head (e.g., ***the*** *two biggest* ***problems***).

This layered organization is naturally explicated in terms of subjectivity/objectivity. Canonically, a grounding element and a lexical head lie at opposite extremes along this dimension. The former harbors the ground, subjec-

tively construed, and establishes the speech event participants as the implicit center of consciousness. The latter introduces and characterizes the grounded thing or process, which—as the entity profiled by the overall expression—is the onstage focus of attention, hence construed with maximal objectivity. Since objectivity correlates with explicit mention, it stands to reason that the lexical head of a nominal or a finite clause would function as its structural core: an overtly manifested element with sufficient content to be conceived and expressed autonomously, and to serve as anchorage for 'lighter' elements pertaining more to how that content is viewed. The grounding predication, subsuming the viewer and the basic viewing arrangement, makes the fewest specifications concerning the nature of the profiled thing or process, and is most extrinsic to its organization. Thus, as one proceeds along the axis leading from the object to the subject of conception, linguistic elements become progressively less contentful, and progressively more peripheral to nominal and clausal structure. Conversely, entities are more likely to go onstage and be explicitly coded to the extent that their independence from the viewer enables them to stand out as targets of conception.

Consider finite clauses in English. In its maximal form (i.e., with all possible auxiliaries included), the verb group can be given by the following formula, where brackets indicate conceptual layering and left-to-right order reflects the temporal order of verbal elements:

(24) [GROUNDING [PERFECT [PROGRESSIVE [PASSIVE [PROCESS]]]]]

An example is (25), where *might* is the grounding predication, *follow* is the lexical head designating an objectively construed process, and the perfect, progressive, and passive are respectively coded by *have*, *be* and *be*, together with the principal inflections they govern on the following verbs:

(25) *They might have been being followed.*

There should be no controversy in the statement that, working from the processual core outward, each element is qualified by the one in the immediately adjacent layer, producing a more elaborate verbal notion that is in turn subject to further qualification by the next layer. The point worth noting here is that each step along this path represents a lesser role for objectively construed content, and a greater one for subjective factors pertaining to how the objective situation is viewed.

The lexical head profiles an objectively construed process. While it does incorporate a particular way of viewing that process (if only in its trajec-

tor/landmark alignment), this facet of its meaning tends to be overshadowed by its rich objective content. By comparison, the passive construction has only *schematic* objective content: the generalized conception of a *transitive* process (Rice 1987). Its main conceptual import resides in the choice of trajector it imposes on this process (specified by the lexical head), a different choice from the one made by the head. It thus affects the relative salience of objectively construed participants. The progressive construction is even more schematic in regard to the objective situation, requiring only that the profiled relation be conceived as *bounded* (the number of participants is immaterial). It imposes on this process a restricted viewing frame, such that the endpoints of the process fall outside the immediate temporal scope. The perfect is schematic even with respect to bounding, so it takes both perfective and imperfective complements:

(26)(a) *I have painted the fence.*
(b) *I have known that for many years.*

It portrays the process in question as being viewed from and being in some way 'relevant' to a temporally subsequent reference point, typically equated with the ground. This reference-point relationship is wholly extrinsic to the process and not dependent on its nature. Finally, a grounding predication obligatorily takes the ground as a point of reference and identifies the viewers with the speech event participants. It establishes the ultimate 'perspective point' from which the objective situation is apprehended.

7. Conclusion

That concludes our tour. Even from this brief survey, it should be evident that grammar is shaped as much by what we are not consciously aware of as by what we are. In particular, grammatical structure pivots around the subject of consciousness that conceives but is not itself (in that role) an object of conception. A revealing description must therefore incorporate and accommodate this implicit conceptualizing process.

References

Fauconnier, Gilles. 1985. *Mental Spaces: Aspects of meaning construction in natural language*. Cambridge, Mass.: MIT Press/Bradford Books.
Haiman, John. 1983. "Iconic and Economic Motivation". *Language* 59:781-819.

Haiman, John. 1985. *Natural Syntax: Iconicity and Erosion* (Cambridge Studies in Linguistics, 44). Cambridge: Cambridge University Press.

Lakoff, George & Mark Johnson. 1980. *Metaphors We Live By*. Chicago: University of Chicago Press.

Langacker, Ronald W. 1984. "Active Zones". *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* 10:172-188.

Langacker, Ronald W. 1985. "Observations and Speculations on Subjectivity". In John Haiman (ed.), *Iconicity in Syntax* (Typological Studies in Language, 6). Amsterdam & Philadelphia: John Benjamins, 109-150.

Langacker, Ronald W. 1986. "Abstract Motion". *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* 12:455-471.

Langacker, Ronald W. 1987a. *Foundations of Cognitive Grammar*. Vol. 1: *Theoretical prerequisites*. Stanford: Stanford University Press.

Langacker, Ronald W. 1987b. "Nouns and Verbs". *Language* 63:53-94.

Langacker, Ronald W. 1988. "A Usage-Based Model". In Brygida Rudzka-Ostyn (ed.), *Topics in Cognitive Linguistics* (Current Issues in Linguistic Theory, 50). Amsterdam & Philadelphia: John Benjamins, 127-161.

Langacker, Ronald W. 1990a. *Concept, Image, and Symbol: The cognitive basis of grammar* (Cognitive Linguistics Research, 1). Berlin & New York: Mouton de Gruyter.

Langacker, Ronald W. 1990b. "Subjectification". *Cognitive Linguistics* 1:5-38.

Langacker, Ronald W. 1991. *Foundations of Cognitive Grammar*. Vol. 2: *Descriptive application*. Stanford: Stanford University Press.

Langacker, Ronald W. 1993a. "Grammatical Traces of Some 'Invisible' Semantic Constructs". *Language Sciences* 15:323-355.

Langacker, Ronald W. 1993b. "Universals of Construal". *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* 19:447-463.

Langacker, Ronald W. 1995. "Raising and Transparency". *Language* 71:1-62.

Langacker, Ronald W. To appear. "Viewing in Cognition and Grammar".

McNeil, David. 1992. *Hand and Mind: What gestures reveal about thought*. Chicago: University of Chicago Press.

Pawley, Andrew. 1985. "On Speech Formulas and Linguistic Competence". *Lenguas Modernas* 12:84-104.

Reddy, Michael J. 1979. "The Conduit Metaphor—A Case of Frame Conflict in Our Language About Language". In Andrew Ortony (ed.), *Metaphor and Thought*. Cambridge: Cambridge University Press, 284-324.

Rice, Sally. 1987. *Towards a Cognitive Model of Transitivity*. San Diego: University of California doctoral dissertation.

Sweetser, Eve E. 1982. "Root and Epistemic Modals: Causality in two worlds". *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* 8:484-507.

Sweetser, Eve E. 1990. *From Etymology to Pragmatics: Metaphorical and cultural aspects of semantic structure* (Cambridge Studies in Linguistics, 54). Cambridge: Cambridge University Press.

Talmy, Leonard. 1985. "Force Dynamics in Language and Thought". In William H. Eilfort, Paul D. Kroeber & Karen L. Peterson (eds), *Papers from the Parassesion on Causatives and Agentivity*. Chicago: University of Chicago Press, 293-337.

Talmy, Leonard. 1988. "The Relation of Grammar to Cognition". In Brygida Rudzka-Ostyn (ed.), *Topics in Cognitive Linguistics* (Current Issues in Linguistic Theory, 50). Amsterdam & Philadelphia: John Benjamins, 165-205.

Trier, Jost. 1934. "Das Sprachliche Feld. Eine Auseinandersetzung". *Neue Jahrbücher für Wissenschaft und Jugendbildung* 10:428-449.

Language in Time:
Lexical and Structural Ambiguity Resolution

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1. Introduction

An investigation of human language processing in the context of a program of cognitive science requires interdisciplinary research in linguistics and psychology taking account of mental representation and process.* In particular a linguistic approach focuses on phonological, semantic and syntactic structures that are central to sentence processing in both production and perception. By contrast, a model of discourse distinguishes between the linguistic, conceptual and situative levels of representation (e.g., Johnson-Laird 1983; van Dijk & Kintsch 1983; Kintsch 1988). The conceptual level treats text structures reflecting global and local aspects of meaning. The integration of textual content in a global interpretive context occurs at the situative level. On a point of methodology we should note that a discourse model provides a promising approach to the investigation of language processes if discourse is not understood as an external artifact *(e-discourse)*, but as a reflection of internally encoded information structures *(i-discourse)* (e.g., Chomsky 1965, 1986). Various levels, which are distinguished from each other on the basis of specific rules and representations, are comparable to *structural modules*. From a psychological point of view these linguistic and conceptual structures are studied with regard to their properties of mental processing. The analysis limits itself not only to internal processes of the linguistic system but, in particular, to the interactive processes of the language system with other cognitive modules or systems. Psycholinguistic data supply evidence about the cognitive reality of mentally-encoded structures of organization, and this interdisciplinary methodology provides a foundation for modeling and simulating of cognitive and neurological proc-

esses. Human thoughts constitute the prima-facie model for any cognitive modeling. This includes both *natural cognition* and *machine cognition* (e.g., artificial intelligence). We should stress that machine cognition always reflects a part of natural cognition. In this sense the prime concern of our reflections here is to render explicit the neuropsychological conditions for linguistic and conceptual processing (Hillert 1987, 1990).

In order to understand how higher-level cognition is generated in the brain, it is important to consider structural parameters underlying mental processing and to investigate the constraints imposed by a certain time frame. Thus current research is mainly concerned with the temporal sequence of language processing, that is, how different types of linguistic or conceptual information are activated and coordinated within a certain time frame (Hillert, Burrington & Gupta 1994; Hillert 1995; Hillert & Swinney 1996; Marslen-Wilson & Tyler 1980). One important distinction relevant to the definition of temporal constraints on language processing relates to the long-standing issue of *automatic* versus *controlled* processing (Posner & Snyder 1975; Schneider & Shiffrin 1977; Shiffrin & Schneider 1977). Whilst automatic processing occurs unconsciously, fairly rapidly and without conscious direction, controlled processes are dynamic and flexible and relatively slow in comparison with automatic processes. Posner & Snyder (1975) specified this distinction in relation to the observation of lexical semantic priming. They postulate that automatic processing is due to activations as they spread out and is reflected in faciliatory processes and that controlled processing is subject to interferences reflected in inhibitory processes. While experimental evidence shows that automatic lexical access occurs bottom-up and is mostly data-driven in the range of 0-200 msec, the definition of controlled processes remains quite vague. For example, do controlled processes involve decision procedures, do they necessarily operate top-down, and if they do, does this mean that they are inhibitory in nature? Moreover, we can ask to what extent lateral inhibition differs from top-down inhibition. Distinguishing between automatic and controlled linguistic processes must be seen in the context of distinguishing between autonomous and interactive processes. Interactive processes can be either automatic or controlling. On the other hand it is also a feature of modular (autonomous) processes that they are automatic (Flores d'Arcais 1988; Forster 1979; Seidenberg, Tanenhaus, Leiman & Bienkowski 1982). Conversely, automatic processes do not necessarily have to point to modular processes. It is therefore plausible to suppose that by repeated use of a linguistic structure the appropriate cognitive processing can be rendered automatic, and that this can lead to modular processing. So from the point of view of research on language acquisition we can treat modularity and automaticity as completely independent factors.

Jerry Fodor's (1983) essay *The Modularity of Mind* has exercised decisive influence on discussion surrounding the processing mechanisms of cognitive subsystems. Essentially, Fodor distinguishes two qualitatively different components: (a) input systems and (b) the central system. Input systems are tied to perceptual qualities and are responsible for the analysis of the input. By contrast the central system handles the fixation of belief and other higher-order cognitive processes such as inferences, decision procedures and problem-solving strategies. Whilst the input systems are essentially data-driven, operate bottom-up, and behave in a modular fashion, the central system integrates different kinds of perceptual information in a non-modular fashion. We call a cognitive system *modular* if it is mandatory, fast and automatic, domain-specific and informationally encapsulated. Furthermore a modular system distinguishes itself by being neuro-architecturally fixed and innately determined. This definition implies that a selective impairment of a modular subsystem or of particular domain-specific properties is possible. This so-called *modularity hypothesis* might be falsified if we can demonstrate empirically that some properties appear independently of each other or if particular processing properties are not typical of a particular cognitive domain but perhaps represent universal principles of cognitive organization. Prototypical structures, for instance, may be candidates here. However, the postulated cognitive dichotomy between input systems and the central system represents the weak point of Fodor's conception. It is possible to speak of a modular mode of operation simply on the basis of fastness or automaticity, though this does not correspond to the definition of modularity put forward by Fodor (cf. Schwartz & Schwartz 1984; Shanon 1988; Simon 1982). Shanon suggests abandoning the dichotomy between modular and non-modular subsystems in favor of a *dynamic modularity* because many processes taking place within the central system which can be labeled modular: they are domain-specific, informationally encapsulated and neurophysiologically fixed. In part this approach is comparable to that of Simon (1982). The autonomy (modularity) of a component (subsystem) behaves relative to the degree of interaction within and between the components.

For the present purpose we study sentence processing from the point of view of language comprehension. Comprehension of a linguistic utterance is based on cognitive processes that enable lexical representations to be activated and made available for interpretation. A theory of language comprehension must take account of at least two aspects: (a) the units involved in the process of language understanding, and (b) how information flows between these units. Whilst the first of these is scarcely an object of controversy in psycholinguistic literature, there are widely diverging opinions about the second. In the follow-

ing discussion, sentence processing is primarily interpreted in the light of syntactic parsing (structural processing) and lexical access. Accordingly, we examine modular and interactive properties and consider which of them cast light on automatic and controlling aspects of processing. These crucial questions are examined from the point of view of resolving structural and lexical ambiguities. First, let us look at sentences [1-1] and [1-2].

[1-1] *The man saw the boy with the telescope.*
[1-2] *The man saw the boy with the kite.*

There are two possible ways of reading [1-1]: the man used the telescope to see the boy, or the man saw the boy who had a telescope (either is perfectly plausible). Although [1-2] consists of the same sequence of syntactic categories, there is a clear preference of analysis: information extraneous to the sentence is applied to resolve the ambiguity (a telescope is more likely than a kite to be used for looking at something). The most important assumption of all modular models is that the various modules operate blindly, that is, without information from subsequent modules. In other words, there is no feedback from higher-order to lower-order modules, in contrast to what happens in an interactive model. An exchange of information can only take place within modules (intra-modular) and not between modules (inter-modular). For this reason the syntactic module does not use any semantic or pragmatic information in order to generate the most plausible syntactic structure. Thus, both sentences [1-1] and [1-2] should initially be parsed identically because the syntactic module works autonomously without the participation of intra-lexical meanings. First, we shall now consider alternative parsing strategies applicable under a variety of syntactic conditions, before we discuss how lexical ambiguities are resolved.

2. Structural ambiguity resolution

How parsing strategies are assigned to parsing situations is the fundamental question when we study the syntactic parser. The parser does not operate statically but uses different strategies according to the kind of information available at particular points. A lively controversy accompanies discussion of a several models of structural ambiguity resolution: (a) *a lexical parsing model,* (b) *a structural parsing model,* (c) *a multiple parsing model,* and (d) *a delayed parsing model*. The lexical parsing model and the structural parsing model both imply a serial parser. The serial parser selects a particular syntactic structure,

on the basis of either lexical or structural preferences and should the preferred syntactic structure prove to be the wrong one, the parser will retrace its stages in order to analyze the structure once more. This reanalysis, also called *garden pathing*, is an indication of the fact that serial parsing has taken place. The extent to which serial parsing occurs, lexically or structurally, is an object of some controversy. At least in experimental psycholinguistics, it is less controversial that backtracking implies post-syntactic inferences prone to conscious reflections and that the initial parse seems to be more likely to reflect automatic, unconscious processes.

2.1. *Lexical parsing model*

The lexical parsing model says that of the alternative parsing structures offered by a syntactically ambiguous word the analysis will be selected which is preferable for lexical reasons. Such a lexical entry is, for instance, the varying frequencies of the different syntactic roles that are inherent in an ambiguous verb. This mechanism operates serially because one alternative structure is activated after the other until the correct one is selected. This procedure has the advantage that the most likely parse is activated first and a reanalysis is therefore *not* often required. In this sense lexical entries would guide the parse (Holmes 1979). The application of a lexical preference strategy was observed for the first time by Ford, Bresnan & Kaplan (1982). According to ambiguous sentences, as shown in [2], subjects were confronted with questions and asked to select that statement which corresponds to their initial interpretation.

[2-1] *The woman wanted the dress on the rack.*
[2-2] *The woman positioned the dress on the rack.*

Subjects chose the interpretation corresponding to the most frequent use of the verb. A drawback of this experimental method is the fact that the task is post-propositional. To look at initial parsing strategies, it is however essential to apply on-line processing measures. Mitchell & Holmes (1985) stress that similar criticism applies to the study of Fodor, Bever & Garrett (1974). The consensus is that it is necessary to use an on-line method to investigate the initial parsing strategy. For this reason Mitchell and Holmes studied parsing using a phrase-by-phrase, subject-paced reading task. In a preliminary experiment they established preferences of verb-subcategorizations. Accordingly, it was found, for instance, that the verb *suspect* in [3-1] prefers a complementizer (COMP) and that the verb *read* in [3-2] prefers a direct object (DO) attachment.

[3-1] *The historian suspected the manuscript of his book had been lost.*
[3-2] *The historian read the manuscript of his book had been lost.*

When we process up to the NP *manuscript* both sentences are temporarily ambiguous, even though the vast majority of speakers would not accept *manuscript* as a DO of *suspect*. This is because the optional relative pronoun *that* does not appear at the syntactic surface structure. However, the subjects must be garden-pathed in [3-2] at the beginning of the phrase *had been lost* because the verb *read* prefers a DO and not a COMP attachment. Thus, recomputing takes place in this case. In [3-1] on the other hand the correct parse is chosen at the beginning in accordance with the lexical preference of the verb *suspect,* and the subjects consequently do not need to reanalyze the sentential structure. The findings confirmed the assumptions discussed because the subjects read phrases faster when the sentences were resolved in the lexically preferred direction. This result indicates that detailed lexical information can influence the course of structural analysis. Admittedly, the stimulus material employed is not unproblematic since pragmatic information could have influenced the selection of a particular parse: it is quite implausible for a manuscript to be suspected (see 3-1).

The experiment by Clifton, Frazier & Connine (1984) also shows that lexical information can determine the parse at the very beginning of syntactic processing, independently of semantic or pragmatic information. The sentences were presented using an automatically paced word-for-word method and a lexical decision task was inserted behind the word immediately following the verb.

[4-1] *The baby-sitter read the * story to the sick child.*
[4-2] *The baby-sitter sang the * story to the sick child.*
[4-3] *The baby-sitter read to * the sick child.*
[4-4] *The baby-sitter sang to * the sick child.*

In [4-1] and [4-4] the sentence structures agree with the lexical preference. Lexical and structural information however do not behave the same way in [4-2] and [4-3]. Lexical decision times would be therefore significantly longer at the test point (TP=*) since parsing of verb-subcategorizations must be recomputed. For instance, in contrast to the sentence structure provided from the lexical point of view we expect an intransitive preference of *sang* in [4-2] and a transitive preference of *read* in [4-3]. The introduction of a noun following an intransitive preference verb [4-2] and of a preposition following a transitive preference verb [4-3] requires the parser to recompute the syntactic structures

anticipated on the basis of lexical preferences. The findings support the assumption of a lexical preference strategy.

Another study worth mentioning, which controlled for possible pragmatic influence, stems from Holmes, Stowe & Cupples (1989). The stimulus material consisted of verbs that prefer either an NP or a COMP. All sentences showed a COMP structure and every sentence variation was presented with and without the relative pronoun *that*. Sentence [5-1] illustrates a plausible and [5-2] an implausible structure with regard to the verb *saw* that prefers an NP, and [5-3] and [5-4] with the verb *doubted* preferring a COMP, is analogous. The authors assume that the processing load in the absence of a relative pronoun is only increased if the verb favors a DO-analysis for the post-verbal NP. On the other hand, with sentences containing verbs favoring a COMP, with and without relative pronouns, no structural reanalysis would become necessary since this selection agrees with the analysis actually required.

[5-1] *The reporter saw (that) her friend was not succeeding.*
[5-2] *The reporter saw (that) her method was not succeeding.*
[5-3] *The candidate doubted (that) his sincerity would be appreciated.*
[5-4] *The candidate doubted (that) his champagne would be appreciated.*

The result of the first experiment, in which a *continuing syntactic decision task* (lexical decisions occur on items which continue or do not continue the syntactic structure of the sentence) was used as a method, produced significantly longer reaction times (RTs) for sentences with relative pronouns in sentential contexts preferring an NP. This points to the conclusion that subjects, on the strength of an individual verb entry, compute a particular structural analysis which is then revised by the presence of a COMP. In syntactic contexts preferring COMPs, on the other hand, significantly longer RTs were recorded at the TP. Holmes, Stowe and Cupples argue that subjects expect the relative pronoun *that* from the verbs that prefer a COMP. The only significant plausibility effect for verbs preferring NPs was found at the post-verbal NP. It is obvious that this effect is stronger in the case of reduced COMP sentences: The verb suggesting an NP initially causes a DO-analysis which is then reanalyzed in the light of the semantically implausible NP. By contrast, according to Holmes *et al.*, the COMP-favoring effect is so strong that the presence of the relative pronoun had no influence on processing speed. Finally, the authors studied whether the phrase length of the ambiguity has any effect on the parse that is initially accessed, using sentences as in [6-1] and [6-2].

[6-1] *The lawyer heard the story about the accident was not really true.*

[6-2] *The lawyer heard that the story about the accident was not really true.*

These sentences with longer phrases of ambiguity also confirmed the hypothesis that, in the case of verbs preferring NPs, lexical information overrides the initial parse. By contrast, garden-pathing was found to hold only for the long and reduced COMPs. Under these conditions subjects seem to be rejecting their initial analysis on the basis of the length of the ambiguity in favor of a DO-analysis. These various results demonstrate that the frequency of verb-subcategorizations is capable of guiding the initial syntactic parse.

2.2. *Syntactic parsing model*

The syntactic parsing model indicates that initially a context-free and inherent phrase-structure is being generated (Frazier 1987). This structure is context-free inasmuch as the parse takes no account of semantic or syntactic aspects of the sentence context or of any lexical knowledge. Subjects work out the smallest number of syntactic nodes if this is compatible with grammatical well-formedness rules. The application of phrase-structure rules produces the simplest possible parse. Consequently the structural preference mechanism operates extremely efficiently: at a particular point just one analysis is carried out and in the syntactic buffer there is no information that is not analyzed. Frazier & Rayner (1982) seem to have discovered evidence to support this assumption. They studied English sentences in which the reader does not receive enough information to resolve the ambiguity: the NP *(the man)* can function either as a DO [7-1] or as the subject (SUBJ) of a relative clause [7-2] because the verb *suspect* permits both structures NP (PP) and COMP.

[7-1] *Mary suspected the man from Calgary.*
[7-2] *Mary suspected the man had committed the crime.*

Following the minimal attachment principle (MA-principle) subjects would have to produce a DO in both sentences in their initial analysis because this is structurally the simplest parse. Frazier and Rayner's eye movement data do in fact show that with relative clauses eyes remain fixed at the disambiguation point significantly longer than with clauses containing a DO. This longer processing time is said to arise from recomputation necessitated by the auxiliary verb *had* requiring disambiguation. In a further study, Rayner, Carlson & Frazier (1983) investigated whether semantic plausibility influences MA. Four different sentence variants were examined: reduced implausible [8-1] and plausi-

ble clauses [8-2], implausible DO-clauses [8-3] and embedded plausible relative clauses [8-4].

[8-1] *The florist sent the flowers was very pleased.*
[8-2] *The performer sent the flowers was very pleased.*
[8-3] *The performer sent the flowers and was very pleased with herself.*
[8-4] *The performer who was sent the flowers was very pleased.*

On the MA-principle the post-verbal nouns in [8-1], [8-2] and [8-3] should be interpreted as DO. But if the syntactic processor were capable of accessing pragmatic information, the post-verbal NP in [8-2] would have to be interpreted as COMP. Rayner *et al*. were able to confirm the preceding findings: pragmatic information seems unable to influence syntactic processing. The eye fixations were longest at the auxiliary *was* in the case of both plausible and implausible reduced relative clauses, [8-1] and [8-2]. This brings us to conclude that subjects applied a MA-strategy independently of how plausible the sentence was. In a second experiment Rayner *et al*. did however record faster reading times with sentences in which the most plausible interpretation was the MA-strategy. The authors explain this finding that contradicts the MA-principle by asserting that higher-order pragmatic information of the thematic processor can influence syntactic parsing. In other words: the pragmatic information used in the experiment (e.g., whether florists *receive* or *send* flowers) would only be available post-lexically.

Ferreira & Clifton (1986) took up this question and produced an experiment using animate and inanimate agents. The indication of *animate* was inherent in the lexicon so that this kind of pragmatic information is more readily accessed by the parser.

[9-1] *The evidence examined by the lawyer turned out to be unreliable.*
[9-2] *The evidence that was examined by the lawyer turned out to be unreliable.*
[9-3] *The defendant examined by the lawyer turned out to be unreliable.*
[9-4] *The defendant that was examined by then lawyer turned out to be unreliable.*

On the MA-principle the reader of the reduced relative clauses should be committed to an incorrect syntactic analysis until s/he processed the PP *by the lawyer*. On the other hand, we ought not to expect an incorrect strategy with the unreduced and syntactically unambiguous clauses, though in [9-1] the SUBJ

cannot be interpreted as an agent of the verb since the former is inanimate. Thus, if the MA-principle holds, the reader of a clause with an animate SUBJ will be garden-pathed, in contrast to [9-2]. These experiments highlight processing difficulties with reduced sentences that are independent of whether the SUBJ is animate or inanimate. The lack of a difference between animate and inanimate gives clear support to the MA-principle. The parser seems only to apply an internal phrase-structure rule in carrying out an initial parse.

Ferreira & Henderson (1990) continued this line of inquiry and looked at the ambiguity arising from time to time from potential syntactic entries of a verb. In [10-1] the verb *wish* clearly has the syntactic entry COMP whilst in [10-2] the verb *forget* accepts both structures, a DO as well as a COMP.

[10-1] *He wished (that) Pam needed a ride.*
[10-2] *He forgot (that) Pam needed a ride.*

Ferreira and Henderson again used eye movement behavior to examine whether lexical subcategorization information is able to exclude the application of the MA-principle. From the so-called *verb guidance hypothesis* it follows that garden-pathing would only be observed in the case of [10-2]: in conformity with the lexical sub-categorization information subjects would initially parse the NP as DO, and carry out a second analysis at the TP. Once again the data seem to support an MA-strategy because subjects read significantly longer sentences without relative pronouns, independently of any particular verb-subcategorization information. Consequently, lexical-syntactic entries seem not to be able to influence the dominant role of the MA-strategy in the initial stage of processing. Admittedly, there remains the question concerning the post-disambiguation phase of sentence processing at which syntactic verb entries play a part. To investigate this point, Ferreira and Henderson carried out a second experiment in which subjects were allowed to pace their reading time by themselves. At the TP the results are comparable to those from the study of eye movements in the first experiment. That is, without a relative pronoun reading times were longer and no influence of the verb-subcategorization could be found, though they did establish a significant interaction in the post-disambiguation phase. The processing of COMP-verbs was faster than that of DO-verbs in sentences without a relative pronoun. This time difference shows that reanalysis can probably be accelerated by verb-subcategorizations.

Mitchell (1987) describes similar findings with a phrase-by-phrase, noncumulative, subject-paced reading task. The sentences were split into two phrases, marked in [11] with a slash (/). For the first phrase significantly longer

reading times were recorded with non-ambiguous intransitive verbs than with ambiguous verbs that can be parsed either transitively or intransitively [11-2]. For the second phrase Mitchell established the reverse effect, that is, the reading times were significantly longer with transitive verbs.

[11-1] *After the child had visited the doctor prescribed / a course of injections.*
[11-2] *After the child had sneezed the doctor prescribed / a course of injections.*

In accordance with the MA-principle intransitive clauses appear initially to be interpreted as transitive. The following reanalysis requires longer reading times than it is the case with transitive clauses. Again, the second phrase is read faster because the syntactic structure generated corresponds to the structure presented by the verb's subcategorization frame (e.g., *to sneeze:* intransitive). Mitchell concludes from these findings that the syntactic processor operates in two stages. In the first stage a MA-strategy is applied which has only access to syntactic categories like nouns or verbs. In the second stage the structural parse is checked and for this purpose lexical subcategorization may be used.

This two-stage model is supported by the findings of Clifton, Speer & Abney (1991) and Abney (1989). In the sentences studied they distinguish between PPs, which are either an argument of the verb or not. While in [12-1] the PP *in a wallet* modifies the preceding verb and is therefore an argument of the verb, the PP in [12-2] *in a hurry* is not an argument of the verb, but an optional adjunct. Analogous cases are represented in [12-3] and [12-4] in which the preceding noun modifies the PP, but only in the first case does the PP *in a wallet* constitute an argument of the noun.

[12-1] *The saleswoman tried to interest the man in a wallet during the storewide sale.*
[12-2] *The man expressed his interest in a hurry during the storewide sale.*
[12-3] *The man expressed his interest in a wallet during the storewide sale.*
[12-4] *The saleswoman tried to interest the man in his fifties during the storewide sale.*

Subjects' reading times in processing the PPs were studied by two separate methods: on the one hand, self-regulating, non-cumulative phrase-by-phrase reading and, on the other, measurement of eye movements during reading. Both methods produced the same results: when reading the PP, reading times were shorter for the verb-attached constructions [12-1] and [12-2], but in the post-

prepositional phrase argument structures were read faster [12-1] and [12-3]. Clifton *et al*. therefore assume that the first parse reflects a MA-strategy and that the difference between argument structures and adjuncts is only relevant at the second stage of processing. In other words, category information guides initial syntactic processing, but afterwards specific lexical information affects parsing. This assumption does not necessarily imply that the available lexical information is set aside. It is far more likely that accessing of subcategorization information cannot occur quickly enough to pass it on to the parser.

Admittedly, Gorrell (1989) pointed to findings contradicting these. In a reading task a noun or a preposition was presented for lexical decision after a transitive or an intransitive verb. With regard to the results produced by Wright & Garrett (1984) that syntactically correct target words give rise to faster RTs than syntactically incorrect ones, Gorrell formulates two hypotheses. The first states that if the MA-principle is initially effective the lexical decision times for nouns after both transitive and intransitive verbs will be the same, because the parser initially produces a transitive structure. The second holds that if lexical subcategorization information is already available in the first stage of structural processing, the RTs with intransitive verbs ought to be significantly longer, because the parser is not expecting a noun, as it is with transitive verbs. In fact, Gorrell found that nouns in a transitive context lead to significantly faster RTs.

2.3. *The multiple parsing model*

Some researchers assert that they have discovered evidence of multiple processing strategies (Foss 1970; Lackner & Garrett 1973; Chodorow 1979; Kurtzmann 1985; Gorrell 1987). In contrast to a serial strategy which is only able to develop one parse at a particular time a multiple parser is in a position to produce a structure for any possible interpretation of an ambiguity. Kurtzmann (1985) argues that evidence manifestly supporting the assumption of a serial MA-strategy can be predicted just as well by a multiple model. In such a case the parser would calculate multiple analyses but assign these to a variety of preferences in the light of pragmatic, structural or lexical factors. Kurtzmann criticizes the eye movement experiments of Frazier & Rayner (1982) from this point of view. He attributes the longer RTs for the non-preferred structure as being subject to weighing-up possible analyses. Gorrell's (1989) study seems to offer direct evidence favoring the multiple processing hypothesis. Syntactically appropriate (e.g., *has*) and inappropriate target words (*me*) were presented for lexical decisions immediately before the RP. Two different types of ambiguity were studied: transitive and intransitive verbs and simple past and passive par-

ticiple verbs. [13-1] has an unambiguous DO, [13-2] is ambiguous, and [13-3] has an unambiguous complement.

[13-1] *It's obvious that Holmes saved the son of the banker * right away.*
[13-2] *It's obvious that Holmes suspected the son of the banker * (right away / was guilty).*
[13-3] *It's obvious that Holmes realized that the son of the banker * was guilty.*

Gorrell recorded significantly longer RTs with the DO structure [13-1] than with the ambiguous [13-2] or COMP [13-3] variants. As we have already indicated, the target word represents a syntactic continuity in the form of a verb in [13-2] and [13-3] while this is not true for [13-1]. Syntactic primes could only be established in the case of verbs that are not prompted structurally by the MA-strategy. For this reason Gorrell supposes that the non-preferred analysis has taken place, for otherwise the verb could not be primed. This outcome can only be predicted by a multiple parsing model. Gorrell also assumes that no additional *processing costs* arises from the multiple activation of alternative analyses. Shorter RTs were recorded for both intransitive contexts, whether ambiguous or unambiguous, in comparison to transitive contexts. If in the ambiguous context only the structurally correct analysis is carried out, this appears to support the idea that no additional processing costs are incurred in producing two parses as opposed to one. Admittedly, the experiments of Holmes (1979) or Ferreira & Henderson (1990) do indicate that the MA-strategy is applied first irrespective whether the verb is lexically marked as intransitive. For this reason it could be that both a DO and a COMP structure is generated in the case of ambiguous and non-ambiguous COMP clauses, and this would lead to comparable results being produced in these two conditions.

2.4. *Delay parsing model*

However, yet other results seem to favor a different model, here called the delay parsing model. The parser delays a decision on which syntactic structure to produce until it has received disambiguating information or until the intervening material has accumulated to the point where it can no longer be retained in the memory without some structure. Frazier & Rayner (1987) presume that this syntactic strategy would be used in the event of structural ambiguity. For example, the word *visit* can be categorized structurally either as a noun or as a verb. The resolution of structural alternatives occurs for the most part via the structural category following the structurally ambiguous word. The hypothesis

in the delay model is therefore plausible in resolving categorical ambiguities. Nevertheless, there is still the question of when the parser that puts the information received on one side actually registers that the ambiguity has been resolved. A solution to the problem could be that the parser puts the analysis to one side in order to examine a restricted number of words immediately following the area of ambiguity. Such a strategy in resolving categorical ambiguity would at least be very plausible, even where the parser adopts a MA-strategy despite this strategy not being applicable. In Frazier and Rayner's eye movement experiment they used categorical ambiguities (e.g., N-N versus N-V) to examine whether the parser is putting on one side information that is being received. In [14] the article *the* was used to maintain categorical ambiguity (*desert*$_{N}$ *trains*$_{N/V}$). The insertion of the demonstrative served to resolve the categorial ambiguity.

[14-1] *I know the (this) desert trains young people.*
[14-2] *I know that the (these) desert trains are tough.*

Shorter reading times were registered in the ambiguous phrase for the categorically ambiguous sentences, and longer times in the disambiguating zone. This result causes us to conclude that the parser postpones syntactic analysis at the ambiguous phrase until the incoming information permits a particular analysis. The results for the non-ambiguous sentences illustrate the reverse reading behavior. The categorial ambiguity is resolved by the preceding context and parsing occurs exclusively in the ambiguous phrase, for which therefore a longer reading time was recorded. Reading was correspondingly faster for the remaining sentence processing. This outcome is not caused by semantic preferences, whose effects were examined in a further experiment. Comparable psychological strategies applied to linguistic structures were found when lexical ambiguities are accessed in a sentential context.

3. Lexical ambiguity resolution

The process of word identification generally implies three different stages of process: access, selection and integration of lexical information. Unfortunately, these terms are often used in a variety of meanings (Tyler & Frauenfelder 1987; Tanenhaus & Lucas 1987). Based on standard definitions, we have a preference for the following terminology: lexical access, the stage of word recognition links the acoustic-phonetic input with corresponding phonological entries,

which in their turn activate the corresponding semantic-syntactic entries. In language production this is regarded by some researchers as a two-stage process (e.g., Butterworth 1989; Kempen & Huijbers 1983; Levelt 1992) whilst others, by contrast, support an interactive approach (e.g., Dell 1986; Stemberger 1983). Most models of language perception treat access to lexical information as a unitary phenomenon of phonological and semantic-syntactic activation patterns. The second phase in word recognition, lexical selection, relates to the processes that enable speakers to select from a number of lexical candidates the one that best agrees with the perceived lexical item. There is a great variety of ideas about how this happens. The process of word identification itself represents the result of the selection phase, that is, the listener at this point determines which word s/he has perceived. The recognition point of a word lies for the most part before the whole word is perceived and is subject to semantic-syntactic restrictions. In the lexical integration phase the selected word is allotted to the meaning context of the entire linguistic utterance. In the above-mentioned discourse model this allocation would occur at the conceptual level.

With numerous experimental studies there are attempts to dissect the process of semantic identification of a word into individual processing stages. With regard to how ambiguous words are perceived in the context of a sentence, a number of hypotheses are discussed (cf. Simpson 1984). The standard position, which says that lexical access is autonomous, assumes a multiple access mechanism. First, all the meanings of a word are activated automatically, that is, driven bottom-up simultaneously and independently of the type of sentence context before lexical selection takes place top-down. Both the speed of access and the information activated in the course of this process remain constant. Selective access occurs post-lexically at a point determined by sentential-semantic relevance. The fundamental question of the extent to which cognitive processes operate in a modular fashion or interactively is the subject of particular controversy in connection with lexical access in language perception. There is no doubt that interactive processes are involved in the resolution of ambiguities. The question posing itself is whether lexical access occurs in a modular fashion before an interactive exchange of information can take place with other, non-lexical, representations. In the early days of modern psycholinguistic research numerous research methods were used with the aim of establishing the possible influence of sentence context on lexical processing: *dichotic listening* (e.g., Lackner & Garrett 1972; MacKay 1973), *real-time repetition* (Cherry 1953; Treisman 1960; Marslen-Wilson 1973, 1985; Marslen-Wilson & Welsh 1978), *phoneme control* (Cutler & Norris 1979; Foss 1970; Mehler, Segui &

Carey 1978; Morton & Long 1976), *masking* (e.g., Marcel 1983), *sentence completion* (Bever, Garrett & Hurtig 1973; Lackner & Garrett 1972; MacKay 1966), *perception of erroneous pronunciation* (Cole 1973; Cole & Jakimik 1978, 1980; Jakimik 1980) and *word monitoring* (Marslen-Wilson & Tyler 1980). Essentially, three different model variants were offered for resolving lexical ambiguities. The *serial lexical access model*, the *multiple lexical access model*, and the *selective lexical access model*. Let us consider models and their evidence for and against them individually.

3.1. *Serial lexical access model*

The serial lexical access model asserts that the lexical processor has no access to external information in order to resolve lexical ambiguities. The system activates alternative entries of an ambiguous word one after the other in the sequence in which they are stored in the lexicon by order of frequency. The search is complete when a word-meaning can be successfully integrated with the sentence context. Hence the processor first accesses the most common meaning and tries to integrate it with a sentential-semantic or pragmatic context. If this fails, the second most common reading is activated. This process continues in a self-regulating search till a successful integration is achieved. In order to prove order access experimentally, it is necessary for the stimulus material to be presented in order of frequency. Hogaboam & Perfetti (1975) assume that lexical access is frequency-sensitive, that is, first the dominant and then the subdominant meaning of an ambiguous word is accessed. In their written experiment on word control subjects were required to decide (consciously) whether a word that was always offered at the end of a sentence was ambiguous or not. The sentential contexts suggested either the dominant [15-1] or the subdominant meaning of a homophone [15-2].

[15-1] *The jealous husband read the letter.*
[15-2] *The antique typewriter was missing a letter.*

In the sentence context biasing the subdominant meaning the discovery time was faster for homophones. The authors supply the following interpretation: first of all, independent of context, the dominant (more frequent) meaning of the ambiguous word is activated and then compared with the meaning of the sentence. If in this process there is no agreement between dominant word meaning and sentence meaning, the search is then continued and a selective access of the nearest subdominant word meaning takes place, followed by a

comparison with the relevant context. Unfortunately these findings reflect a conscious decision procedure and are therefore not relevant to the explanation of those processes involved in real-time lexical access. Forster & Bednall (1976) drew the same conclusions from their results with a syntactic recognition exercise. Subjects were asked whether a word represents syntactically correct continuity with a word presented beforehand (e.g., *to box, the box*). Faster recognition times were recorded whenever the syntactic context suggested the dominant meaning. This leads to the conclusion that speed of lexical access is in proportion to frequency. In a further experiment subjects were required to tell whether words were ambiguous or not. Affirmative replies with ambiguous words came faster than negative replies with non-ambiguous ones. This can be explained by subjects being able to terminate the search process after discovering the second meaning of an ambiguous word whilst, with a non-ambiguous word, subjects have to carry on searching in order to satisfy themselves that there are no other meanings.

Simpson's (1984) findings also support the idea of a dominance-dependent and context-sensitive access process with homophones. In a neutral context subjects displayed shorter decision times with dominant target words (i.e., showing a meaning relation to the dominant homophone meaning) than with subdominant target words. However, if the context biased either the dominant or the subdominant meaning, there was a faster reaction time only for the context-relevant meaning—independent of relative dominance. This result apparently reflects frequency-related access, e.g., if no particular meaning is biased by the sentential context, the dominant meaning is always selectively activated. Admittedly, Simpson's experiments were carried out with a 120 ISI. There is therefore the possibility that in this space of time the non-relevant meaning that is automatically activated at 0 ISI is then de-activated. Onifer & Swinney (1981), who were not able to replicate Simpson's results with their zero ISI, refer to this argument.

Again, Rayner & Duffy (1986) found evidence that in a neutral context equibiased meanings of an ambiguous word (homograph) yielded longer eye fixations than matched unambiguous words. This suggests for a multiple access mechanism. In contrast, for biased words eye fixation duration did not differ compared to control words. That has been taken as evidence in favor of a serial access mechanism guided by the dominant meaning of the homograph and which occurs before contextual integration takes place. Duffy, Morris & Rayner (1988) investigated in particular the contextual influence on biased and equibiased words. To avoid lexical priming effects contexts were used in which no single word was semantically related to the ambiguous word. The results

show that fixation duration for equibiased words in biasing contexts was about the same as for unambiguous words. This finding is comparable with the selective access process found with biased words in a neutral context. However, a multiple activation has been found when contexts bias sub-dominant meanings. Thus, the interaction between frequency and context-type determines how lexical access occurs, at least with written material.

Finally, we should mention the language performance observed by Rayner & Frazier (1989), which suggests direct selective access. The sentences that were examined, as example [16] illustrates, vary in the degree of dominance: in one case the frequency of different meanings was equal whilst in another one meaning predominated.

[16-1] *George said that the wire informed John that his aunt ...*
[16-2] *George said that the wire surrounded the entire ...*

The results show that in a neutral context a homophone with comparable frequencies takes longer to read than a homophone with markedly divergent frequencies. In the case of equibiased frequencies Rayner and Frazier assume that both meanings were activated and integrated into the appropriate syntactic contexts. By contrast, the fact that with divergent frequencies shorter eye fixation durations were found suggests a serial accessing mechanism geared to frequency. As soon as the dominant meaning activated was contextually integrated, the search for alternative meanings was stopped. This interpretation agrees with results recorded for a disambiguating context. Whenever the syntactic context required the subdominant meaning, reading times were longer in the case of divergent frequencies.

3.2. *Selective lexical access model*

One of the first experimental priming studies was carried out by Meyer & Schvaneveldt (1971). They employed pairs of words (e.g. *doctor-nurse* or *mouse-cheese*) that are semantically related. They argue in part that the very robust priming effects that were recorded (approx. 80 msec) were evidence against the modularity hypothesis. The anteposed priming word, representing a semantic context, would influence access of the following target word. Admittedly, two important aspects must be highlighted in this context. First, these effects can emerge intra-lexically within a semantic network (cf. Collins & Loftus 1975; Forster 1979) and are thus caused by external knowledge representations. Second, in contrast to Seidenberg *et al.*'s interpretation of an intra-

lexical effect and of the multiple access model, a series of experiments illustrates contextual influence on special semantic aspects of a prime. This characteristic priming was developed by Schwanenflugel & Shoben (1985; Schwanenflugel & Lacount 1988) and transferred by Tabossi, Colombo and Job to the cross-modal priming paradigm (Tabossi, Colombo & Job 1987; Tabossi, 1988a, 1988b; Moss & Marslen-Wilson 1993; cf. Simpson & Krüger 1991: written material). A selective effect was found in the case of a zero ISI both for ambiguous and non-ambiguous words. Tabossi (1988a) found multiple access where the sentence context weakly biased the dominant meaning of the homophone [17-1] and the target words were associated either with the dominant or the subdominant homophone meanings (SEA versus LIQUEUR) or displayed characteristic features (SAFE versus RED). On the other hand, selective access was discovered where the dominant sentence context itself contained a characteristic feature, as in [17-2]. RTs were clearly faster for a target word which was associated with this dominant contextual feature (SEA) than for the target word associated with the subdominant meaning of the homophone (LIQUEUR).

[17-1] *The man had to be at five o'clock at the port * for a very important meeting.*

[17-2] *The violent hurricane did not damage the ships which were in the port *, one of the best equipped along the coast.*

The possible methodological objection that lexical decision could involve post-lexical processes does not apply to Tabossi's studies because all experiments were carried out with the same set of homophones and target words. However, another aspect that we have already discussed deserves closer attention. Was the processing of features, which might be conceptual and which are not represented intra-lexically, investigated in Tabossi's studies? If that is the case, the argument ought to count against the standard view, which is the multiple access model. The available literature illustrates the fact that no individual theory of lexical and syntactic process does justice to the available experimental data. A number of studies demonstrate that the discourse content and (or) the lexical context can lead to selective access.

3.3. *Multiple lexical access model*

The multiple lexical access model describes a procedure in which all lexical entries of a word are activated without regard to any contextual or top-down

information that may be available. This assumption is likewise compatible with a modular approach. Lexical processing therefore makes multiple access possible and the selection process follows, using external information. If the sentence structure allows lexical ambiguity to be disambiguated, the syntactic processor can then select the information that is available during lexical access. This model also has the capacity to deactivate immediately after successful integration the irrelevant entries that have also been activated during lexical access. Essentially, the evidence for the multiple lexical access model rests on studies of phoneme monitoring and lexical priming. For instance, in phoneme control tests using acoustically presented sentences subjects are asked to press a button as quickly as possible once they hear a word that begins with a particular sound. The assumption is that the time required to recognize a phoneme reflects a measure of the difficulty of local processing. Foss (1970; cf. Hakes 1972; Swinney & Hakes 1976) asked subjects to recognize particular phonemes following ambiguous and non-ambiguous words within a sentence presented acoustically, as illustrated in [18].

[18-1] *The farmer put his straw beside the machine.*
[18-2] *The merchant put his hay beside the machine.*

In these two sentences /b/ was the target phoneme. The RTs illustrate the fact that phoneme control in ambiguous words like *straw* takes longer than in non-ambiguous words like *hay*. This was the case even with context-relevant sentences (*The farmer put his...*). The result therefore supports the hypothesis of multiple lexical access. But there are methodological reservations about the studies that were carried out. Foss & Jenkins (1973) modified this approach and used the same paradigm to examine ambiguous words whose different meanings were suggested by particular sentence contexts. In line with Foss's (1970) findings, the results showed that with phoneme monitoring there was no reduction in processing load from one context to another. Mehler, Segui & Carey (1978) show that the time differences recorded derived from poor control of word-length: ambiguous words were shorter than non-ambiguous words with the result that it is not surprising that phoneme perception of ambiguous words was faster. Sentence completion tests point to multiple lexical access. MacKay (1966) established that subjects need longer to complete a sentence phrase containing an ambiguous word [19-1] than a sentence phrase with a non-ambiguous one [19-2].

[19-1] *After taking the right turn at the intersection, I ...*

[19-2] *After taking the left turn at the intersection, I ...*

Bever, Garrett & Hurtig (1973) assume the modified multiple access model which predicts a phrase-selective lexical access mechanism. The above-mentioned effect is clearly stronger if sentence-completion takes place within the phrase in which the ambiguity occurs (e.g., *at the* compared to *I*). Finally, the dichotic sentence perception test carried out by Lackner & Garrett (1972; MacKay 1973) also supports the idea of multiple access. In this experiment subjects listened to different sentences simultaneously through the left and right-hand sides of a set of headphones after being instructed beforehand to pay conscious attention only to one of them. Whilst the subjects gave their attention to the ambiguous sentence [20-1], the verb *put out* disambiguated the two other sentences, [20-2] and [20-3]:

[20-1] *The spy put out our torch as our signal to attack.*
[20-2] *The spy extinguished the torch in the window.*
[20-3] *The spy displayed the torch in the window.*

The description of the consciously processed sentence on the part of the test subjects varied with the meaning suggested by the second sentence. This observation points to the fact that both possible meanings of the verb are activated. Again, Cairns & Kamerman (1975) showed that a few syllables after presentation of a homophone the monitoring times for a particular phoneme were no longer than those recorded for control words. Although the method of phoneme monitoring is highly critical, these results indicate that the meanings of an ambiguous word are activated at the outset in multiple with each other independently of linguistic context.

To give a complete picture of the processes involved in language comprehension an experiment must apply a measurement precisely at the point where on-line processes take place. So far, the cross-modal priming technique has provided the best approximation to this aim. Here, auditory and visual stimuli are administered either simultaneously or in close proximity. At a particular point in the on-line process of auditory sentence comprehension it is possible to determine the processing load measured in milliseconds either by lexical decision or lexical naming. Homophone processing in a sentential context has been investigated in a number of experiments using this on-line technique. In what was probably the first study of this kind, Conrad (1974) applied a cross-modal variant of the Stroop naming exercise. Conrad recorded longer color-naming times where a word was similar in meaning to a homophone.

Clearly, both homophone meanings were being activated. In this experiment the target words denoting colors and presented visually came directly after the homophones (zero msec interstimulus interval = zero ISI). In the follow-up study by Oden & Spira (1983) a 500 ISI was used and results showed that activation of the homophone's meanings was influenced by the context, though we must emphasize here that lexical access occurs in a 200 msec time-span (Marslen-Wilson & Tyler 1980; Seidenberg *et al*. 1982; Tanenhaus, Leiman & Seidenberg 1979). Hence the findings of Oden and Spira doubtless reflect post-lexical integration processes. This criticism also applies to some priming effects at the word level that we have referred to elsewhere (Hillert 1995b).

Prather & Swinney (1977) used a cross-modal lexical priming method to investigate whether multiple access of different lexical categories takes place independently of syntactic context, and findings are consistent with the multiple access model: both grammatical as well as ungrammatical meanings were primed. This result implies that the syntactic context initially exercises no influence on the access of a particular, grammatically correct syntactic category. Swinney (1979) introduced a variant of the priming technique developed by Conrad: at a particular point in a sentence heard by the subject (e.g., directly following a homophone: zero ISI) the subject takes a lexical decision about visually presented words. These words, which in Swinney's experiment appeared on a monitor at zero and 1500 ISI, are associated with either the first or the second meaning of the homophone. For example, the homophone was presented in the following context:

[21-1] *Rumor had it that, for years, the government building had been plagued with problems. The man was not surprised when he found (several spiders, roaches) and other bugs * in the corner of his room.*

The words *spiders* and *roaches*, priming the dominant meaning of the homophone *bugs* were omitted when the word was presented in a neutral context. With the sentence above the semantically related words ANT, SPY and the control word SEW were presented in the * positions on a monitor for lexical decision. With zero ISI cross-modal priming was obtained both for ANT and for SPY independent of variations in context. This multiple access mechanism, which was also phrase-sensitive (modified thesis; cf. Blutner & Sommer 1988), ended after a 1500 ISI (after *corner*) as the decision time for ANT was shorter than for SPY in the sentence context suggested (see above). Swinney, Onifer, Prather & Hirschkowitz (1979) were able to achieve a similar effect with isolated presentation of homophones and target words. This two-stage access

process did not only occur with N-N ambiguities but also with N-V ones, too (Swinney 1982). In order to establish whether this initial multiple access is frequency-dependent, Onifer & Swinney (1981) used homophones with dominant and subdominant meanings each of which was clearly predicted by the linguistic context. Again, they found a multiple access effect. On the strength of these results we must conclude that lexical accessing occurs relatively independently of the effects of frequency.

By way of contrast we should mention that contextual effects have not been investigated in detail with the cross-modal lexical priming paradigm. However, an analysis of different semantic aspects of a non-ambiguous word (polysemy) seems altogether comparable with analysis of the meanings of an ambiguous word. Multiple access was found in the study by Whitney, McKay, Kellas & Emerson (1985). They varied verbs that related to different semantic aspects of a prime (in examples [22] the target words are CUT and METAL respectively).

[22-1] *The man used the knife.*
[22-2] *The man heated the knife.*

N-V ambiguities were again investigated by Tanenhaus, Leiman & Seidenberg (1979) in different semantic contexts. The target words to be named, which were semantically related to the noun or the verb, were presented at particular intervals (SOA: stimulus onset asynchrony). At a zero SOA there was priming for both verb and noun meanings, independent of context. Naming occurred faster with a 200 SOA only where the sentence context suggested the relevant meaning. Although a slight RT difference was recorded for context-relevant meanings in the case of a zero SOA, the difference from the contextually unaffected case was not significant.

[23-1] *I bought the watch.*
[23-2] *I will watch.*

But the findings of Seidenberg *et al.* are not open to such clear interpretation. In contrast to Swinney's studies with their cross-modal decision tasks, Seidenberg's used a cross-modal lexical naming task. The possible influence of a following context was examined. There was a syntactic context (*They all rose.* versus *She bought a rose;* target word: FLOWER), a conceptual context (semantic bias: *You play the spade* versus *You buy the spade*; CARD), and a semantic context (semantic associate: *The farmer bought the straw* versus *Joe*

bought the straw; HAY). With the exception of one context type, multiple access was established in every case at zero ISI, and at 200 ISI context-sensitive effects were observed under all conditions. Seidenberg *et al.* found multiple access in neutral and pragmatic contexts but selective access in case of a semantic context. This result was achieved by using N-N ambiguities but not with N-V ones. All other variants related to context or homophone confirm the multiple access model. This result which demonstrates selective access under the N-N condition (*farmer...straw*-HAY) and contradicts Swinney's (1979) finding, is interpreted by Seidenberg *et al.* (1982) as an intra-lexical priming effect. This effect, which we call *intra-lexical* here, reflects meaning relations within the mental lexicon which can be distinguished from associations that we make on the basis of common sense. The selective access mechanism involved here does not necessarily contradict the modularity hypothesis as long as the effect occurs intra-lexically. If intra-lexical relations reflect the subjective structure of experience (Fodor 1983), then taxonomic relations like co-hyponymy are *in general* not represented within the lexicon. Ergo, the possibility of selective access exists only with Seidenberg *et al.*'s stimulus material and not with Swinney's. We should recall that for example *spiders, roaches...bugs*-ANT were the semantic relations in Swinney's experiment. The essential difference concerning the stimulus material is that Swinney's context consists of co-hyponyms and Seidenberg *et al.*'s of free associations. We must assume that a sentence context consisting *inter alia* of intra-lexical relationships only activates particular semantic features of the homophone, with the result that selective access can be expected. Bearing in mind the assumption that such meaning relations as co-hyponymy, as they were used by Swinney, reflect inter-lexical (conceptual) relationships, we cannot expect any selective access. Though response times in Swinney's experiment generally support the multiple access model, we must not ignore the fact that slight context-sensitive effects were observed. RTs were markedly (though not significantly) shorter where semantically related words were heard in the sentence context (*spider, roaches*) ahead of the target word (ANT) (cf. Onifer & Swinney 1981). As we have already indicated, the kind of information (e.g., what it is that is being accessed) can be decisive in determining contextual influence on semantic access (Gerrig 1986; Williams 1988). Onifer & Swinney's (1981) prime-target word relationships were, for instance, near-synonymy (*sage-wise*), antonymy (*cold-hot*), hyponymy (*bug-insect*), attribution relations (*scale-fish*) or thematic relations (*pool-swim*). That multiple lexical access has been discovered by Onifer and Swinney suggests that no specific semantic aspects of a homophone were activated by the sentential context.

There are various aspects suggesting that in naming tasks linguistic performance is influenced by artificial factors to a smaller extent than it is in lexical decision tasks. First, it must be said that naming is a more natural exercise than lexical decision because it does not imply a component of binary classification (words versus non-words). Possibly lexical decisions are not entirely free of strategic influences (cf. Balota & Chumbley 1990). Second, lexical decision in contrast to naming is influenced by the *familiarity* or *significance of meaning* of the target word (Balota & Chumbley 1984, 1985). And finally, backward priming may perhaps have falsified the results on multiple lexical access (cf. Koriat 1981; Kiger & Glass 1983). Backward priming means that a word influences access of a word that is presented immediately prior to it in the sense of an interactive cascade process. For instance, this might have been the case with the processing of homophones in cross-modal decision tasks using a zero ISI: at the zero ISI point, i.e., when both the meaning of the homophone (prime) and of the (visual) target word are available, the meaning-related target word functions as the context for the homophone, which in turn primes the target word. With regard to these conditions, no selective access can be expected since the target words prime both homophone meanings independently of the sentence context. Glucksberg, Kreuz & Rho (1986) controlled for this possible effect by offering non-words as target items and discovered that the multiple access effects found by Onifer & Swinney (1981) are traceable to backward priming. Glucksberg used non-words resembling actual words (e.g., PETLS {petal} as target item; control item: SLETP; homophone *flower*), and they established that lexical decision time was only lengthened when the target item is related to the meaning of the homophone that suggests the sentential context. However, different follow-up studies were able to prove that multiple access does not arise from backward priming (Burgess, Tanenhaus & Seidenberg 1989; Jones 1989; Tanenhaus, Burgess & Seidenberg 1988). Compared with lexical decision tasks on the other hand, backward priming does not occur with naming (Seidenberg, Waters, Sanders & Langer 1984). The ISI factor is relevant to the extent that lexical selection took place within the range of 200 msec. The results, which rest on an ISI of greater than zero, might reflect post-lexical effects. It is equally problematic if target words are not presented in the *flow* of the linguistic perception process but directly at the end of a sentence. Post-lexical effects between the identification point of the homophone and its physical end manifest themselves in particular with longer words (for non-ambiguous words cf. Zwitserlood 1989). The modified version of the multiple lexical access model implies that lexical meanings are activated via the spread of stimulation. The meanings are addressed by relations between the lexical

elements on the basis of relative degrees of activation. One concept can be primed by another, closely related concept, this being the only exception applicable to automatic and autonomous lexical accessing. Admittedly, if great differences exist in the degree of activation that have arisen from dominance or priming, selective access can take place. Seidenberg *et al*. (1982) assume on the basis of their data that nouns and verbs correspond to different concepts but are equipped with the same mechanism of recognition within the lexical network. If only one meaning is primed in the case of N-V ambiguities, both concepts sharing the same conceptual features are activated. By contrast, with N-N ambiguities it would also be true that only one concept would be activated by the priming of one meaning. Thus, this model adopts a serial evaluation mechanism for intra-semantic N-N ambiguities. In the selective accessing model lexical accessing is guided by external information. Initial access of an ambiguous word can be influenced by syntactic, semantic and pragmatic contexts. In this version any separate sub-processor can exercise an influence on the lexical processor. An extreme variant of this model implies that only the contextually and pragmatically most appropriate meaning is activated. This process would then be functionally identical with serial access, in which the most frequent use is accessed first. However, this interpretation remains questionable inasmuch as it remains theoretically unclear which necessary criteria are justified by the distinction for example between intra-semantic and inter-semantic relations. The above-mentioned disparity between Swinney's results and those of Seidenberg *et al*. can also be attributed to differences of methods used. In Swinney's experiment a lexical decision task was applied which might have involved backward priming (cf. Koriat 1981), on the other hand, Seidenberg *et al*. employed a lexical naming task that is free of this effect. Another difference between both studies is that in Swinney's experiment the homophone was heard in the middle of a sentence whilst in Seidenberg's experiment it came at the end of a sentence. It remains an open question whether these various factors are attributable to this kind of methodological weakness or to different theoretical emphases (intra versus inter). At the very least we can conclude that the observed discrepancy is marginal.

4. Conclusion

In reviewing properties of ambiguity resolution it seems that lexical and structural ambiguities are resolved in a quite different ways. Overall, in most cases lexical ambiguities are in the first step multiply accessed and sentential context

is used to select the relevant meaning. In contrast, the standard picture of structural ambiguity resolution points in the initial stage to a serial analysis and afterwards context is used to confirm or to guide a reanalysis. Let us look, however, into a an alternative view which challenges the standard picture of both, lexical and structural ambiguity resolution.

As we discussed earlier, criticism of the multiple access model, the standard view, was attributed to (a) methodological objection and (b) a reinterpretation of obviously contrary data. For example, although some studies have used identical techniques, they have arrived at opposite conclusions (e.g., Swinney 1979 versus Tabossi 1988). Moreover, semantic priming which seems to support a selective lexical access has been interpreted as due to intra-lexical associations, and this reinterpretation therefore preserved the multiple (modular) access hypothesis (Seidenberg *et al.* 1982). The selective access model however is supported by a number of studies. The divergent results may be attributed to the interaction between frequency and contextual constraints (MacDonald, Pearlmutter & Seidenberg 1994). The study of Swinney's (1979) which supports the multiple lexical access model, examined meanings of an ambiguous word which were roughly equal. Studies of Rayner & Duffy (1986) and Duffy, Morris & Rayner (1988) indicate, however, that a biasing context produces selective access when both meanings are similar in frequency and when the context biases the dominant meaning. (Note however that this finding was reached using eye fixation studies in contrast to the CMLP-technique used by Swinney or Seidenberg *et al.*, for example.) Moreover, the lexical access mechanism seems not only to be influenced by factor frequency but also by the kind of context provided. If meanings are not accessed in one step but as a pattern of activation over a set of units, then the context computes those meaning patterns which are relevant at a certain time. The opposing terms *shallow* versus *in-depth semantic processing* are therefore general notions for the possible patterns of relevant meaning activations (Kawamoto 1983; Seidenberg 1993).

Similar arguments can be put forward to the standard view of structural ambiguity resolution (MA-principle). The frequencies of certain syntactic structures may have an important impact on the processing of verb-argument structures. MacDonald *et al.* (1994) pointing out that effects which were attributed to the MA-principle might alternatively be explained by frequency effects (cf. Spivey-Knowlton, Trueswell & Tanenhaus 1993). For example, the verb *examined* has about the same frequencies as a past tense or a past participle. Thus sentence [24-1] favors an MA-interpretation because the SUBJ is inanimate. However, a verb like *enjoyed* as in sentence [24-2] is significantly more frequent as a past tense than as a past particle. Thus, in this case an MA-

interpretation is verb-biased, though not contextually-biased, because *evidence* is not a plausible agent of *enjoyed.* In contrast to the prediction, the context does not favor a reduced relative-clause interpretation.

[24-1] *The evidence examined by the lawyer turned out to be unreliable.*
[24-2] *The evidence enjoyed by the lawyer turned out to be unreliable.*

Moreover, high-frequent types of syntactic structures may produce also an overriding influence. How lexical-morphological information is accessed is crucial to the resolution of structural ambiguities, in particular in those languages where morphological information is sufficient to predict parsing strategies. Thus, in the attempt to explore cognitive strategies universal, we are from the point of view of ambiguity resolution especially interested in contrastive studies investigating verb-final languages such as German, Dutch and Japanese. In the German sentence [25-1] case features provide sufficient information on theta-assignment. The noun *Nichte* is feminine (FEM) and when the dative case (DAT) is assigned the feminine determiner (*die*) changes to a masculine determiner (*der*). Thus the determiner informs the listener that the first argument is filled by an IO and that a DO (ACC-object) with the main verb will follow.

[25-1] *Der Onkel hat der*$_{DAT}$ *Nichte*$_{FEM}$ *das Geschenk gekauft.*
"The uncle has the niece the present bought"

Thus, before the arguments are filled theta-assignment is possible and the parser should compute a selective structural analysis at an early stage. To conclude, cross-linguistic studies on ambiguity resolution are necessary to investigate throughout possible parsing and lexical access mechanism as well as to model universal cognitive structures of language processing.

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References

Abney, S. 1989. "A Computational Model of Human Parsing". *Journal of Psycholinguistic Research* 18:129-144.

Balota, D.A. & J.I. Chumbley. 1984. "Are Lexical Decisions a Good Measure of Lexical Access? The role of word frequency in the neglected decision stage". *Journal of Experimental Psychology: Human Perception and Performance* 10:340-357.

Balota, D.A. & J.I. Chumbley. 1985. "The Locus of Word-frequency Effects in the Pronunciation Task: Lexical access and/or production?" *Journal of Memory and Language* 24:89-106.

Balota, D.A. & J.I. Chumbley. 1990. "Where Are the Effects of Frequency in Visual Lexical Perception Tasks? Right where we said they were! Comment on Monssell, Doyle, and Haggard (1989)". *Journal of Experimental Psychology: General* 119:231-237.

Bever, T.G., M.F. Garrett & R. Hurtig. 1973. "The Interaction of Perceptual Processes and Ambiguous Sentences". *Memory and Cognition* 1:277-286.

Blutner, R. & R. Sommer. 1988. "Sentence Processing and Lexical Access: Implications of nonword interference of the focus-identifying task". *Journal of Memory and Language* 27:359-367.

Burgess, C., M.K. Tanenhaus & M.S. Seidenberg. 1989. "Context and Lexical Access: Implications of nonword interference for lexical ambiguity resolution". *Journal of Experimental Psychology: Learning, Memory, and Cognition* 15:620-632.

Butterworth, B. 1989. "Lexical Access in Speech Production". In W. Marslen-Wilson (ed.), *Lexical Representation and Process*. Cambridge, MA: MIT Press, 108-135.

Cairns, H.S. & J. Kamerman. 1975. "Lexical Information Processing During Sentence Comprehension". *Journal of Verbal Learning and Verbal Behavior* 14:170-179.

Cherry, E.C. 1953. "Some Experiments on the Recognition of Speech, with One and with Two Ears". *Journal of the Acoustic Society of America* 25:975-979.

Chodorow, M.S. 1979. "Time-compressed Speech and the Study of Lexical and Syntactic Processing". In W. Cooper & E.C.T. Walker (eds), *Sentence Processing. Psycholinguistic studies presented to Merrill Garrett.* Hillsdale, NJ: Lawrence Erlbaum, 87-109.

Chomsky, N. 1965. *Aspects of the Theory of Syntax.* Cambridge, MA: MIT Press.

Chomsky, N. 1986. *Knowledge of language: It's nature, origin and use.* New York: Plenum.

Clifton, C. Jr., L. Frazier & C. Connine. 1984. "Lexical Expectations in Sentence Comprehension". *Journal of Verbal Learning and Verbal Behavior* 23:696-708.

Clifton, C. Jr., S. Speer & S. Abney. 1991. "Parsing Arguments. Phrase structure and argument structure as determinants of initial parsing decisions". *Journal of Memory and Language* 30:251-271.

Cole, R. & J. Jakimik. 1978. "Understanding Speech: How words are heard". In G. Underwood (ed.), *Strategies of Information Processing.* New York: Academic Press, 67-116.

Cole, R. & J. Jakimik. 1980. "A Model of Speech Perception". In R. A. Cole (ed.), *Perception and Production of Fluent Speech.* Hillsdale, NJ: Lawrence Erlbaum, 133-163.

Cole, R.A. 1973. "Listening for Mispronunciations: A measure of what we hear during speech". *Perception & Psychophysics* 13:153-156.

Collins, A. & E.F. Loftus. 1975. "A Spreading Activation Theory of Semantic Processing". *Psychological Review* 82:407-428.

Conrad, C. 1974. "Context Effects in Sentence Comprehension: A study of the subjective lexicon. *Memory & Cognition* 2:130-38.

Cutler, A. & D. Norris. 1979. "Monitoring Sentence Comprehension". In W.E. Cooper & E.C.T. Walker (eds), *Sentence Processing: Psycholinguistic studies presented to Merrill Garrett*. Hillsdale, NJ: Lawrence Erlbaum, 113-129.

Dell, G.S. 1986. "A Spreading Activation Theory of Retrieval in Sentence Production". *Psychological Review* 93:283-321.

Duffy, S.A., R.K. Morris & K. Rayner. 1988. "Lexical Ambiguity and Fixation Times in Reading". *Journal of Memory and Language* 27:429-436.

Ferreira, F. & C. Clifton. 1986. "The Independence of Syntactic Processing". *Journal of Memory and Language* 25:348-368.

Ferreira, F. & J. Henderson. 1990. "The Use of Verb Information in Syntactic Parsing: A comparison of evidence from eye movements and segment-by-segment self paced reading". *Journal of Experimental Psychology: Learning, Memory, and Cognition* 16:555-568.

Flores d'Arcais, G.B. 1988. "Automatic Processes on Language Comprehension". In G. Denes, C. Semenza & P. Bisiacchi (eds), *Perspectives on Cognitive Neuropsychology*. Hillsdale, NJ: Lawrence Erlbaum, 91-114.

Fodor, J.A. 1983. *The Modularity of Mind*. Cambridge, MA: MIT Press.

Fodor, J.A., T.G. Bever & M.F. Garrett. 1974. *The Psychology of Language*. New York: McGraw-Hill.

Ford, M., J. Bresnan & R. Kaplan. 1982. "A Competence-based Theory of Syntactic Closure". In J. Bresnan (ed.), *The Mental Representation of Grammatical Relations*. Cambridge, MA: MIT Press, 727-796.

Forster, K.I. 1979. "Levels of Processing and the Structure of the Language Processor". In W.E. Cooper & E.C.T. Walker (eds), *Sentence Processing: Psycholinguistic studies presented to Merrill Garrett*. Hillsdale, NJ: Lawrence Erlbaum, 27-75.

Forster, K.I. 1989. "Basic Issues in Lexical Processing". In W.D. Marslen-Wilson (ed.), *Lexical Representation and Process*. Cambridge, MA: MIT Press, 75-107.

Forster, K.I. & E. Bednall. 1976. "Terminating and Exhaustive Search in Lexical Access". *Memory and Cognition* 4:53-61.

Foss, D.J. & C.M. Jenkins. 1973. "Some Effects of Context on the Comprehension of of Ambiguous Sentences". *Journal of Verbal Learning and Verbal Beavior* 12:577-589.

Foss, D. J. 1970. "Some Effects of Ambiguity upon Sentence Comprehension". *Journal of Verbal Learning and Verbal Behavior* 9:699-706.

Frazier, L. & K. Rayner. 1982. "Making and Correcting Errors During Sentence Comprehension: Eye movements in the analysis of structural ambiguous sentences". *Cognitive Psychology* 14:178-210.

Frazier, L. 1987. "Sentence Processing: A tutorial review". In M. Coltheart (ed.), *Attention and Performance, XII.* Hillsdale, NJ: Lawrence Erlbaum, 559-586.

Gerrig, R. 1986. "Process and Products of Lexical Access". *Language and Cognitive Processes* 1:187-196.

Glucksberg, S., R.J. Kreuz & S.H. Rho. 1986. "Context Can Constrain Lexical Access: Implications for models of language comprehension". *Journal of Experimental Psychology: Learning, Memory, and Cognition* 12:323-335.

Gorrell, P.G. 1989. "Establishing the Loci of Serial and Parallel Effects in Syntactic Processing". *Journal of Psycholinguistic Research* 18(1):61-73.

Hakes, D.T. 1972. "Effects of Reducing Complement Constructions on Sentence Comprehension". *Journal of Verbal Learning and Verbal Behavior* 11:278-86.

Hillert, D. 1987. *Zur mentalen Repräsentation von Wortbedeutungen. Neuro- und Psycholinguistische Überlegungen.* Tübingen: Gunter Narr.

Hillert, D. 1990. *Sprachprozesse und Wissensstrukturen. Neuropsychologische Grundlagen der Kognition.* Opladen: Westdeutscher Press.

Hillert, D. 1995. "On Tracking Language as a Sequential Activity: Semantic-syntactic deviations in aphasia". Proceedings, European Conference on Cognitive Science (INRIA/ARC), April 4-7, 1995, Saint-Malo, France.

Hillert, D., D.F.H. Burrington & G.A. Gupta. 1994. "Semantic Activation for Lexical Perception". In D. Hillert (ed.), *Linguistics and Cognitive Neuroscience. Theoretical and Empirical Studies on Language Disorders*. Linguistische Berichte Special Issue 6:245-268.

Hillert, D. & D.A. Swinney. 1996. "'Driving with a Monkey-tooth around the Corner': Real-time access to metaphoric and literal meanings of nominal compounds in German". Ms.

Hogaboam, T.W. & C.A. Perfetti. 1975. "Lexical Ambiguity and Sentence Comprehension: The common sense effect". *Journal of Verbal Learning and Verbal Behvaior* 14:265-75.

Holmes, V.M. 1979. "Some Hypotheses about Syntactic Processing in Sentence Comprehension. In W.E. Cooper & E.C.T. Walker (eds), *Sentence Processing: Psycholinguistic studies presented to Merrill Garrett.* Hillsdale, NJ: Lawrence Erlbaum, 227-243.

Holmes, V.M., L. Stowe & L. Cupples. 1989. "Lexical Expectations in Parsing Complement-verb Sentences". *Journal of Memory and Language* 28:668-689.

Jakimik, J.A. 1980. *The Interaction of Sound and Knowledge in Lexical Perception from Fluent Speech.* Unpublished doctoral dissertation, Carnegie-Mellon University.

Johnson-Laird, P.N. 1983. *Mental Models: Towards a cognitive science of language, inference, and consciousness.* Cambridge: Cambridge University Press.

Jones, J.L. 1989. "Multiple Access of Homonym Meanings: An artifact of backward primng?" *Journal of Psycholinguistic Research* 18(4): 417-432.

Kawamoto, A. 1993. "Nonlinear Dynamics in the Resolution of Lexical Ambiguity: A parallel distributed processing account". *Journal of Memory and Language* 32:474-516.

Kempen, G. & P. Huijbers. 1983. "The Lexicalization Proces in Sentence Production and Naming: Indirect selection of words". *Cognition* 14:185-209.

Kiger, J.I. & A.L. Glass. 1983. "The Facilitation of Lexical Decisions by a Prime Occuring after the Target". *Memory & Cognition* 11:356-65.

Kintsch, W. 1988. "The Role of Knowledge in Discourse Comprehension: A construction-integration model". *Psychological Review* 93(2):163-182.

Kolk, H. & L. Blomert. 1985. "On the Bradley Hypothesis Concerning Agrammatism: The nonword-interference effect". *Brain and Language* 26:94-105.

Koriat, A. 1981. "Semantic Facilitation in Lexical Decision as a Function of Prime-target Association". *Memory & Cognition* 9:587-598.

Kurtzmann, H.S. 1985. *Studies in Syntactic Ambiguity Resolution.* Unpublished doctoral dissertation. MIT.

Lackner, J.R. & M.F. Garrett. 1972. "Resolving Ambiguity: Effects of biasing contexts in the unattended ear". *Cognition* 1:359-379.

Levelt, W.J.M. 1992. "Accesing Words in Speech Production: Stages, processes and represen-tations". *Cognition* 42:1-22.

MacDonald, M.C., N.J. Pearlmutter & M.S. Seidenberg. 1994. "The Lexical Nature of Syntactic Ambiguity Resolution". *Psychological Review* 101(4):676-703.

MacKay, D.G. 1966. "To End Ambiguous Sentences". *Perception & Psychophysics* 1:426-436.

MacKay, D.G. 1973. "Aspects of the Theory of Comprehension, Memory and Attention". *Quarterly Journal of Experimental Psychology* 25:22-40.

Marcel, A.J. 1983. "An Approach to the Relation between Phenomenal Experience and Perceptual Processes. Conscious and unconscious processes". *Cognitive Psychology* 15:238-300.

Marslen-Wilson, W.D. 1973. "Linguistic Structure and Speech Shadowing at Very Short Latencies". *Nature* 244:522-523.

Marslen-Wilson, W.D. 1985. "Speech Shadowing and Speech Comprehension". *Speech Communication* 4:55-73.

Marlsen-Wilson, W.D. & L. Tyler. 1980. "The Temporal Structure of Spoken Language Understanding". *Cognition* 8:1-72.

Marslen-Wilson, W.D. & A. Welsh. 1978. "Processing Interactions and Lexical Access during Word-recognition in Continuous Speech". *Cognitive Psychology* 10:29-63.

Martin, R.C. 1987. "Articulatory and Phonological Deficit in Short-term Memory and their Relation to Syntactic Processing". *Brain and Language* 32:159-192.

McClelland, J.L. & D.E. Rumelhart. 1981. "An Interactive Activation Model of Context Effects in Letter Perception: Part 1. An account of basic findings". *Psychological Review* 88:375-407.

Mehler, J., J. Segui & P.W. Carey. 1978. "Tails of Words: Monitoring ambiguity". *Journal of Verbal Learning and Verbal Behavior* 17:29-35.

Meyer, D.E. & R.W. Schvaneveldt. 1971. "Facilitation in Recognizing Pairs of Words: Evidence of a dependence between retrieval operations". *Journal of Experimental Psychology* 90:227-234.

Mitchell, D.C. & V.M. Holmes. 1985. "The Role of Specific Information about the Verb in Parsing Sentences with Local Structural Ambiguity". *Journal of Memory and Language* 24:542-559.

Mitchell, D.C. 1987. "Lexical Guidance in Human Parsing: Locus and processing characteristics". In M. Coltheart (ed.), *Attention and Performance, XII.* Hillsdale, NJ: Lawrence Erlbaum, 601-618.

Morton, J. & J. Long. 1976. "Effects of Word Transitional Probability on Phoneme Identification". *Journal of Verbal Learning and Verbal Behavior* 12:431-461.

Moss, H.E. & W.D. Marslen-Wilson. 1993. "Access to Word Meanings during Spoken Language Comprehension: Effects of sentential semantic context". *Journal of Experimental Psychology: Learning, Memory & Cognition* 19(6):1254-1276.

Neely, J.H. 1990. "Semantic Priming Effects in Visual Lexical Perception. A selective review of current findings and theories". In D. Besner & G. Humphreys (eds), *Basic Processes in Reading: Visual lexical perception.* Hillsdale, NJ: Lawrence Erlbaum, 264-336.

Oden, G.C. & J.L. Spira. 1978. "Influence of Context on the Activation and Selection of Ambiguous Word Senses". *Wisconsin Human Information Processing Report* No. 6.

Onifer, W. & D. Swinney. 1981. "Accessing Lexical Ambiguities during Sentence Comprehension: Effects of frequency of meaning and contextual bias". *Cognition* 9:225-36.

Ostrin, R. & M.F. Schwarz. 1986. "Reconstructing from a Degraded Trace: A study of sentence repetition in agrammatism". *Brain and Language* 28:328-345.

Posner, M.I. & C.R.R. Snyder. 1975. "Attention and Cognitive Control". In R. Solso (ed.), *Information Processing and Cognition: The Loyola symposium.* Hillsdale, NJ: Lawrence Erlbaum, 55-85.

Prather, P.A. & D. Swinney. 1988. "Lexical Processing and Ambiguity Resolution: An autonomous process in an interactive box". In S.L. Small, G.W. Cottrell & M.K. Tanenhaus (eds), *Lexical Ambiguity Resolution: Perspectives from psycholinguistics, neuropsychology and artifical inteligence.* San Mateo, CA: Morgan Kaufmann, 289-310.

Rayner, K. & S.A. Duffy. 1986. "Lexical Complexity and Fixation Times in Reading: Effects of word frequency, verb complexity, lexical ambiguity". *Memory & Cognition* 14:191-201.

Rayner, K. & L. Frazier. 1989. "Selection Mechanisms in Reading Lexically Ambiguous Words". *Journal of Experimental Psychology: Learning, Memory and Cognition* 15:779-790.

Rayner, K., M. Carlson & L. Frazier. 1983. "The Interaction of Syntax and Semantics during Sentence Processing: Eye movements in the analysis of semantically biased sentences". *Journal of Verbal Learning and Verbal Behavior* 22:358-374.

Schneider, W. & R.M. Shiffrin. 1977. "Controlled and Automatic Human Information Processing: I. Detection, search and attention". *Psychology Review* 8:1-66.

Schvaneveldt, R.W., D.E. Meyer & C.A. Becker. 1976. "Lexical Ambiguity, Semantic Context, and Visual Lexical Perception". *Journal of Experimental Psychology: Human Perception and Performance* 2:243-256.

Schwanenflugel, P. & K. LaCount. 1988. "Semantic Relatednes and the Scope of Facilitation for Upcoming Words in Sentences". *Journal of Experimental Psychology: Learning, Memory and Cognition* 14:344-354.

Schwanenflugel, P. & E. Shoben. 1985. "The Influence of Sentence Constraint on the Scope of Facilitation for Upcoming Words". *Journal of Memory and Language* 24:232-252.

Schwartz, M.F. & B. Schwartz. 1984. "In Defense of Organology: Jerry Fodor's modularity of mind". *Cognitive Neuropsychology* 1:25-42.

Seidenberg, M.S., M.K. Tanenhaus, J.M. Leiman & M. Bienkowski. 1982. "Automatic Access of the Meanings of Ambiguous Words in Context: Some limitations of knowledge-based processing". *Cognitive Psychology* 14:489-537.

Seidenberg, M.S., G.S. Waters, M. Sanders & P. Langer. 1984. "Pre- and Post-lexical Loci of Contextual Effects on Lexical Perception". *Memory & Cognition* 12:315-328.

Seidenberg, M.S. 1993. "Connectionist Models and Cognitive Theory". *Psychological Science* 4:228-235.

Shanon, B. 1988. "Remarks on the Modularity of Mind". *British Journal of the Philosophy of Science* 39:331-352.

Shiffrin, R.M. & W. Schneider. 1977. "Controlled and Automatic Human Information Processing: II. Perceptual learning, automatic attending and general theory". *Psychology Review* 84: 127-190.

Simon, H.A. 1982. *The Sciences of the Artificial.* Cambridge, MA: MIT Press.

Simpson, G. 1984. "Lexical Ambiguity and its Role in Models of Word Recognition". *Psychological Bulletin* 96:316-340.

Simpson, G. & M. Krüger. 1991. "Selective Access of Homograph Meanings in Sentence Context". *Journal of Memory and Language* 30:627-643.

Spivey-Knowlton, M. J., J.C. Trueswell & M.K. Tanenhaus. 1993. "Context and Syntactic Ambiguity Resolution". *Canadian Journal of Psychology* 47:276-309.

Stemberger, J.P. 1983. "Inflectional Malapropisms: Form-based errors in English morphology". *Linguistics* 21:573-602.

Swinney, D.A. & D.T. Hakes. 1976. "Effects of Prior Context upon Lexical Access during Sentence Comprehension". *Journal of Verbal Learning and Verbal Behavior* 15:681-689.

Swinney, D.A. 1979. "Lexical Access during Sentence Comprehension: (Re)consideration of context effects". *Journal of Verbal Learning and Verbal Behavior* 18:645-660.

Swinney, D.A. 1982. "The Structure and Time-course of Information Interaction during Speech Comprehension: Lexical segmentation, access, and interpretation". In J. Mehler, E.C.T. Walker & M. Garrett (eds), *Perspectives on Mental Representations. Experimental and theoretical studies of cognitive processes and capacities.* Hillsdale, NJ: Lawrence Erlbaum, 151-167.

Swinney, D.A., W. Onifer, P. Prather & M. Hirschkowitz. 1979. "Semantic Facilitation across Sensory Modalities in the Processing of Individual Words and Sentences". *Memory & Cognition* 7:165-195.

Tabossi, P. 1988a. "Accessing Lexical Ambiguity in Different Types of Contexts". *Journal of Memory and Language* 27:324-40

Tabossi, P. 1988b. "Effects of Context on the Immediate Interpretation of Unambiguous Words". *Journal of Experimental Psychology: Learning, Memory and Cognition* 14:153-62.

Tabossi, P., L. Colombo & R. Job. 1987. "Accessing Lexical Ambiguity: Effects of context and dominance". *Psychological Research* 49:161-167.

Tanenhaus, M.K. & M.M. Lucas. 1987. "Context Effects in Lexical Processing". *Cognition* 25:213-234.

Tanenhaus, M.K., C. Burgess & M. Seidenberg. 1988. "Is Multiple Access an Artifact of Backward Priming?" In S.L. Small, G.W. Cotrell & M.K. Tanenhaus (eds.), *Lexical Ambiguity Resolution.* San Mateo, CA: Morgan Kaufmann, 311-329.

Tanenhaus, M.K., G.S. Dell & G. Carlson. 1987. "Context Effects in Lexical Processing: A connectionist approach to modularity". In J.L. Garfield (ed.), *Modularity in Knowledge Representation and Natural-language Understanding.* Cambridge, MA: MIT Press, 83-108.

Tanenhaus, M.K., J.M. Leiman & M.S. Seidenberg. 1979. "Evidence for Multiple Stages in the Processing of Ambiguous Words in Syntactic Contexts". *Journal of Verbal Learning and Verbal Behavior* 18:427-440.

Treisman, A.M. 1960. "Contextual Cues in Selective Listening". *Quarterly Journal of Experimental Psychology* 12:242-248

Trueswell, J.C. & M.K. Tanenhaus. 1991. "Tense, Temporal Context and Syntactic Ambiguity Resolution. *Language and Cognitive Processes* 6:339-350.

Tyler, L.K. & U.H. Frauenfelder. 1987. "The Process of Spoken Word Recognition: An introduction". In U.H. Frauenfelder & L.K. Tyler (eds), *Spoken Word Recognition. A Cognition special issue.* Cambridge, MA: MIT Press, 1-20.

Van Dijk, T.A. & W. Kintsch. 1983. *Strategies of Discourse Comprehension.* New York: Academic Press.

Whitney, P., T. McKay, G. Kellas & W.A. Emerson, Jr. 1985. "Semantic Activation of Noun Concepts in Context". *Journal of Experimental Psychology: Learning, Memory, nd Cognition* 11:26-135.

Williams, J.N. 1988. "Constraints upon Semantic Activation during Sentence Comprehension". *Language and Cognitive Processes* 3(3):165-206.

Wright, B. & M. Garrett. 1984. "Lexical Decision in Sentences". *Memory and Cognition* 12:31-45.

Zwitserlood, P. 1989. "The Locus of the Effects of Sentential-semantic Context in Spoken-word Processing". *Cognition* 32:25-64.

Cognitive Complexity and Control:
A Theory of the Development of Deliberate Reasoning and Intentional Action

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> To us it seems obvious that a concept can become subject to consciousness and deliberate control only when it is part of a system. (Vygotsky 1934/1962:92)

Despite their apparent accessibility to introspection, the psychological processes involved in deliberate reasoning and intentional action remain relatively resistant to analysis.* Part of the problem arguably consists in a failure on the part of cognitive scientists to clarify the functional role of consciousness in the production of goal-directed activity. In this chapter, we describe a new developmental theory that connects the control of thought and action to consciousness of cognitive structures. According to the theory, called the Cognitive Complexity and Control Theory (hereafter, the CCC Theory), reflective awareness of one's knowledge is required in order to use that knowledge to guide behavior under conditions of interference. Consideration of consciousness and its development offers new insights into the nature of cognitive control.

1. The development of deliberate reasoning and intentional action

Psychologists have long recognized that they can learn something about the structure of an ability by examining how it is constructed in childhood. Consider the dramatic differences between toddlers and preschoolers in the degree to which their reasoning appears deliberate and their action seems intentional or

goal-directed. What is it that develops during these years that makes possible increased control over thought and action? A brief example of two age-related changes in control will illustrate not only the general character of the data sets to be discussed in this chapter, but also the range of theoretical options available to those who would explain these changes. Figure 1 presents sample stimuli from the bi-dimensional deductive card sort, a representative rule use task in which children are given explicit instructions and required to use the instructions to guide their behavior.



Figure 1: *Stimuli from the bi-dimensional deductive card sort, which is an example of a rule use task in which children are given explicit instructions and required to use them to match test cards to target cards.*

First, children are shown two target cards, a blue flower and a red car. Then, they are told, "If I show you a blue one, you have to put it there [pointing to the blue flower], but red ones go over here [pointing to the red car]." At this point, children are given a test card, such as a blue car, told, "Here's a blue one," and asked, "Where does this go?" Research to be reviewed indicates that 2.5-year-olds can sort according to a single rule. For example, they may sort all the blue cards correctly. However, children at this age have difficulty using two rules together—for example, to sort a blue card, then a red card, and then a blue card. On the other hand, sorting according to two rules is relatively easy for 3-year-olds. What 3-year-olds cannot do is sort cards by one pair of rules (e.g., the color rules) and then switch and sort the same cards by a different, incompatible pair of rules (e.g., shape rules: "Cars go here, but flowers go over there."). Three-year-olds persist in sorting cards by the first dimension, despite being told that they should switch to the new dimension and despite being told the post-switch rules on every trial. Nonetheless, if they are asked, for example, "Where do the cars go? And where do the flowers go?", they will answer correctly by pointing to the appropriate boxes. That is, they appear to demonstrate knowledge of the post-switch rules even though they perseverate on the pre-switch pattern of responding. Five-year-olds demonstrate knowledge of the post-switch rules and they use these rules appropriately to sort the cards.

Assuming for the moment that these changes in children's card sorting are reliable, and that they reflect meaningful changes in reasoning and action, how might these changes be explained? Several partially-overlapping accounts will be considered and then research will be reviewed that establishes the reliability of the changes and demonstrates their significance for the study of cognitive control.

1.1. *Executive function accounts*

To explain the acquisition of control over behavior, several authors have postulated the existence of qualitatively distinct levels of function. For example, White (1965) suggested that a cognitive level potentially controls the operation of an associative one. Responses at the cognitive level of function have a longer latency than those at the automatic associative level and their execution requires "a mechanism of inhibition that is presumed to have its first sizable influence on behavior during this age range [5-7 years]." (p. 189). In the absence of inhibition, behavior will be controlled by the associative level. The associative level is presumed to emerge earlier than the cognitive level both phylo- and ontogenetically. The notion of distinct levels of function is consonant with hypothesis theory (e.g., Levine 1966; Tumblin & Gholson 1981) and was picked up by T.S. Kendler (Kendler 1979) in her re-formulation of mediation theory (e.g., Kendler & Kendler 1962).

For Vygotsky (1934/1962) and Luria (e.g., 1959), the cognitive level is linguistic in nature: Private speech makes possible planning and inhibition. Based on his neuropsychological work, Luria attributed increases in self regulation during the preschool period to maturation of prefrontal cortex. The diverse set of self-regulatory behaviors associated with prefrontal damage in adults (and hence attributed to prefrontal cortex) may be subsumed by the construct of executive function. Welsh & Pennington (1988) define executive function as:

> [The] ability to maintain an appropriate problem-solving set for attainment of a future goal (Blanchi 1922; Luria 1966). This set can involve one or more of the following: (a) an intention to inhibit a response or to defer it to a later more appropriate time, (b) a strategic plan of action sequences, and (c) a mental representation of the task, including the relevant stimulus information encoded in memory and the desired future goal-state. (Welsh & Pennington 1988:201-202)

Response inhibition remains a central concern among researchers who study executive function (see Diamond 1991). Recently, a number of theorists

have attempted to explain changes in inhibition by postulating the existence of an inhibition mechanism (e.g., Harnishfeger & Bjorklund 1993; Dempster 1992; Tipper, Bourque, Anderson & Brehaut 1989). Although inhibition accounts cannot explain why children at different ages exhibit inflexibility in some contexts and not in others, one might choose to describe age-related changes in deliberate reasoning and intentional action in terms of inhibition. For example, one might propose that in the deductive card sort, 3-year-olds know the post-switch rules, but nonetheless cannot inhibit a tendency to use the pre-switch rules (cf. Diamond 1991; Konow & Pribram 1970; Milner 1963).

1.2. *Accounts that emphasize consciousness*

Recent work on memory and learning has supported the hypothesis that multiple levels of function can be distinguished on the basis of whether or not they involve conscious processing (e.g., Jacoby 1989; Petri & Mishkin 1994; Squire 1987; Tulving 1985). Although these accounts have typically not focused on implications for development, they all assume that unconscious systems (or processes) are phylo- and onto-genetically prior to conscious ones (see Squire 1982; Tulving 1987), and research on memory in infants and young children generally supports this developmental assumption (e.g., Greenbaum & Graf 1989; Parkin & Streete 1988; Rovee-Collier 1990).

From this perspective, age-related changes in reasoning and action could be explained by the growth of conscious, intentional, or controlled processes, as opposed to unconscious, automatic processes. In contrast to executive function accounts, consciousness, not response inhibition *per se*, makes possible the control of behavior. For example, 3-year-olds might perseverate on a pre-switch pattern of responding in the deductive card sort because they cannot maintain the post-switch rules in mind (cf. Goldman-Rakic 1987; Pennington 1994).

Karmiloff-Smith's (1992) tri-phasic Representational Redescription model moves beyond a simple distinction between conscious and unconscious processes by introducing the notion of explicit representations that are not conscious. According to the Representational Redescription model, knowledge is originally represented in an implicit, procedural format (called 'level I'). Knowledge in this format is modular and inflexible: the procedures are data-driven and they must be 'run off' in their entirety. With sufficient practice, behavioral mastery of these procedures is achieved and the knowledge is automatically redescribed into a more abstract, explicit format (called 'E1') that reveals the structure of the procedures. Although this newly-redescribed knowledge is explicit, it is not conscious. At this level of redescription, separate as-

pects (or components) of the knowledge can interact with aspects of other explicitly-represented knowledge, but they cannot be consciously manipulated.

From the perspective of her theory, inflexibility in the deductive card sort presumably can be attributed to the representational format of children's knowledge (levels I or E1). For example, 3-year-olds may rely on implicit (level I) procedures to sort during the pre-switch phase. Because these procedures are implicit, performance on the task will be relatively inflexible. Perhaps by 5 years of age, children have typically acquired enough experience with sorting that their procedures have been redescribed into conscious (and hence, flexible) rules. As with other approaches that emphasize consciousness, however, there is no *a priori* way to predict the representational format of 2.5-year-olds' or 3-year-olds' knowledge in a particular situation. In fact, for Karmiloff-Smith (1992), changes in rule use ought not to be age-related at all; rather, they should depend upon practice (where increased practice ought to lead to increased control).

1.3. *Accounts that emphasize memory*

Although they rarely address the issue of consciousness directly, a variety of neo-Piagetian accounts (e.g., Case 1992; Pascual-Leone 1970) make specific predictions about the amount of information that children at different ages can hold in mind. These accounts and others (e.g., Brainerd 1983; Olson & Campbell 1993) construe memory to be the primary constraint on children's performance in a wide variety of tasks.

A large body of research has documented reliable age-related increases in children's memory span, which is measured as the maximum number of items (e.g., digits, words, letters) that can be recalled immediately after a single presentation (see Dempster 1981, for a review). Typically, these studies have found that 2-year-olds can recall about two items, whereas 5-year-olds can recall nearly four. It is possible that memory span constrains the number of rules that children can use in the deductive card sort. For example, presentation of the two shape rules ("Cars go here, but flowers go over there.") in addition to the two color rules may exceed 3-year-olds' memory span, causing them to rely on the initial pair of rules, which they are unlikely to forget in the course of the task because they continue to be potentially applicable, albeit wrong.

2. The CCC theory: Overview

According to the CCC theory, there are systematic, age-related changes in the complexity of the rule systems that children can represent. Rules (condition-action statements that can be phrased in a variety of logically-equivalent ways)

allow the representation of effective relations between antecedent conditions and actions to executed actions or inferences to be made (including the selection of other rules). Complexity is characterized in terms of the number of levels of embedding that are present in a rule system. Increases in complexity correspond to increases in metacognition and self awareness and result in increased conscious control over thought and action.

On the deductive card sort, 3-year-olds, unlike 2.5-year-olds, are able to integrate two rules (e.g., "If red then here and if blue then there.") into a single rule system. They carefully consider which rule's antecedent condition is satisfied. What they cannot do, however, is reflect on their newly-created rule system. As a result, even though they represent the pre-switch rules and the post-switch rules, they cannot represent a higher-order rule that allows them first to select the appropriate rule pair (e.g., the shape rules) and then to determine which specific rule (e.g., "Cars go here.") to use. Over the course of the fourth year, children come to recognize that they know two pairs of rules that apply to the same situation. A correlate of this new degree of self reflection is that children can construct a higher-order rule for determining which pair of rules to use.

The main tenets of the CCC Theory are summarized in Table 1. As indicated in the table, the theory assumes the existence of two different types of system: a response-based mechanism that learns and stores behavioral routines in an unconscious fashion according to associationist principles, and a conscious representational system that controls the operation of the response-based system and can recursively control itself.

Table 1: *Aspects of the Cognitive Complexity and Control (CCC) theory.*

1. Two types of system: Response-based and representational.
2. Development = Growth of the representational system.
3. The representational system involves cognitive control structures that correspond to rules (which explicitly link conditions to actions or inferences).
4. Growth of the representational system = Increases in the complexity of the explicit rule systems that children can use.
5. Complexity = Number of levels of embedding in these systems.
6. Increases in complexity = Increased reflective awareness of rules.

According to the CCC Theory, the development of consciousness and the cognitive control of action consists in the growth of the representational system, which comes to represent increasingly complex rule systems. Com-

plexity corresponds to levels of embedding. Figure 2 illustrates the way in which one rule can be embedded under another and controlled by it. A rule such as A, which links a1 to c1, is incompatible with rule C, which links a1 to c2. Rule A is controlled by a higher-order rule (rule E) that can be used to select rules A and B, as opposed to rules C and D. To use rule E, one must consider both the setting condition (s1 or s2) and the lower-order antecedent conditions (a1 or a2), in order to determine which consequence follows (c1 or c2).

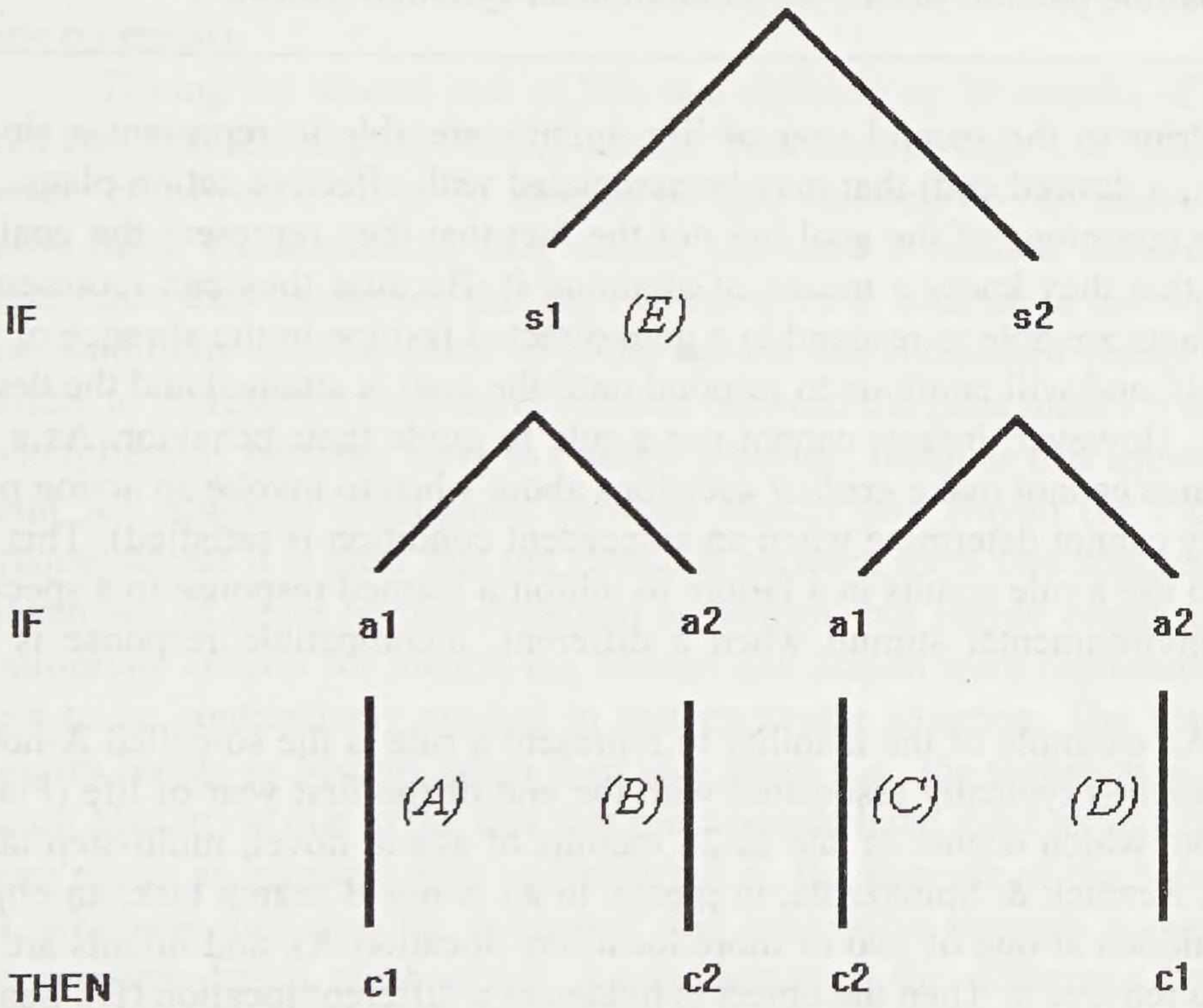


Figure 2: *Hierarchical tree structure depicting formal relations among rules. (Note: s1 and s2 = setting conditions; a1 and a2 = antecedent conditions; c1 and c2 = consequences).*

The major transitions in complexity that the theory is designed to explain normally occur (1) at the end of infancy, (2) during the third year of life, and (3) at about 4 or 5 years of age. The three transitions are summarized in Table 2.

Table 2: *Three transitions in the complexity of children's cognitive control structures.*

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1. The 2nd Year (1-2 years). From the explicit representation of a goal to the explicit representation of a rule (i.e., the relation between a condition and an action).
2. The 3rd Year (2-3 years). From the explicit representation of a rule to the explicit representation of a relation between two rules (i.e., a pair of rules).
3. The 4th Year (3-4 years). From the explicit representation of a pair of rules to the explicit representation of a higher-order rule that integrates two incompatible pairs of rules (i.e., a hierarchical system of rules).

Prior to the second year of life, infants are able to represent a single goal (i.e., a desired end) that may be associated with effective action plans. Infants are conscious of the goal but not the fact that they represent the goal or the fact that they know a means of attaining it. Because they can represent a goal, infants are able to respond in a goal-directed fashion in the absence of the goal itself, and will continue to respond until the goal is attained and the desire satisfied. However, infants cannot use a rule to guide their behavior. As a result, infants cannot make *explicit* decisions about when to invoke an action plan (i.e., they cannot determine when an antecedent condition is satisfied). This inability to use a rule results in a failure to inhibit a learned response to a specific set of environmental stimuli when a different, incompatible response is required.

An example of the inability to represent a rule is the so-called A-not-B error, which is typically associated with the end of the first year of life (Piaget 1952), but which occurs as late as 24 months of age in novel, multi-step tasks (Zelazo, Reznick & Spinazzola, in press). In an A-not-B search task, an object is first hidden at one of two or more locations (location A), and infants are allowed to retrieve it. Then the object is hidden at a different location (B). Search at A on post-switch (B) trials is called an A-not-B perseverative error. Even if infants who perseverate in this task know the correct location of the object (i.e., have the correct goal), they lack awareness of the conditionally-specified relation between the means and the goal. In other words, they fail to use a rule such as, "The left one" (which is short for, "When I get to the location on the left, reach"), and their behavior continues to be controlled by a response-based tendency to reach to the pre-switch location. (More sophisticated versions of this task will be considered in more detail below.)

The consequences of failing to represent a single rule can also be illustrated with an example involving adults. Consider the following experience.

You return home at the end of the day, tired and perhaps puzzling over a perplexing problem. You attempt to open the front door, and find that the key doesn't fit. When you look at the key you see that it is your office key, which you use regularly throughout the day to open your office door. In the absence of a conscious representation of the link between your home door and your home key (or any other conscious key-related representation, for that matter), your knowledge of which door you are opening (the goal) must compete with a prepotent response tendency to select your office key when retrieving a key from your pocket. (The difference between infants and adults in this case is that adults are *capable* of representing the rule, even if they sometimes fail to fulfill their potential).

During the second year of life, and certainly by 30 months of age, children can represent explicit rules, such as, "Red ones go here", or "Blue ones go there". However, even at 30 months of age, children do not know that they know rules. Consequently, they cannot represent a relation between two or more rules; they cannot see that the two rules are in contrast to one another and that conditions must be tested carefully against one antecedent versus the other. Failure to represent a contrastive relation between the rules makes it difficult to switch flexibly between them in a single situation, much as it is sometimes difficult for adults to distinguish between Mozart and Haydn (or Picasso and Braque) unless it is clear that the choice is between these two composers. Beethoven would never be mis-classified as Mozart, but Haydn might, unless the appropriate criteria for identifying Mozart and Haydn were represented as criteria to be contrastively applied in that particular situation. The bias to misclassify Haydn as Mozart rather than vice versa (i.e., the tendency to perseverate on Mozart) is due to the fact that most people have more experience classifying music as Mozart's than as Haydn's (i.e., the strength of the Mozart criteria, whatever they may be, is greater; this associative strength is mediated by the response-based mechanism). Again, however, the difference between 2-year-olds and adults is that adults are capable of using rules, whereas 2-year-olds are not. Thus, when 30-month-old children are asked to use a pair of rules, they represent each of the rules, but they simply cannot represent the contrastive relation between them. As a result, they initiate rule use appropriately, but they tend to perseverate on the first rule that they are asked to employ unless there is very little overlap between the rules.

By 36 months, children can reflect on two or more rules and represent a contrastive relation between them. That is, they can integrate two separate rules into a single system. Representing the relation between the rules permits children to switch flexibly between the rules; children appreciate the need to con-

sider carefully which of the two antecedent conditions is satisfied. However, although 3-year-olds can represent a pair of rules (*qua* pair of rules), they cannot reflect on their representation of a pair of rules and consequently cannot represent a higher-order relation between two incompatible pairs of rules. When asked to switch between rule pairs (as in the deductive card sort), they will perseverate on the first pair of rules (e.g., they will continue to sort cards by color after they are told to switch to shape). They know each pair, which is why they can express knowledge of the post-switch rules, but they do not know that they know each pair, and therefore cannot make a deliberate decision to use one pair or the other. Failure to recognize that they know two pairs of rules that apply to the same situation under different descriptions prevents them from actively considering the description before considering the rule. Three-year-olds thus approach a rule use task such as the deductive card sort in much the same manner that Frege's (1892/1949) astronomically-unsophisticated adults approach the task of denoting Venus: They recognize the morning star and they can identify the evening star, but they fail to understand that there is really only one star (or planet) under two different descriptions.

Gradually, over the course of the fourth year, children come to recognize that they represent pairs of rules. Pairs of rules can then be embedded under higher-order rules and integrated into a single conceptual system. Figure 2 depicts the system of rules that can be represented by the end of the preschool period. In terms of this figure, 2-year-olds can represent A and B and their relation; and 4- or 5-year-olds can represent the entire, hierarchical set, which involves representing the higher-order relation between A and B, on the one hand, and C and D, on the other.

There are further changes that occur within each level of complexity. For example, after acquiring the ability (at about 4 years) to integrate two pairs of rules into a single system and switch flexibly between them, children acquire the ability to *combine* the pairs of rules and use them simultaneously or in rapid succession. Thus, after children are able to switch flexibly from color to shape in the card sort, they acquire the ability to use both dimensions together to sort stimuli (as in a matrix classification task; see Frye, Zelazo & Palfai 1995, Exp. 3; Inhelder & Piaget 1964; Roberts & Fischer 1979). The integration of two rule pairs into a single system is made possible by an increase in the complexity of children's rule systems. The later-emerging ability to integrate information from two dimensions (e.g., in a nonlinear fashion; Zelazo, Helwig & Lau, in press) is a further skill that is acquired *within* age-related constraints on complexity.

For each change in the complexity of children's rule systems, the same cognitive developmental processes are recapitulated. Initially, children repre-

sent a rule system of a particular level of complexity, and this rule system permits children to exercise a new degree of self control. However, use of the system is subject to limitations that cannot be overcome until yet another level of complexity and consciousness is achieved. Dissociations between knowledge and the ability to use that knowledge occur until children reflect on that knowledge, which allows a higher-order rule to be created. Higher-order rules permit the selection of one embedded rule system for use instead of an incompatible one. After children acquire the ability to select one embedded rule system, they then acquire the ability to coordinate these systems and use them simultaneously. Experience with a rule system, such as the rule system that integrates color rules and shape rules, makes the rule system more robust and liberates processing resources (Siegler 1991). The availability of resources is what permits improvements in performance at that same level of complexity (e.g., the ability to use two subsystems simultaneously as in matrix classification).

3. Three transitions in the complexity of children's cognitive control structures

In this section, the three transitions in complexity that are postulated by the CCC Theory will be discussed in relation to recent studies on the development of deliberate reasoning and intentional action.

3.1. *The 2nd year (1-2 years): From the explicit representation of a goal to the explicit representation of a rule*

According to the CCC Theory, even when particular behavioral routines are elicited directly and automatically, they are elicited as a function of awareness of particular stimuli by the representational system. Thus, some minimal consciousness (Zelazo 1996), at least, is required even for the automatic invocation of the response-based system; behavioral routines are not completely blind. Further, these routines are not stereotyped; they are goal-oriented rather than pre-programmed. However, behavioral routines stored in the response-based system are not consciously controlled.

Intentional, consciously-controlled action depends on the conscious representation of rules by the representational system. A useful, preliminary analysis of intentional (or voluntary) action was advanced by J.M. Baldwin, who wrote, "[...] Three elements of the voluntary process are desire, deliberation, and effort" (Baldwin 1892:286). For Baldwin, 'desire' refers to the con-

scious representation of a goal and 'deliberation' refers to the active consideration of alternative means and ends. Effort accompanies the selection and execution of a plan. From the perspective of the CCC Theory, infants are capable of desire but not deliberation. The active consideration of alternative means and ends requires the conscious representation of a rule linking conditions to actions (or inferences).

This approach is consistent with Anscombe's (1958) early analysis in which she identified consciousness as one of the essential characteristics of intentional action. Intentional actions are done in relation to some future state of affairs (a goal) and what is done is directed towards achieving that state of affairs (a means). The person who is acting must be aware of the goal and the means and the relation between them. Further, from the perspective of the CCC Theory, the intentional use of a means to an end involves determining when to invoke that means as opposed to another. This determination requires a rule. The fact that people are aware of the conditionally-specified relation between means and goals is revealed by their ability to answer the question, "Why are you doing x?" and by their surprise when an action goes awry. Surprise makes it possible to infer people's awareness of act-outcome relations. People would not be surprised when an action goes awry unless they knew what they were doing and what the outcome of their action should be.

Frye (1991) used surprise as a dependent measure to try to determine when infants consciously employ means and goals, and to distinguish the development of intention from the conditioned or associative responding that is exhibited early in life (e.g., Papousek 1961; Siqueland & Lipsitt 1966). Infants at three different ages—eight, sixteen and twenty-four months—were presented with variations of Piaget's (1952) support task where a toy has to be moved into reach by pulling a cloth on which the toy is resting. To determine whether infants are conscious of the goal of bringing the toy into reach, the situation was gimmicked so that pulling on the cloth either did not affect the toy or actually made it move farther out of reach. These changed consequence manipulations produced surprise reactions at all three ages. Surprise was judged from videotapes by observers who were not told the purpose of the experiment. These results indicated that even the 8-month-olds had the goal of bringing the toy into reach.

Although the changed consequence results indicate that all the infants were aware of the goal, these results alone are insufficient to establish that infants were acting intentionally. The infants could have been surprised even if they simply had an expectation for the event of the toy coming into reach without being aware of the relation between this event and their action. To test for

the awareness of means, a mismatched means manipulation was created. This time, the support situation was gimmicked so that a means that should not have been effective nonetheless was. A hidden mechanism was used so that pulling a cloth that was twelve inches to the side of the toy brought the toy into reach. Only the 24-month-olds and some of the 16-month-olds were surprised in this situation. The results indicate that the older infants were surprised even when a favorable event came about because they were aware that their act was not a customary means to that goal. Together, these studies of infant intention suggest that by 8 months, infants are aware of goals. However, it is not until the second year of life that infants are usually aware of how specific means relate to goals. As a result, infants under 2 years of age have difficulty establishing specific rules for selecting among means in the context of goal-directed behavior.

Consider another experimental paradigm that clearly requires the conscious representation of a goal, but does not necessarily involve deliberation and rule use. In any delayed response task (Hunter 1917), including the A-not-B task (Piaget 1954), an object is conspicuously hidden at one of several locations. After a delay, infants are allowed to search for the object. To search correctly on the first trial, infants must use a representation of the object's location to guide their search.

Numerous researchers since Piaget have confirmed that infants as young as 7 months of age will search for hidden objects (see Wellman, Cross & Bartsch 1986) and search has been linked to the functioning of prefrontal cortex in both infants (Bell & Fox 1992) and nonhuman animals (Diamond & Goldman-Rakic 1989). The A-not-B task in particular has revealed a limitation on infants' search that has important implications for the extent to which infants can deliberately control their behavior by conscious representations. Piaget (1954) noted that infants late in the first year of life often make A-not-B perseverative errors. The Piagetian interpretation of these errors, which centered on the development of the object concept, has fallen out of favor, but the existence of the errors themselves is well established (Wellman *et al.* 1986). Moreover, contrary to the Piagetian account, perseverative errors occur throughout the second year and even into the preschool years in some situations (DeLoache & Brown 1983; LeCompte & Gratch 1972; Loughlin & Daehler 1973; Miller, Cohen & Hill 1970; Sophian & Wellman 1983; Webb, Massar & Nadolny 1972; Zelazo, Reznick & Spinazzola, in press). From the perspective of the CCC Theory, the A-not-B task requires the use of an explicit rule, which explains why the task is so difficult prior to the end of the first year. Further, for 2-year-olds, who have only recently acquired the ability to use an explicit rule, rule use is fragile and susceptible to disruption.

Zelazo, Reznick & Spinazzola (in press) created a situation in which 2-year-olds had to select among a number of options in order to retrieve an object that was conspicuously hidden by an experimenter. In one condition, a 4-step condition, the retrieval response was as follows: Children had to (1) remove a foam barrier, (2) pull a tray beneath a door (revealing 3 geometric symbols attached to strings), (3) choose a symbol, and (4) pull one string by its symbol under the door so as to retrieve an object at the end of the string. When the object was retrieved at one location (A) three times prior to seeing the object hidden at a new location, even 24-month-olds tended to search at the old location (exhibiting the A-not-B error). On the other hand, children in a representation-only condition, who merely watched the object being hidden at one location (without retrieving it) prior to seeing it hidden at a new location, did not perseverate but instead nearly always searched at the correct location. Because active responses to the pre-switch location were required in order to elicit the errors, the errors cannot easily be accounted for by interference from a previous representation of the object's location. Such interference would have occurred even in the representation-only condition. If children are not perseverating on a representation of the object's previous location, then they likely knew where the object was hidden on the post-switch trials but were unable to use this knowledge to control their behavior when there was a competing response tendency. This conclusion is consistent with a variety of findings indicating that infants' knowledge about hidden objects exceeds their ability to use that knowledge (e.g., Baillargeon *et al*. 1990; Diamond, Cruttenden & Neiderman 1994; Hofstadter & Reznick 1996).

From the perspective of the CCC Theory, awareness of an object's correct location in a search task will not suffice under conditions of interference. What is required in order to avoid the pitfall of perseveration is an explicit rule linking a condition (a symbol) to an action (pull)—a rule such as, "When I get to the symbol on the left, reach.". In the absence of such a rule, a representation of the appropriate goal (i.e., a representation of the object at location B) will compete with a response-based tendency to reach to location A. Representation of a rule requires a degree of reflection that is beyond the capabilities of infants and remains relatively fragile in children until about the third year of life.

3.2. *The 3rd year (2-3 years): From the explicit representation of a rule to the explicit representation of a relation between two rules*

The general paradigm that we have used to study rule use in children 2.5 years of age and older is to present children with conditional statements and examine

the circumstances in which they can use them to guide their behavior. This paradigm has long been employed by Luria and his colleagues. For example, in one series of studies (see Luria 1959, 1961), children were told to squeeze a rubber ball when a green light flashed, but to refrain when a red light flashed. Luria described a developmental sequence in which children's ability to understand and repeat instructions outstrips their ability to follow those instructions. Although Luria's work is promising, it is difficult to interpret due to cursory descriptions of methods and results. As Luria (1979) himself noted, "This work constituted no more than a series of pilot studies [...] and additional extensive observations must still be made." (Luria 1979:119).

Our own research has substantiated and extended Luria's findings about the development of rule use. In a study by Zelazo & Reznick (1991, Exp. 1), two tasks were administered to children aged 31, 33.5, and 36 months. One task was a card sort not unlike the bi-dimensional deductive card sort described above, but with the crucial difference that it only required use of a single pair of rules. Target cards (e.g., a garden hose and a chair) were affixed to each of two trays. Children were then told two rules, such as, "If it's something found inside the house, then it goes in this box. If it's something found outside the house, then it goes in that box.". At this point, they were shown ten pictures (such as a snowman, a bed, and a swingset), which were labeled at the basic level (e.g., "Here's a snowman,"), and for each one, children were asked, "Where does this go?" A knowledge task was identical to the sorting task except that instead of being asked to sort items, children were asked which rule's antecedent condition each item satisfied. For example, children were told, "Here's a snowman," and asked, "Is it something found inside the house or is it found outside?". The two tasks employed the same rules and the same items, but differed in the extent to which they required children to use their knowledge to execute the actions prescribed by the apodoses of the rules. Thirty-six-month-olds performed equally well on both tasks, but, across a variety of categories, children in the two younger age groups performed better on the knowledge task than on the sorting task, indicating that they failed to use their knowledge in the service of simple rules.

A later study (Zelazo, Reznick & Pinon 1995, Exp. 1) found that 2.5-year-olds had difficulty even when (1) cards were labeled at the superordinate level (i.e., in terms of the rule; e.g., as "something found inside"), (2) children were reminded of the rules, and (3) children were rewarded. In one condition, 32.25-month-old children were told, "Remember, inside things go here, outside things go there. Look, here's something that goes outside, which box does it go in?" and then given a sticker for correct responding. Remarkably, these chil-

dren were unable to use the rules systematically to sort the ten test cards. Analyses of errors revealed a tendency to repeat responses. Although children rarely put all the cards into the same box, when they made an error, it usually involved putting a card into the box in which they had put a card on the previous trial.

These results indicate that 2.5-year-olds represented the rules at some level, and actually *started* to use them, but were susceptible to perseverative errors and ultimately failed to sort systematically. In terms of the CCC Theory, 2.5-year-olds know one rule such as, "Outside things go here", and they know the other rule (e.g., "Inside things go there"), but these rules are not integrated into a system in a way that permits effective control of behavior. If they had been able to step back from their knowledge, so to speak, and consider both rules simultaneously, then they would have recognized the need to choose carefully between the rules and avoid assimilating test cards to only one of them.

Three-year-olds' performance on the sorting task, on the other hand, seems to reflect the representation of a contrastive relation between two rules (i.e., it seems to reflect the representation of a pair of rules). Children were simply given two rules and required to use them; they were not trained to make distinctions and opportunities for modeling the experimenter were minimized. Because successful responding was underdetermined by the nonlinguistic aspects of the task (e.g., the perceptual similarity of the exemplars), one can be reasonably confident that they were representing the rules and using them to govern their behavior. (In fact, in a version of the task in which children were given the cards but not told specific rules, 3-year-olds failed to create the categories). The ability to use a pair of rules seems to be acquired rapidly at the end of the third year of life. According to the CCC Theory, this important acquisition is due to an increase in children's ability to reflect on their rules and consider a contrastive relation between them.

3.3. *The 4th Year (3-4 years). From the explicit representation of a pair of rules to the explicit representation of a higher-order rule*

Of the three major changes in rule use accounted for by the CCC Theory, those occurring during the fourth year have been studied most extensively. As part of a larger study, Frye, Zelazo & Palfai (1995, Exp. 2), showed 3-year-olds and 5-year-olds two bi-dimensional card sorts like the one illustrated in Figure 1 above. Half of the children at each age received two sorts (color-size and shape-number) and half received two different sorts (size-number and color-shape). For each sort, the procedure was as follows. Target cards were affixed

to two trays. On each of 5 pre-switch trials, the experimenter told children rules for separating test cards by one dimension (e.g., "All the red ones go here, but all the blue ones go there."), showed children a card, and asked them, "Where does this go in the _____ (e.g., color) game?" Children were required to place the card into one of the trays. When they had completed 5 trials, children were asked to stop playing the first game and to switch to a new game. They were then given 5 post-switch trials. The procedure for these trials was identical to that for the pre-switch trials except that children were told the rules for sorting by the other dimension (e.g., shape).

All children were correct on the 5 pre-switch trials. Post-switch responses were classified as passing if children were correct on 4 or 5 out 5 trials. Children who sorted the same number of cards incorrectly were classified as failing. All children could be classified by these criteria. In 89% of the cases, children were correct or incorrect on all 5 trials. On each of the card sorts that children received, 3-year-olds tended to fail (13 out of 20 for first card sort and 14 out of 20 for the second), whereas the majority of 5-year-olds passed (15 out of 20 for the first and 14 out of 20 for the second).

According to the CCC Theory, in order to switch flexibly between pairs of rules, children need to represent a hierarchical system of inferences in which two incompatible pair of rules are embedded under a more general rule that governs which pair of rules to employ (see Figure 2). Children were required first to determine which dimension was relevant (i.e., shape or color), and then to make a discrimination based on the value along the relevant dimension. That is, they needed to use a rule such as, "If we're playing the color game, then if it's red, then put it there" (or any logically-equivalent statement). According to the CCC Theory, 3-year-olds can represent a pair of rules, but they do not know that they can represent a pair of rules and so they cannot represent a higher-order rule that operates on a pair of rules. The lack of reflective awareness of their rules can be characterized as a constraint on the complexity of the rule systems that 3-year-olds can represent. Without a higher-order rule, children will perseverate on the most compelling pair of rules.

An important aspect of the Frye, Zelazo & Palfai (1995) results is that the same age-related change occurred for card sorts that involved different pairs of dimensions (i.e., color-size and shape-number). In fact, remarkably similar results have now been found in a number of studies (e.g., Zelazo, Frye, Reznick, Schuster & Argitis 1995) that varied numerous aspects of the procedure, including the levels of dimensions used (e.g., geometric or natural shapes), whether children were trained during the pre-switch phase or merely told the rules, and whether test cards were labeled by both dimensions or only

by the relevant one (e.g., "Here's a red one."). In all cases, 3-year-olds were able to employ the first set of rules they were given, but they could not switch between rule pairs, despite being told the new rules on each trial. Instead, they systematically perseverated on the pre-switch pattern of responding. In contrast, by age 4 or 5 years, children performed well.

Research on card sorting between the ages of 3 and 5 years has tested a number of specific predictions derived from the CCC Theory. First, in terms of the CCC Theory, 3-year-olds perseverate on a pair or rules such as, "Red ones go here; Blue ones go there." They represent and continue to use the pre-switch rules even though they know the post-switch rules. This claim can be contrasted with considerations derived from research on discrimination learning (Esposito 1975). For example, children who perseverate could be attending to stimuli solely in terms of the first dimension (e.g., Zeaman & House 1963). If children perseverate on a dimension *per se*, then perseveration should occur regardless of whether the levels of that dimension are changed. Another alternative is that perseveration reflects learned responses to unique stimulus configurations (or compounds) that are not conceptualized as instances of dimensions or as values along dimensions. Learned responses to particular stimuli (e.g., a blue boat) may need to be extinguished before new ones can be learned. If this were the case, then children should perseverate only in the presence of these particular stimuli.

In a study by Zelazo, Frye *et al.* (1995, Exp. 3), predictions derived from these alternatives were tested by comparing performance on three versions of the card sort (see Figure 3). If 3-year-olds attend solely to a single dimension, then they should continue to perseverate during the post-switch trials even when the levels of the dimensions are changed between the pre- and post-switch phases (e.g., if children are required to sort red and blue rabbits and boats by color during the pre-switch phase, but to sort yellow and green flowers and cars by shape during the post-switch phase). In contrast, if children are perseverating on specific rules, then they should not perseverate in this version of the task, called the *total change version*. Inability to use a higher-order rule would not result in perseveration in this version because there is no interference between the two pairs of rules.

To differentiate between the specific-rules account (derived from the CCC Theory) and the particular-stimulus-configurations account, we also examined performance on a version of the task in which there was a change in the stimuli that did not preclude the possibility of perseverating on the first pair of specific rules. In this version, called the *partial change version*, only the levels of the dimension that was *irrelevant* on the pre-switch trials were changed (see

Figure 3). For example, if children first sorted red and blue boats and rabbits by color during the pre-switch phase, they might be required to sort red and blue flowers and cars by shape during the post-shift phase. This would still allow them to perseverate on specific rules, such as, "If it's red, then put it here, and if it's blue, then put it there", but it would prevent them from perseverating on responses to particular cards, such as a red boat.

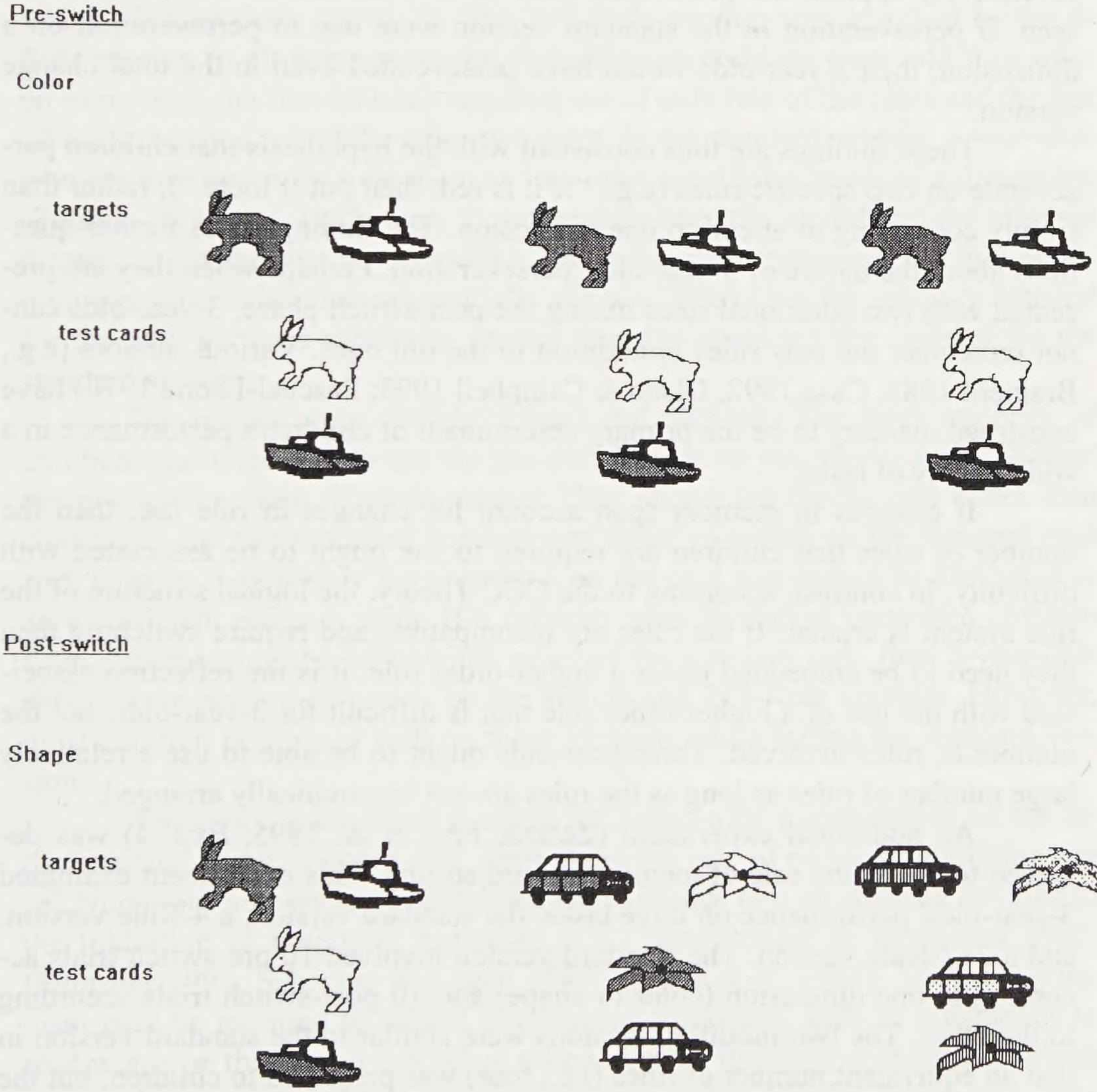


Figure 3: *Examples of the standard, total change and partial change versions of the bi- dimensional deductive card sort (for subjects receiving the color rules first) used in Zelazo, Frye* et al. *(1995, Exp. 3).*

The results indicated that 3-year-olds perseverate on specific rules specifying particular levels of a dimension. Although 3-year-olds perseverated in the standard and partial change versions, they typically did not perseverate in the total change version. The fact that 3-year-olds perseverated in the partial change version demonstrates that they are in fact using rules and not learning specific responses to specific stimulus configurations: In this version, they perseveratively applied the pre-switch rules to new stimuli that they had never seen. If perseveration in the standard version were due to perseveration on a dimension, then 3-year-olds would have perseverated even in the total change version.

These findings are thus consistent with the hypothesis that children perseverate on two specific rules (e.g., "If it is red, then put it there."), rather than simply continuing to attend to one dimension. The finding raises further questions about the nature of 3-year-olds' perseveration. Perhaps when they are presented with two additional rules during the post-switch phase, 3-year-olds cannot remember the new rules in addition to the old ones. Various authors (e.g., Brainerd 1983; Case 1992; Olson & Campbell 1993; Pascual-Leone 1970) have construed memory to be the primary determinant of children's performance in a wide variety of tasks.

If changes in memory span account for changes in rule use, then the number of rules that children are required to use ought to be associated with difficulty. In contrast, according to the CCC Theory, the logical structure of the rule system is crucial: If the rules are incompatible and require switching then they need to be embedded under a higher-order rule. It is the reflection associated with the use of a higher-order rule that is difficult for 3-year-olds, not the number of rules involved. Three-year-olds ought to be able to use a relatively large number of rules as long as the rules are not hierarchically arranged.

An additional experiment (Zelazo, Frye *et al.* 1995, Exp. 4) was designed to assess the role of memory in card sorting. This experiment examined 3-year-olds' performance on three tasks, the standard version, a 4-Rule version, and a 2+2-Rule version. The standard version involved 10 pre-switch trials according to one dimension (color or shape) and 10 post-switch trials according to the other. The two modified versions were similar to the standard version in that an equivalent number of rules (i.e., four) was presented to children, but the rule system was simplified by eliminating the hierarchical relation. In the 4-Rule version, children were given four rules involving one dimension only (either color or shape). Four exemplars from one dimension were displayed so that children matched test cards to four targets instead of two targets for all 20 test trials (i.e., there was no switch). As in the standard version, test cards

matched one target card on the relevant dimension and matched another target on the irrelevant dimension. For example, children who were required to sort vehicles according to shape (i.e., type of vehicle), were shown the following target cards: a white car, a brown plane, an orange bus, and a blue boat. They were then told: "If it's a car it goes here, if it's a plane it goes here, if it's a bus it goes here, and if it's a boat it goes here.". Prior to each trial, the experimenter stated the relevant rules, showed children a test card (e.g., a brown car), and asked, "Where does this go?". The 2+2-Rule version was identical to the 4-Rule version in all respects except that although children were told four rules on every trial, the first 10 trials required use of only two of the rules and the last 10 trials required use of the other two rules. In the standard version, 3-year-olds who are told two rules treat them as two rules specifying levels of a dimension (Zelazo, Frye *et al.* 1995, Exp. 3), rather than one rule identifying the relevant dimension. In the two new versions, four rules were presented to children simultaneously, rather than sequentially as pairs. Therefore, the memory demand for the new versions should be greater than (or equal to) the demand for the standard version.

The results were straightforward and striking. The large majority of children who were able to use the pre-switch rules on the standard task showed the predicted pattern of performance: They succeeded (performed better than chance) on the two modified versions and failed to switch on the standard card sort. Clearly, 3-year-olds' perseveration on the card sort cannot be attributed to an insufficient memory span. If a memory span limitation prevented children from remembering the post-switch rules on the standard task, then 3-year-olds should have performed poorly on the 4-Rule and 2+2-Rule versions. However, most children performed well on these versions while failing the standard version.

If memory span cannot account for 3-year-olds' perseveration on the bidimensional deductive card sort, what about the role of response inhibition *per se*? Numerous authors have postulated the existence of a mechanism devoted to the inhibition of prepotent responses (e.g., Harnishfeger & Bjorklund 1993; Dempster 1992; Schachar & Logan 1989; Tipper *et al.* 1989). Such a mechanism may be required to inhibit overlearned responses, such as a tendency to read words on the Stroop task when asked to name the color of the ink in which the words are printed (MacLeod 1991; Stroop 1935). On the Stroop task, subjects know perfectly well what they are required to do, but they have difficulty resisting interference, which results in increased reaction times.

One way to assess the role of inhibition on the card sort is to determine whether extensive training with the pre-switch rules is required to produce per-

severation. If inhibition of prepotent responses is the problem, then the likelihood of perseveration ought to increase as a function of the number of pre-switch trials as interference accrues. In contrast, if 3-year-olds are simply unable to represent a higher-order rule for selecting between rule pairs, then they ought to perseverate even in the presence of minimal interference. For example, they ought to perseverate even after a single pre-switch trial. For 4-year-olds, who have recently acquired the ability to use higher-order rules, the situation will be different. The CCC Theory maintains that response-based interference (and hence, the potential for inflexibility) accrues as a function of practice. Thus, for 4-year-olds, who *can* use a higher-order rule to control a pair of rules, the likelihood of actually doing so will decrease as a function of practice with one pair of rules. (On the other hand, if inflexibility were due to the fact that the rules were represented unconsciously (cf. Karmiloff-Smith 1992), then practice ought to lead to representational redescription and to increased flexibility). The situation is again different for 5-year-olds, according to the CCC Theory. According to the theory, experience with rules at a particular level of complexity (e.g., experience with higher-order rules) leads to greater reliability of execution. By 5 years, the use of a higher-order rule for switching between dimensions will be robust and not easily affected by response-based interference due to pre-switch trials.

As part of a larger study, Zelazo, Frye *et al*. (1995, Exp. 1) manipulated the number of pre-switch trials that children received on the card sort. Three-year-olds and 4-year-olds received either 1 pre-switch trial or 10 before being given 5 post-switch trials. The number of 3-year-olds who passed after a single pre-switch trial did not differ significantly from the number who passed after ten such trials. On the other hand, there was an effect of number of pre-switch trials for 4-year-olds. Among 4-year-olds, children who received one pre-switch trial were more likely to pass than children who received 10 trials.

The finding that the large majority of 3-year-olds perseverated on the pre-switch rules even after a single pre-switch trial is consistent with the suggestion that they simply fail to comprehend the alternative possibilities afforded by the tasks (i.e., they fail to construct a higher-order rule linking the alternative rule pairs). In general, the results disconfirm a prediction generated from the inhibition account, which attributes perseveration to difficulty inhibiting an over-learned response. Further evidence that mitigates against inhibition has been found using a ramp task (to be described in a subsequent section): 3-year-olds can switch from an overlearned response if only a single pair of rules are required.

In contrast to executive function approaches, Karmiloff-Smith's (1992) Representational Redescription model would predict that more pre-switch trials

would result in improved post-switch performance because practice drives representational redescription, which in turn leads to increased flexibility. Obviously, there is no evidence for a facilitative effect of number of pre-switch trials on 3-year-olds' performance. On the other hand, the findings for 4-year-olds contradict this prediction from the Representational Redescription model. The role of domain-general changes in reflection may need to be explored more fully in Karmiloff-Smith's (1992) model (Zelazo 1994).

Together these results indicate that changes in inhibition may take place within constraints on the complexity of children's rule systems. Three-year-olds simply cannot construct a higher-order rule linking the alternative rule pairs. However, 4-year-olds fail to use a higher-order rule only when their ability to resist interference is taxed. Because their use of higher-order rules is a newly-acquired capability, it is fragile and susceptible to disruption. At this level of complexity, rule use becomes more robust as a function of experience.

It is possible, however, that even a single pre-switch trial produces a failure of inhibition in 3-year-olds. Thus, they may well know what to do on post-switch trials, but simply be unable to resist interference. If 3-year-olds know what to do, then perhaps a different dependent measure would yield successful sorting. For example, it may be possible to observe improved performance if children are required to respond verbally on post-switch trials. According to inhibition accounts such as those espoused by Luria (1959) and Diamond (1991), failures of response control are due to difficulty using flexible knowledge to control behavior, which is why one sometimes sees dissociations between knowledge and action. For example, Milner (1963) has reported that patients with damage to prefrontal cortex who perseverate on the Wisconsin Card Sort Task can nonetheless state the relevant rules even while failing to follow them. Furthermore, Luria (1961) reports studies in which children with cerebro-asthenic syndrome (organic retardation) were required to respond verbally or motorically (or both). Generally, these children exhibited perseveration when required to make motor responses in a discrimination task, but not when required to respond verbally. Verbal responses may provide a more direct assessment of knowledge, and they may be intrinsically more flexible.

In contrast to executive function accounts, which emphasize failures of inhibition, the CCC Theory maintains that 3-year-olds who perseverate on the card sort are fixated on a specific pair of rules. Inflexibility is overcome when children become reflectively aware of these rules via a higher-order rule. Thus, 3-year-olds ought to perseverate even on a version of the card sort in which they are required to respond verbally instead of manually.

In a recent experiment (Zelazo, Frye & Rapus 1996, Exp. 3), 3-year-olds received one of two conditions. In both conditions, familiar figurines were

attached to each of the boxes and the boxes were labeled as "Ernie's box" and "Grover's box". Children were told rules such as, "If it's red, then you have to put it over here in Ernie's box; blue ones go there in Grover's box." They were then presented with a test card, which was labeled by the relevant dimension only, and they were asked, "Where does this go?" In a manual modality condition, children were required to place the card into one of the two boxes. In a verbal modality condition, children were asked to place their hands on handprints (to prevent manual responding) and to refer to the boxes by name only. Both conditions included pre- and post-switch phases and children in each condition received three card sorts that involved color and shape, although different colors and shapes were used in each sort.

Nearly all children in both conditions failed to switch. The results clearly indicate that 3-year-olds perseverate even when they are *never* required to respond manually. Together with the finding that perseveration occurs in 3-year-olds even after a single pre-switch trial (Zelazo, Frye *et al*. 1995, Exp. 1), this finding argues against a simple inhibition account of perseveration on the card sort, where children know what to do but cannot inhibit a pre-potent pattern of responding. One alternative explanation for 3-year-olds' failure is that they fail precisely because they do not know the post-switch rules. Although 3-year-olds are told the new rules, it is not clear whether 3-year-olds *consciously represent* these rules. Jacoby and others (e.g., Jacoby 1989; Jacoby, Jennings & Hay, in press) have postulated the existence of two independent influences on behavior, conscious and unconscious processes. Normally, these processes operate together: The probability of a particular response (say, sorting by color) is equal to the probability that it will be generated by conscious processes plus the probability that it will be generated by unconscious processes should the conscious processes fail. By using the process-dissociation procedure (Jacoby 1989), it is possible to derive separate estimates of conscious and unconscious influences on responding in a particular situation. We might ask: When 3-year-olds perseverate on pre-switch rules, are they conscious of the post-switch rules?

To derive separate estimates of conscious and unconscious influences, one needs to compare behavior in a facilitation condition with behavior in an interference condition. The post-switch phase of the standard version of the card sort is an interference condition, in which conscious and unconscious influences are put into conflict. Conscious influences would produce correct sorting (i.e., use of the post-switch rules), but unconscious influences would produce perseveration (i.e., use of the pre-switch pair of rules). A facilitation condition in the card sort could be easily created by administering additional

pre-switch trials instead of post-switch trials (as in the 10-trial pre-switch phase in the standard condition in Zelazo, Frye *et al.* 1995, Exp. 4). Use of the pre-switch rules on these extended pre-switch trials could be due either to conscious processes or to unconscious ones, as either process would yield a pre-switch response.

By comparing performance on the facilitation condition to performance on the interference condition, it is possible to solve for conscious and unconscious influences in a set of equations and thus, to derive estimates of these influences on 3-year-olds' behavior in this task. To see what this approach would predict (based on the assumption of two independent influences on behavior), suppose that 3-year-olds always use the pre-switch rules on the extended pre-switch phase (i.e., in the facilitation condition) and always use the pre-switch rules on the post-switch phase (i.e., in the interference condition). Clearly, this is an idealization of the data, but it puts the process-dissociation approach into relief. If 3-year-olds are always correct in the facilitation condition and always perseverate in the interference condition, then the probability of using the pre-switch rules in the facilitation condition is 1, and the probability of using the pre-switch rules in the interference condition is also 1. When we use the process-dissociation procedure to get our estimate of conscious and unconscious influences, we find that conscious influences are minimal and unconscious influences are maximal.

From the perspective of the process-dissociation approach, a failure to represent the post-switch rules consciously may cause behavior to be controlled by automatic response tendencies. On the other hand, 5-year-olds' success on the task would be attributed to increased conscious influences on behavior (and the process dissociation procedure would, of course, generate suitably high estimates of this influence). These claims are generally consistent with the notion that conscious processes emerge late in ontogeny and are susceptible to disruption in normal aging (Jacoby, Jennings & Hay, in press).

Are children unconscious of the post-switch rules? According to the CCC Theory, there are two types of system: response-based and conscious representational. Unconscious routines, mediated by the response-based mechanism, exhibit the characteristics of procedural memories: they are long-lasting, automatically retrieved, and relatively rigid. However, in contrast to the process-dissociation approach, the CCC Theory argues for a relatively sophisticated characterization of conscious representations. According to the theory, 3-year-olds consciously represent both the pre- and the post-switch pairs of rules. However, because they cannot reflect on these pairs of rules as pairs of rules, they cannot conceive of the relation between them. The rule pairs are thus con-

scious, but children are not conscious of representing them, which is why they cannot use them under conditions of interference, even when verbal responses are required.

If 3-year-olds are conscious of the post-switch rules, then they ought to be able to express them (though not use them). There should be a dissociation between knowledge and action like that observed in patients with prefrontal damage (Milner 1963). Diamond (1985) has noted dissociations between looking and reaching on the A-not-B task, where infants look to the correct location while reaching perseveratively, but according to Roberts, Hager & Heron (1994:390), these (and related) dissociations are extremely rare (occurring only about 1% of the time).

If children perseverate on the deductive card sort but nonetheless can express knowledge of the rules, this would support the claim that their problem is not with the representation of the post-switch pair of rules *per se*. The presence of a dissociation would also strengthen the possibility that perseveration on the embedded rules tasks is associated with the functioning of prefrontal cortex (although not necessarily with growth of an inhibition mechanism; see the later section, Complexity and Executive Function).

In a recent study (Zelazo, Frye & Rapus 1996, Exp. 1), 3-year-olds were administered the standard card sort. After the post-switch trials, children were given two additional trials that assessed separately their knowledge of the post-switch rules and their ability to use that knowledge. Each of the trials involved two knowledge questions and one action question. For the knowledge questions, children were asked, "Where do the ____ (e.g., red ones) go in the ____ (e.g., color) game? Where do the ____ (e.g., blue ones) go?" In response to each question, children were required to point unambiguously to one of the two trays. For the action questions, children were told, "Play the ____ (e.g., color) game", given a test card that was labeled by the relevant dimension only, and asked, "Where does this go in the ____ (e.g., color) game?"

The majority of children continued to use the pre-switch rules on the post-switch phase and were classified as failing the post-switch phase. Knowledge questions confirmed that all children (except one) in fact knew the post-switch rules. Nonetheless, nearly all of the children (except one) who failed to sort correctly on the post-switch phase continued to sort incorrectly on *both* action questions.

The findings indicate that children answered the knowledge questions correctly by pointing to the appropriate boxes when asked, for example, "Where do the red ones go in the color game? Where do the blue ones go?" but they then proceeded to sort incorrectly. This phenomenon has been replicated

several times (Zelazo, Frye & Rapus 1996), and it occurs even after a single pre-switch trial. A reasonable interpretation of the process-dissociation framework leads to the prediction that 3-year-olds are not conscious of the post-switch rules. Clearly, conscious *influences* on post-switch performance are negligible, but the post-switch rules nonetheless appear to be consciously represented. Three-year-olds almost invariably responded correctly to an explicit question about the rules. Perhaps the assumption of two distinct processes, which is inherent in the process dissociation framework, is too simple to account for the fact that sometimes consciousness does not permit the conscious control of behavior. An adequate account of intentional action must distinguish between consciousness and the capacity for conscious control. The CCC Theory draws this distinction and provides an account of their relation: One may be conscious of something without being reflectively aware of it. Consciousness alone will not suffice to permit control; control requires reflective awareness and the use of a higher-order rule. In the deductive card sort, 3-year-olds are conscious of the rules, but they cannot reflect upon these rules. They can answer the knowledge questions, but the ability to reflect on this knowledge and subordinate it to a higher-order rule is required to use that knowledge under conditions of interference. Thus, although 3-year-olds consciously represent the post-switch rules, they cannot properly be said to know what to do. For adults, on the other hand, the dual nature of the task is obvious; one recognizes immediately that one knows two different ways to sort the cards. The ability to reflect upon one's knowledge permits selection of the appropriate set of rules. That is, it permits conscious control of one's behavior by the rules. The minority of children in each experiment who passed the post-switch phase approached the task in a fashion that was qualitatively distinct from that of children who failed.

Although the changes in rule use between 3 and 5 years of age have been studied most extensively using the card sort, the changes occur across a range of tasks that require deliberate reasoning and intentional action. For example, the changes occur in tasks that assess reasoning about mechanical devices, as well as in tasks that assess social understanding. Furthermore, the same changes occur whether children are required to make inferences or to act.

3.3.1. *The domain of physical causality*

Consider another rule-use task: the lever task. The lever task involves a mechanical device that requires reasoning about physical (as opposed to psychological or normative) causality. In this task, there is a mechanism with two levers or handles (see Figure 4). One handle is described by the experimenter as

"Yours," and the other as "Mine". Pressing one of the two handles makes a toy emerge from the top of the mechanism. Which handle is effective depends both on the state of the mechanism (the setting condition) and on the position of a flag. In one setting condition, the rules are, "If the flag is up, then you have to press your handle. If the flag is down, then you have to press mine.". In the other setting condition, the relation between the position of the flag and the effect of the handles is reversed (i.e., the rules are, "If the flag is up, press my handle. If the flag is down, press yours.").

In the study by Zelazo, Frye, Reznick, Schuster & Argitis (1995, Exp. 1) described above, 3-year-olds chose the correct actions for the first setting condition, but when the configuration of the apparatus changed to the other setting condition, they perseverated despite being told the new rules on every trial. On the other hand, most 4-year-olds performed well. At both ages, performance on the this task was positively correlated with performance on the card sort.

The same age-related change has been found in a ramp task, which is a very different physical causality problem that nonetheless has the same logical structure as the card sort and the lever task. The problem requires preschoolers to reason about marbles rolling down an enclosed ramp. A series of results from this task has added substantially to our understanding of the fourth year change in rule use.

The task employs a ramp that has two input holes at the top and two output holes at the bottom. The ramp is constructed so that it can work in two distinct configurations—straight and across. In the straight configuration, marbles roll straight down the ramp—e.g., from the left input hole to the left output hole—whereas in the across configuration they traverse the ramp—e.g., from left to right. The configuration of the ramp is shown by a light being on or off. Children were told the higher-order rule for the configuration of the ramp (e.g., "The light is on, so the marble will roll across.") on each trial and were asked to predict which output hole the marble would emerge from when it was placed in a given input hole at the top. In other words, the children had to infer the outcome of a causal sequence governed by the device. After training, children were presented with five trials in one configuration and then switched to five trials in the other. A higher-order rule must be used to switch between the pair of rules for the two configurations.

Frye, Zelazo, Brooks & Samuels (1996, Exp. 1) found that the ramp task produced the same pattern of results as the lever task and card sort. Four-year-olds were able to switch between configurations. In contrast, 3-year-olds were unable to switch, even though they were told the correct rule on every

trial. There was an additional finding. Unlike the lever task and card sort, 3-year-olds not only had difficulty switching, but they also appeared to enter the experiment with the expectation that marbles would roll straight down. Given that young children's previous experience with inclined planes is most likely to have been with toys rolling straight down, the bias for straight is not surprising. If extra-experimental experience were the cause of 3-year-olds' bias, then the first time the 3-year-olds were exposed to the across condition in training they were in effect already being asked to switch rules. A similar sort of bias may be apparent in the social (or theory of mind) tasks that are discussed in the next section.

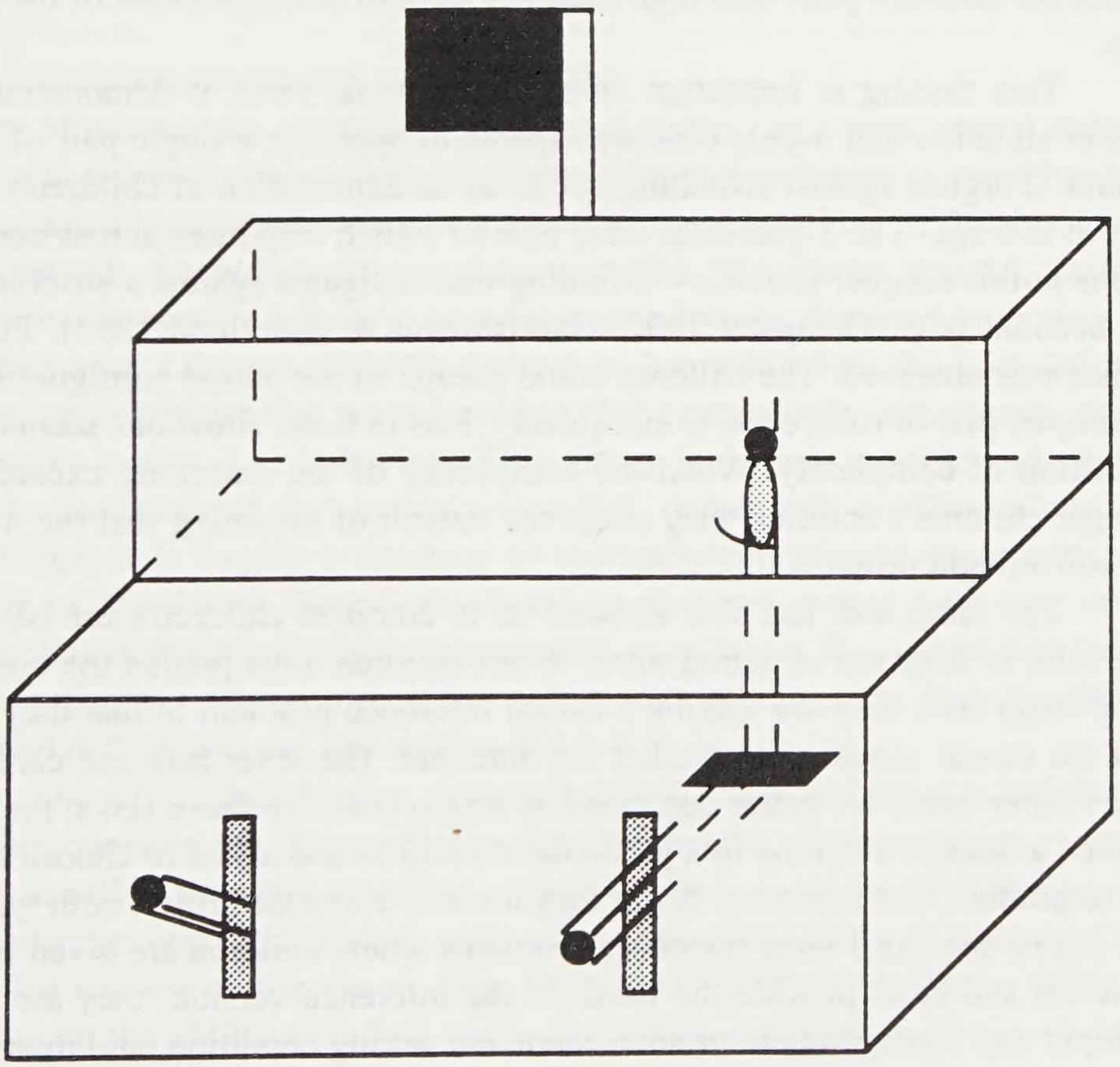


Figure 4: *The lever task shown with the flag up and the child's handle pressed down (operating according to the rules: "If the flag is up press yours, but if the flag is down press mine.").*

The design of the ramp task makes it possible to test whether 3-year-olds are able to employ a single pair of rules that nonetheless requires children to treat one stimulus in two different ways. The argument that 3-year-olds are unable to guide their reasoning with a higher-order rule is made much more convincing if it can be shown that they are capable of treating a single stimulus in two different ways. Testing for switching with a single pair of rules in the ramp task was done by blocking off one of the input holes. Now, the marble could only be inserted in one place, but children still had to predict whether it would emerge on the left or the right at the bottom depending upon whether the apparatus was in the straight or across configuration. Using this version, Frye, Zelazo, Brooks & Samuels (1996, Exp. 1) found that 3-year-olds were able to predict the marble's path with high accuracy in both configurations of the apparatus.

This finding is important on several counts. First, it demonstrates in another situation that 3-year-olds are capable of applying a single pair of rules. Second, it argues against switching *per se* as an explanation of children's difficulty at this age. The 3-year-olds were able to switch responses across configurations in this simpler instance—a finding that mitigates against a strict inhibition account (e.g., Dempster 1992; Harnishfeger & Bjorklund 1993). Finally, no bias was observed. The children could predict in the across configuration in the simple, pair of rules case. Consequently, bias in these situations seems to be a function of complexity. When the complexity of the reasoning exceeds the younger children's abilities, they adopt the default of assuming that the marble will roll straight down.

The ramp task has also allowed us to compare children's use of inference rules to their use of action rules. When children must predict the outcome in the ramp task, they are solving a causal inference problem in that they must infer the causal sequence to predict the outcome. The lever task and card sort, on the other hand, are better described as action tasks. In these tasks, the child is given a desired outcome in a particular condition and asked to choose an action to produce that outcome. When they involve embedded rules, both types of task can be seen as 3-term reasoning problems where children are given two of the terms and must provide the third. In the inference version, they are given the input and configuration, or antecedent and setting condition, and must infer the outcome or consequent. In the action version, they are given a desired consequent and the setting condition, and must act to produce the correct antecedent.

Frye, Zelazo, Brooks & Samuels (1996, Exp. 2) presented an action version of the ramp task in order to determine whether the CCC Theory could

explain performance on both the inference and action versions. The original two input holes were restored for this test, but now a small open box was placed beneath each output hole. One of these boxes was designated as the child's. The boxes moved from trial to trial. The task now required the child to act by placing the marble in an input hole so that it emerged in the designated box. The usual two configurations of the apparatus were presented. Three-year-olds, but not four-year-olds, perseverated in their choices after the switch. The younger children also showed a bias for actions that (incorrectly) relied on the marbles rolling straight down. These results indicated that the embedded rules analysis can be extended to both inference and action tasks. They may also help explain how inference and action are related in the social tasks that are considered next.

3.3.2. *The domain of social understanding*

Theory of mind tasks assess the ability to consider one's own mental states in relation to those of other people. A renewed interest in theory of mind has been accompanied by a proliferation of a theoretical explanations of theory of mind development. According to one theory, called 'the theory theory', children quite literally acquire a theory, or a naive psychology, designed to explain human behavior. Like scientific theories, this theory involves the postulation of explanatory variables that are believed to play a causal role in the production of observable events (i.e., behavior). This theory is domain specific and while it may be constrained by innately-specified perceptual predispositions and knowledge, it is largely a function of culturally-conditioned experience. According to 'the theory theory', the theorizer does not change with age; rather, the theorizer's theory of mind changes with experience. By way of this theory, children discover (or construct) the notion that other people have minds that represent reality, and can also misrepresent it.

The CCC Theory takes developments in theory of mind seriously, but does not consider the changes to be domain specific. Rather, increases in the ability to reflect on one's cognitive structures result in widespread increases in self understanding, self control, and social interaction. Thus, this account suggests that success on the classic false belief task (Wimmer & Perner 1983) depends upon the ability to reflect upon conflicting judgments and to switch between them. The false belief task necessarily involves two conflicting perspectives because the child being tested knows the location of an object but must predict where another person, who does not know the object's location, will look. The change in reflection at about 4 years of age allows children to control the switch from judging from their own perspective to judging from the per-

spective of another person. In this way, the false belief task can be seen to be like the ramp task (or any other rule-use task of comparable complexity), because these tasks require one to reconcile two incompatible approaches to a single problem.

In the study by Frye, Zelazo & Palfai (1995, Exp. 2) described earlier, several standard theory-of-mind tasks were administered in addition to the card sorts (see also Zelazo, Burack, Benedetto & Frye 1996). The theory of mind tasks included an appearance-reality task (Flavell, Green & Flavell 1986), a false belief task (Perner, Leekham & Wimmer 1987), and a representational change task (Gopnik & Astington 1988). In one appearance-reality task, children are shown a familiar candy box (a 'Smarties' box) and told to look at it. After the box is opened and children discover that it contains pencils, they are asked two questions: (1) "What does it look like is in it?" and (2) "What's really in it?". Most 3-year-olds say, "Pencils", in response to both questions, whereas 5-year-olds answer correctly. The same results are typically found for false belief and representational change. In the false belief version of this task, the reality question is implicit, and children are only asked, "If someone looked at this box without opening it, what would they think was in it?". The representational change version is like the false belief task except that children are asked about their own false beliefs: "When you first saw the box, before we opened it, what did you think was inside it?". To both false belief and representational change questions, most 3-year-olds say, "Pencils".

As shown above, on the card sort, 3-year-olds were able to employ the first set of rules that they were given, but could not switch between rule pairs. In contrast, 4- and 5-year-olds performed well. Analogous age-related changes were found for the theory of mind tasks. Remarkably, there were significant positive correlations among tasks with age controlled. The theory of mind tasks and the rule-use tasks are similar in that they require children to employ a higher-order rule in order to select the condition (or perspective) from which to reason: In the appearance-reality task, for example, children need to determine whether to make judgments from the perspective of superficial appearance or from the perspective of 'reality'. The logical structure of these tasks differs from the logical structure of the tasks on which 3-year-olds perform well (e.g., Gopnik & Slaughter 1991). These latter tasks typically require children to employ a simple pair of rules (e.g., "If before, then pretended hot chocolate; if after, then pretended lemonade.").

Most researchers view the card sort and the theory of mind tasks as dissimilar. From the perspective of the CCC Theory, however, all of the tasks have the same logical structure and all require self-reflective knowledge of

one's knowledge—namely, knowledge made possible by the ability to use higher-order rules. Higher-order rules allow children to understand that the shape rules and the color rules both apply to a single task under different descriptions (or setting conditions). Likewise, the difficulty that children have distinguishing between appearance and reality is overcome when children conditionalize 'identities' on setting conditions and integrate the identities into a single system of ideas, much as the morning star and the evening star come to be connected to one's ideas about Venus.

4. Complexity and executive function

In addition to providing a new way of conceptualizing changes in theory of mind, the CCC Theory has implications for current thinking about executive function. Executive function is a relatively ill-defined construct that spans working memory, representational flexibility, resistance to interference, response inhibition, and error correction. According to the CCC Theory, consideration of the role of complexity may prove useful in making sense of this diverse set of behaviors. For example, inhibition is a behavior to be explained rather than an adequate explanatory construct. According to the CCC Theory, inhibition and other failures of executive function can be viewed as *consequences* of a failure to reflect upon one's knowledge and to integrate it into a rule system that will permit the deliberate selection of rules. Behavioral control is explained by the complexity of children's rule systems, where complexity provides an index of reflective awareness. To date, the role of complexity in executive function has been largely neglected.

Another contribution of the CCC Theory to current thinking about executive function is that is provides a way to reconcile the constructs of representational flexibility and response control (Zelazo, Reznick & Pinon 1995). Executive function includes both the processes regulating the manipulation of representations and the processes controlling action. When performance fails because one has difficulty inhibiting an incorrect representation and establishing a correct one, this might be characterized as an error based on representational inflexibility. Executive errors due to representational inflexibility can be contrasted with failures of response control, which occur when one cannot inhibit an incorrect response despite establishing a correct alternative (e.g., Milner 1963). Failures of response control frequently involve an insensitivity to error information (Konow & Pribram 1970): subjects persist in their errors despite explicit feedback from the experimenter. The CCC framework makes

clear how the two types of error may be descriptions of the same phenomenon at different levels of analysis. For example, when 3-year-olds perseverate on the card sort, there is a sense in which this is lack of response control because the children make errors despite an accurate representation of the new rules. However, in another sense, it is representational inflexibility because it is a representation of a specific pair of rules (i.e., specifying levels of the pre-switch dimension; see Zelazo, Frye *et al*. 1995, Exp. 2) on which they are fixated. Inflexibility is overcome when children represent (and thus become reflectively aware of) this representation via a higher-order rule. Thus, 3-year-olds err despite possessing the relevant knowledge (lack of response control), but they do so because failure to construct a higher-order rules results in perseveration on an irrelevant representation. In other words, they consciously represent the relevant knowledge, but fail to employ this knowledge because a competing representation is controlling their behavior. Like the morning star and evening star, representational inflexibility and lack of response control are descriptions of the same phenomenon from different perspectives.

5. Conclusion

Taken together, the research reviewed in this chapter supports the CCC Theory of the development of deliberate reasoning and intentional action. The results from several studies involving children between the ages of 2 and 5 years indicate that there are systematic, domain-general, age-related changes in the complexity of the rule systems that children can represent. Increases in the complexity of children's rule systems correspond to increases in metacognition and self awareness and result in increased conscious control over thought and action. Higher-order representation of relations between rules permits the deliberate selection of one rule (or system of rules) for use despite interference from other rules (or systems) at the same level in the hierarchy of rules.

The CCC Theory reconciles a number of accounts of cognitive development, including accounts that emphasize increases in mediation, inhibition, explicit memory, and consciousness. As a result, it is similar in some respects to many theories, while differing from all of them in important ways. First, the theory differs from most (if not all) developmental theories in its scope. It is more narrow in its application than many other theories (e.g., Case 1985) in the sense that it is designed to explain only intentional thought and action. This excludes from consideration behavior that is generated primarily by sophisticated automatic processes (e.g., priming, implicit rule learning, use of syntactic

rules). At the same time, the CCC Theory is more general than most recent theories (e.g., Fischer 1981; Karmiloff-Smith 1992) in that it postulates formal constraints on the complexity of the explicit cognitive structures that children can use at different ages. These changes affect children's deliberate reasoning about mechanical devices, social situations, etc.

Second, the CCC Theory differs from most other theories in establishing a correspondence between children's cognitive structures and conscious rule systems of varying complexity. Rules are defined by their formal properties: They are propositions that link antecedent conditions to consequences. Complexity is also defined formally as the degree of embedding inherent in a rule system. Although children always use rules that have some particular content (e.g., "Red ones go here."), age-related changes in cognitive structures are attributed to changes in the formal properties of the rule systems that children are capable of using. These changes in the characteristics of children's rule systems occur across content domains. One advantage of the use of explicit rules to account for behavior is that it is relatively easy to map the structures onto particular tasks (e.g., it is clear whether children are told two rules or three rules). In its reliance on rules, the theory resembles information-processing models (Anderson 1983; Klahr 1992; Siegler 1983).

The third difference between the CCC Theory and other theories is perhaps the most important. The CCC Theory argues that there are systematic changes in the contents of consciousness as a function of increases in the complexity of children's rule systems. The central metaphor for the process of cognitive change is that with each increase in complexity, children become capable of 'stepping back' from their rules and reflecting on them. This metaphor of increasing detachment and reflection (the child as reflective agent) can be contrasted with other metaphors in the developmental literature: the child as scientist (Kuhn, 1989), the child as theoretician (Karmiloff-Smith 1988), the child as digital computer (Klahr 1992), and the child as apprentice (Rogoff 1990). Unlike these metaphors (but not unlike Piaget's (1926/1952) early characterization of the growth of logical thinking as a movement away from egocentrism), the child as reflective agent metaphor emphasizes the importance of increasing self awareness in the acquisition of cognitive control. In general, consciousness has been given short shrift in the study of cognitive development: The CCC Theory takes the construct of consciousness seriously. According to the theory, for each level of complexity, there is a sense in which children are conscious of certain rules and a sense in which they are not. And the difference between these two senses matters.

Because it addresses the functional role of consciousness in the production of goal-directed activity, the CCC Theory can accommodate recent find-

ings on the acquisition of a theory of mind. Increases in the ability to reflect on one's cognitive structures result in widespread increases in self understanding, self control, and social interaction (Kuhn 1992). Theory of mind is seen not as the construction of a theory, but rather as an increase in self awareness. By exploring the connection between consciousness and the control of behavior, it seems possible to shed light on the development of deliberate reasoning and intentional action in a wide variety of domains. Explanatory constructs such as the notion of increasingly complex rule systems yield testable predictions concerning children's behavior.

Although the CCC Theory has much in common with many other accounts, it is perhaps most similar in spirit to the programmatic approach sketched by Vygotsky and Luria. In general, these authors emphasized the connection between consciousness of rules (expressed in private speech) and the control of behavior. More specifically, they considered the importance of integrating concepts into symbolic (sign) systems. For example, Vygotsky (1929) describes a 'primitive' boy (i.e., one who lacks formal education) who is asked to reflect upon knowledge that he represents:

> Another example: a primitive boy is asked, "What is the difference between a tree and a log?" He answers, "I have not seen a tree, nor do I know of any tree, upon my word." Yet there is a lime-tree growing just opposite his window. When you ask him, "And what is this?" he will answer, "This is a lime-tree." (Vygotsky 1929:417).

From the perspective of the CCC Theory, this rather ingenuous boy has not coordinated his knowledge of a lime-tree into a general system that captures his knowledge of trees. He knows about a tree, but he does not know that he knows about it and so cannot use his knowledge effectively. In this regard he is much like Moliere's *bourgeois gentilhomme*, who was amazed to learn that he was capable of speaking prose.

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References

Anderson, J.R. 1983. *The Architecture of Cognition*. Cambridge, MA: Harvard University Press.

Anscombe, G.E.M. 1958. *Intention*. Oxford: Oxford University Press.

Baillargeon, R., M. Graber, J. Devos & J. Black. 1990. "Why Do Young Infants Fail to Search for Hidden Objects?" *Cognition* 36:255-284.

Baldwin, J.M. 1892. "Origin of Volition in Childhood". *Science* 20:286-287.

Bell, M. & N. Fox. 1992. "The Relations between Frontal Brain Electrical Activity and Cognitive Development during Infancy". *Child Development* 63:1142-1163.

Brainerd, C. 1983. "Working Memory Systems and Cognitive Development". In C.J. Brainerd (ed.), *Recent Advances in Cognitive-developmental Theory: Progress in cognitive development research*. New York: Springer-Verlag, 167-236.

Case, R. 1985. *Intellectual Development: Birth to adulthood*. Orlando, FL: Academic Press.

Case, R. 1992. *The Mind's Staircase*. Hillsdale, NJ: Lawrence Erlbaum.

DeLoache, J.S., & A.L. Brown. 1983. "Very Young Children's Memory for the Location of Objects in a Large-scale Environment". *Child Development* 54:888-897.

Dempster, F. 1981. "Memory Span: Sources of individual and developmental differences". *Psychological Bulletin* 89:63-100.

Dempster, F. 1992. "The Rise and Fall of the Inhibitory Mechanism: Toward a unified theory of cognitive development and aging". *Developmental Review* 12:45-75.

Diamond, A. 1985. "Development of the Ability to Use Recall to Guide Action, as Indicated by Infants' Performance on AB". *Child Development* 56:868-883.

Diamond, A. 1991. "Neuropsychological Insights into the Meaning of Object Concept Development". In S. Carey & R. Gelman (eds), *The Epigenesis of Mind: Essays on biology and cognition*. Hillsdale, NJ: Lawrence Erlbaum, 67-110.

Diamond, A., L. Cruttendon & D. Neiderman. 1994. "AB with Multiple Wells: 1. Why are multiple wells sometimes easier than two wells? 2. Memory or memory + inhibition?" *Developmental Psychology* 30:192-205.

Diamond, A. & P. Goldman-Rakic. 1989. "Comparison of Human Infants and Rhesus Monkeys on Piaget's AB Task: Evidence for dependence on dorsolateral prefrontal cortex". *Experimental Brain Research* 74:24-40.

Esposito, N.J. 1975. "Review of Discrimination Shift Learning in Young Children". *Psychological Bulletin* 82:432-455.

Fischer, K.W. 1981. "A Theory of Cognitive Development: The control and construction of hierarchies of skills". *Psychological Review* 87:477-531.

Frege, G. 1949. "On Sense and Nominatum" (Trans. by H. Feigl). In H. Feigl & W. Sellars (eds), *Readings in Philosophical Analysis*. New York: Appleton, Century, Crofts, 85-102. (Original work published 1892.)

Frye, D. 1991. "The Origin of Intention in Infancy". In D. Frye & C. Moore (eds), *Children's Theories of Mind*. Hillsdale, NJ: Lawrence Erlbaum, 15-38.

Frye, D., P.D. Zelazo, P. Brooks & M. Samuels. 1996. "Inference and Action in Early Causal Reasoning". *Developmental Psychology* 32:120-131.

Frye, D., P.D. Zelazo & T. Palfai. 1995. "Theory of Mind and Rule-based Reasoning". *Cognitive Development* 10:483-527.

Goldman-Rakic, P.S. 1987. "Circuitry of the Pre-frontal Cortex and the Regulation of Behaviour by Representational Knowledge". In F. Plum & V. Mountcastle (eds), *Handbook of Physiology*, Vol. 5. Bethesda, MD: American Physiological Society, 373-417.

Gopnik, A. & V. Slaughter. 1991. "Young Children's Understanding of Changes in Their Mental States". *Child Development* 62:98-110.

Greenbaum, J.L., & P. Graf. 1989. "Preschool Period Development of Implicit and Explicit Remembering". *Bulletin of the Psychonomic Society* 27:417-420.

Harnishfeger, K.K., & D.F. Bjorklund. 1993. "The Ontogeny of Inhibition Mechanisms: A renewed approach to cognitive development". In R. Pasnak & M. Howe (eds), *Emerging Themes in Cognitive Development*. Lincoln, NE: University of Nebraska Press, 28-49.

Hofstadter, M. & J.S. Reznick. 1996. "Response Modality Affects Human Infant Delayed- response Performance". *Child Development* 67:646-658.

Hunter, W.S. 1917. "Delayed Reaction in a Child". *Psychological Review* 24:74-87.

Inhelder, B. & J. Piaget. 1964. *The Early Growth of Logic in the Child*. New York: Harper & Row.

Jacoby L.L. 1989. "A Process-dissociation Framework: Separating automatic from intentional uses of memory". *Journal of Memory and Language* 30:513-531.

Jacoby, L.L., J.M. Jennings & J.F. Hay. In press. "Dissociating Automatic and Consciously-controlled Processes: Implications for diagnosis and rehabilitation of memory deficits". In D.J. Herrmann, M.K. Johnson, C.L. McEvoy, C. Hertzog & P. Hertel (eds), *Basic and Applied Memory Research: Theory in context*. Hillsdale, NJ: Lawrence Erlbaum.

Karmiloff-Smith, A. 1992. *Beyond Modularity*. Cambridge, MA: MIT Press.

Kendler, H.H., & T.S. Kendler. 1962. "Vertical and Horizontal Processes in Problem Solving". *Psychological Review* 69:1-16.

Kendler, T.S. 1979. "The Development of Discrimination Learning: A levels-of-functioning explanation". In H.W. Reese & L.P. Lipsitt (eds), *Advances in Child Development and Behavior*, Vol. 13. New York: Academic Press, 83-115.

Klahr, D. 1992. "Information Processing Approaches to Cognitive Development". In M.H. Bornstein & M.E. Lamb (eds), *Developmental Psychology: An advanced textbook* (3rd ed.). Hillsdale, NJ: Lawrence Erlbaum, 273-336.

Konow, A. & K.H. Pribram. 1970. "Error Recognition and Utilization Produced by Injury to the Frontal Cortex in Man". *Neuropsychologia* 8:489-491.

Kuhn, D. 1989. "Children and Adults as Intuitive Scientists". *Psychological Review* 96:674-689.

Kuhn, D. 1992. "Cognitive Development". In M.H. Bornstein & M.E. Lamb (eds), *Developmental Psychology: An advanced textbook* (3rd ed.). Hillsdale, NJ: Lawrence Erlbaum, 211-272.

LeCompte, G.K. & G. Gratch. 1972. "Violation of a Rule as a Method of Diagnosing Infants' Levels of Object Concept". *Child Development* 43:385-396.

Levine, M. 1966. "Hypothesis Behavior by Humans during Discrimination Learning". *Journal of Experimental Psychology* 71:331-338.

Loughlin, K. & M. Daehler. 1973. "The Effects of Distraction and Added Perceptual Cues on the Delayed Reaction of Very Young Children". *Child Development* 44:384-388.

Luria, A.R. 1959. "The Directive Function of Speech in Development and Dissolution: Pt. 1: Development of the directive function of speech in early childhood". *Word* 15:341-352.

Luria, A. 1961. *The Role of Speech in the Regulation of Normal and Abnormal Behaviour*. Trans. by J. Tizard. New York: Pergamon.

Luria, A.R. 1966. *Higher Cortical Function in Man*. New York: Basic Books.

Luria, A.R. 1979. *The Making of Mind*. Cambridge, MA: Harvard University Press.

Luria, A.R. 1982. *Language and Cognition*. Ed. by J.V. Wertsch. New York: Wiley.

Luria, A.R., & E.D. Homskaya. 1964. "Disturbance in the Regulative Role of Speech with Frontal Lobe Lesions". In J.M. Warren & K. Akert (eds), *The Frontal Granular Cortex and Behaviour*. New York: McGraw-Hill, 353-371.

MacLeod, C.M. 1991. "Half a Century of Research on the Stroop Effect: An integrative review". *Psychological Bulletin* 109:163-203.

Miller, D., L. Cohen & K. Hill. 1970. "A Methodological Investigation of Piaget's Theory of Object Concept Development in the Sensory-motor Period". *Journal of Experimental Child Psychology* 9:59-85.

Milner, B. 1963. "Effects of Different Brain Lesions on Card Sorting". *Archives of Neurology* 9:90-100.

Olson, D. & R. Campbell. In press. "Constructing Representations". In C. Pratt & A Garton (eds), *The Development and Use of Systems of Representation*. New York: Wiley.

Pascual-Leone, J. 1971. "A Mathematical Model for the Transition Rule in Piaget's Developmental Stages". *Acta Psychologica* 32:301-345.

Papousek, H. 1961. "Conditioned Head Rotation Reflexes in Infants in the First Months of Life". *Acta Paediatrica* (Uppsala) 50:565-576.

Parkin, A.J. & S. Streete. 1988. "Implicit and Explicit Memory in Young Children and Adults". *British Journal of Psychology* 79:361-369.

Pennington, B.F. 1994. "The Working Memory Function of the Prefrontal Cortices: Implications for developmental and individual differences in cognition". In M.

Haith, J.B. Benson, R.J. Roberts, Jr. & B.F. Pennington (eds), *Future-oriented Processes in Development*. Chicago: University of Chicago Press, 243-289.

Petri, H.L. & M. Mishkin. 1994. "Behaviorism, Cognitivism and the Neuropsychology of Memory". *American Scientist* 82:30-37.

Piaget, J. 1954. *The Construction of Reality in the Child*. New York: Basic Books.

Roberts, R.J., L.D. Hager & C. Heron. 1994. "Prefrontal Cognitive Processes: Working memory and inhibition in the antisaccade task". *Journal of Experimental Psychology: General* 123:374-393.

Roberts, R.J., Jr. & K.W. Fischer. 1979. *A Developmental Account of Classification Skills*. Charlottesville, VA: University of Virginia Press.

Rogoff, B. 1990. *Apprenticeship in Thinking: Cognitive development in social context*. New York: Oxford University Press.

Rovee-Collier, C. 1990. "The 'Memory System' of Pre-linguistic Infants". In A. Diamond (ed.), *The Development and Neural Bases of Higher Cognitive Functions. Annals of the New York Academy of Sciences* 608:517-536.

Siegler, R.S. 1983. "Five Generalizations about Cognitive Development. *American Psychologist* 38:263-277.

Siegler, R.S. 1991. *Children's Thinking*. 2nd ed. Englewood Cliff, NJ: Prentice Hall.

Siqueland, E.R. & L.P. Lipsitt. 1966. "Conditioned Head-turning in Human Newborns". *Journal of Experimental Child Psychology* 3:356-376.

Sophian, C. & H.M. Wellman. 1983. "Selective Information Use and Perseveration in the Search Behavior of Infants and Young Children". *Journal of Experimental Child Psychology* 35:369-390.

Squire, L.R. 1982. "The Neuropsychology of Human Memory". *Annual Review of Neuroscience* 5:241-273.

Squire, L.R. 1987. *Memory and Brain*. New York: Oxford University Press.

Stroop, J.R. 1935. "Studies of Interference in Serial Verbal Reactions. *Journal of Experimental Psychology* 18:643-661.

Tipper, S.P., T.A. Bourque, S.H. Anderson & J.C. Brehaut. 1989. "Mechanisms of Attention: A developmental study". *Journal of Experimental Child Psychology* 48:353-378.

Tulving, E. 1985. "How Many Memory Systems Are There?" *American Psychologist* 40:385-398.

Tulving, E. 1987. "Multiple Memory Systems and Consciousness". *Human Neurobiology* 6:67-80.

Tumblin, A. & B. Gholson. 1981. "Hypothesis Theory and the Development of Conceptual Learning". *Psychological Bulletin* 90:102-124.

Vygotsky, L.S. 1929. "The Problem of the Cultural Development of the Child". *Journal of Genetic Psychology* 36:415-434.

Vygotsky, L.S. 1962. *Thought and Language*. Trans. By E. Hanfmann & G. Vakar. Cambridge, MA: MIT Press. (Original work published 1934).

Webb, R.A., B. Massar & T. Nadolny. 1972. "Information and Strategy in the Young Child's Search for Hidden Objects". *Child Development* 43:91-104.

Wellman, H.M., D. Cross & K. Bartsch. 1986. "Infant Search and Object Permanence: A meta-analysis of the A-not-B error". *Monographs of the Society for Research in Child Development* 51(3):1-51, 62-67.

Welsh, M. & B. Pennington. 1988. "Assessing Frontal Lobe Functioning in Children: Views from developmental psychology". *Developmental Neuropsychology* 4:199-230.

White, S.H. 1965. "Evidence for a Hierarchical Arrangement of Learning Processes". In L.P. Lipsitt & C.C. Spiker (eds), *Advances in Child Development and Behavior*. New York: Academic Press, 187- 220.

Wimmer, H. & J. Perner. 1983. "Beliefs about Beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception". *Cognition* 13:103-128.

Zeaman, D. & B. House. 1963. "The Role of Attention in Retardate Discrimination Learning". In N.R. Ellis (ed.), *Handbook of Mental Deficiency*. New York: McGraw-Hill, 159-223.

Zelazo, P.D. 1994. "From the Decline of Development to the Ascent of Consciousness". *Behavioral and Brain Sciences* 17:731-732.

Zelazo, P.D. 1996. "Towards a Characterization of Minimal Consciousness". Manuscript under review. *New Ideas in Psychology*.

Zelazo, P.D., J. Burack, E. Benedetto & D. Frye. 1996. "Theory of Mind and Rule Use in Individuals with Down Syndrome: A test of the uniqueness and specificity claims". *Journal of Child Psychology and Psychiatry* 37:479-484.

Zelazo, P.D., D. Frye, J.S. Reznick, B.V. Schuster & G. Argitis. 1995. "Age Related Changes in the Execution of Explicit Rules". Manuscript under review.

Zelazo, P.D., D. Frye & T. Rapus. 1996. "An Age-related Dissociation between Knowing Rules and Using Them". *Cognitive Development* 11:37-63.

Zelazo, P.D., C.C. Helwig & A. Lau. In press. "Intention, Act and Outcome in Behavioral Prediction and Moral Judgement". *Child Development*.

Zelazo, P.D. & J.S. Reznick. 1991. "Age-related Asynchrony of Knowledge and Action". *Child Development* 62:719-735.

Zelazo, P.D., J.S. Reznick & D. Pinon. 1995. "Response Control and the Execution of Explicit Rules". *Developmental Psychology* 31:508-517.

Zelazo, P.D., J.S. Reznick & J. Spinazzola. In press. "Representational Flexibility and Response Perseveration in a Search Task". *Developmental Psychology*.

Zelazo, P.D. & T.R. Shultz. 1989. "Concepts of Potency and Resistance in Causal Prediction". *Child Development* 60:1307-1315.

Discourse in Dementia:
Consideration of Consciousness

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Until recently, the focus of language-brain research was almost exclusively directed to the way in which structural aspects of language, i.e., phonology, semantics, and syntax, were disrupted as a result of localized brain damage.* Within the last several decades, however, researchers in neuroscience have begun to address the language-brain relations as reflected in more naturally occurring, larger chunks of language generically referred to as discourse (Joanette & Brownell 1990; Gardner 1990).

The emphasis on analyzing the structural aspects of sentential language persisted in the development of methods to analyze discourse. Similar to linguistic approaches characterizing the grammar system of lower levels of language, linguistic procedures for discourse were developed to characterize the rule governed nature of connected language according to its constituents. For example, narrative discourse is defined by a setting, action sequence, and resolution. Considerable empirical information regarding discourse abilities in various brain-damaged populations has been provided by systematic descriptions of discourse (Chapman & Ulatowska 1992b; Frederiksen & Stemmer 1993; Glosser & Deser 1990; Ulatowska, North, & Macaluso-Haynes 1981).

There are, however, limitations to capturing the full linguistic meaning when describing only the structural aspects of discourse. Discourse ability is highly individualized as a result of the speaker's creative translation of thought into language (Duchan 1994). Clearly, the intended meaning of a text or message is influenced to a large degree by the intent, motivation, and ideas of the speaker. Theories of how individuals use language to communicate must take into account intrinsic properties of the speaker.

In order to expand previous structural descriptions of discourse processing, researchers turn to the construct of *consciousness* to provide a conceptual framework for considering variables related to the speaker (Bailey 1986; Chafe 1979; Stamenov 1992; Weiskrantz, 1992). At present, discourse research is one of the richest areas in neuropsychology and neurolinguistics for elucidating the complex interaction between language and cognition as well as the complex relations of language and brain. The addition of consciousness expands the domains to include the complex interrelationships across language, brain, and *mind*.

1. Relevance of consciousness to language

Historically, the scientific interest in consciousness has been sporadic. The vacillating interest is due largely to the difficulty in directly observing consciousness leading some researchers to view consciousness as too subjective for empirical study. Consciousness can be explored from two perspectives, either from a neurobiological perspective or a behavioral perspective. The neurobiological approach attempts to identify the neurobiological processes in the brain that cause consciousness or perceptual awareness. For example, the primary question is what are the neural events that lead to the experience of conscious states and perceptual experience. The behavioral approach, on the other hand, examines certain behavioral phenomena that may provide a window into how meaning may be derived from sensory input and perceptual experience. The notion of consciousness may be explored at multiple levels, e.g., from a primary level of sensory stimulation, to a more intermediate level of perceptual translation, at an even higher level of conceptualization giving meaning to consciousness. Allport (1988) argues that consciousness is related to behavioral integration and can be accessed through behavior. Clearly, consciousness operates in the mind of humans and higher animals. In this chapter, we adopt a behavioral approach to consider consciousness in Alzheimer's Disease (AD). We maintain that important inferences about the content and activities of consciousness can be derived from examining behavior and language, in particular.

From a developmental standpoint, language and consciousness are viewed from two perspectives. For one, language and consciousness are regarded as interdependent processes with consciousness emerging from and depending on language. Vygotsky (1934) used the term 'inner language' to refer to consciousness. The capacity of humans to perceive and evaluate themselves as well as to be aware of certain states is typically realized through 'inner lan-

guage'. The second viewpoint, however, would argue that the development of consciousness does not necessarily emerge from language since its content has representational form in modes other than symbolic language, e.g., kinesthetic, sensory, or emotive means (Levelt 1989).

Clearly, language expression provides an incomplete view of the full scope of conscious processing (Luria 1981). Nonetheless, most theorists would agree that language and consciousness are highly interdependent processes that develop and function simultaneously and cooperatively (Halliday 1977). Thus, elaboration of language abilities reinforces elaboration of conscious processes and *vice versa*.

The relevance of consciousness to understanding discourse and communication is that consciousness deals with how humans interpret and relate to their world. Humans are not bound by direct concrete experiences. Rather, they are able to transcend the interpretation of the sensory experiences and incoming information. Humans are able to process information at a level far more complex than the immediate perceptual experience affords by drawing conclusions and abstracting ideas. Luria (1981) suggests that consciousness plays a major role in the ability to go beyond the immediate experience.

Language is used to a large extent to code what is in one's consciousness (Luria 1981; Vygotsky 1934; Whorf 1956). To speak is to outwardly signal that of which one is aware. Language provides a vital mechanism in processing sensory information, giving the input meaning, and formulating generalized interpretations beyond the scope of the direct perceptual experience. Chafe (1979) expresses the relationship between language, consciousness, and communication in a personally relevant context as follows:

> It happens very often that we see, hear, and otherwise experience things happening around us, that we later remember these things, and that for one reason or another we are motivated to use language to communicate what we remember to other people [...]. In so doing we convert into verbal form something that may have been partially or even wholly nonverbal to begin with [...]. (Chafe 1979:214)

This statement illustrates how speakers experience a certain input/event that is subsequently pulled into consciousness at a preverbal stage with the intent of translating the experience into verbal form. The point is that a full account of how speakers use language to convey meaning for social functions requires consideration of the relation between mind (consciousness) and language (Searle 1992).

2. Issues in neurogenic populations

The relationship between language and consciousness may be particularly revealing in examining communicative patterns in patient populations with brain damage. Some provocative questions can be pursued in this area. For example, how is consciousness affected when language is significantly disrupted as in moderate-to-severe aphasia? Can 'inner language' be preserved despite marked impairment in 'expressive language'?

In dementia, a question that naturally arises is: What happens to consciousness as cognitive systems, including the language system, deteriorate? In particular, what are the effects of a progressive disintegration of propositional language on consciousness in dementia? In talking to patients with dementia, one is struck with the sharp contrast between how much they talk and yet how little they say. That is, the patients tend to use a lot of language to convey minimal information, at least through the moderate stages. What do these and other discourse phenomena suggest about conscious and unconscious processes?

The following is a striking characterization by Luria (1972) of the mental faculties or state of consciousness in a young soldier with aphasia who sustained a severe brain injury. Although this patient was certainly not dementing, the impact of cognitive and linguistic deficits on the content of consciousness are vividly portrayed:

> "I'm in a kind of fog all the time, like a heavy half-sleep. My memory's a blank. I can't think of a single word. All that flashes through my mind are some images, hazy visions that suddenly appear and just as suddenly disappear, giving way to fresh images. But I simply can't understand or remember what these mean.
>
> Whatever I do remember is scattered, broken down into disconnected bits and pieces. That's why I react so abnormally to every word and idea, every attempt to understand the meaning of words."
>
> He was not alone in realizing this. Moreover, he not only felt but was convinced that other people noticed this, that everyone was aware he had become a totally different person, fit for nothing, the mere semblance of a man who for all practical purposes had died. In short, a man who had been killed in the war. (Luria 1972:11-12)

This reflection on the thoughts of a brain injured man exemplifies salient properties of consciousness as well as suggests ways that the content of consciousness may be altered subsequent to brain injury. The statement "vision suddenly appears and just as suddenly disappears, giving way to fresh images"

conveys a sense of the limited capacity and short duration as well as the change of direction in consciousness content. The inability to translate images into words or to apply a frame of reference leaves the man unable to interpret the world around him. The analogy of his consciousness compared to "a kind of fog [...] like a heavy half sleep" paints a telling picture of the limitations when images cannot be verbally coded.

3. Purpose

In this chapter, the salient discourse behaviors in patients with dementia are discussed in view of what insight is provided into conscious processing. To achieve this, we first describe the framework delineating how we conceptualize consciousness. The framework is then applied to the language of patients with dementia to discuss the implications for conscious processing in this population. The discourse phenomena are illustrated with language from individuals with dementia. The term 'dementia' is used in this chapter to refer to dementia of the Alzheimer type (AD). Finally, we discuss the implications of consciousness to neurolinguistic research.

4. Conceptualization of consciousness

4.1. *Assumptions*

This paper focuses primarily on what the flow of language in patients with dementia reveals about consciousness. Two assumptions are made regarding which aspects of language will be the most relevant to consciousness. The first one is that propositional language is more directly related to consciousness than more automatic-type language. The second assumption is that the social functions of language provide the motivation for verbalizing the images in consciousness for communicative purposes.

4.1.1. *Propositional language and consciousness*

Language behavior has been characterized along a continuum with conscious, voluntary propositional language at one end of the continuum and unconscious, automatic language at the other end (Jackson 1874; Van Lancker 1990). Propositional utterances represent spontaneously created responses generated to initiate or reply to a particular communicative context. In contrast, automatic

responses are non-creative and consist of fixed, overlearned responses such as social exchanges or recurrent stereotyped utterances. For our purpose, the concept of automatic language is used in a generic sense to refer to repetitive, highly practiced units of language that may range from single sentences to well-rehearsed personal narratives (Schwartz & Chawluk 1990). These units of language are produced with little conscious effort, i.e., through unconscious processes.

Jackendoff (1992) however, cautions not to trivialize unconscious processes. These unconscious processes interact in a complex way with conscious processes. Language formulation draws continuously on both unconscious and conscious processes working together. Certain aspects of propositional language require minimal conscious processing. Normal speakers do not have to expend large amounts of energy formulating a message each time they speak. Rather, many underlying processes of speaking are carried out in normals with little conscious attention. Articulating the sounds, selecting the words, and using the appropriate syntax in formulating a message happen almost automatically, with little awareness (Levelt 1989).

Nonetheless, the distinction between propositional and automatic language seems to have linguistic reality as evidenced by a differential breakdown associated with brain damage. A dissociation between the propositional (conscious) and automatic (unconscious) processes of language has been useful in documenting selective patterns of preservations and impairments in language of pathological populations (Lum & Ellis 1994; Van Lancker 1990; Whitaker 1976). In particular, the automatic aspects of language have been reported as being more resilient to breakdown in dementia and aphasia than the propositional aspects that require more controlled processes.

The primary aspect of conscious processing of interest in this chapter is in the ability to propositionalize an idea from consciousness. That is, how do AD patients translate ideas from their consciousness into language for communicative or social purposes?

4.1.2. *Functions of language*

The verbalization or propositionalization of an idea from consciousness is an intentional activity motivated by a desire to communicate. In order to elucidate how one goes about mapping the conscious content into verbal realization, it is necessary to consider the function or intent of a communicative attempt.

Halliday (1977) identified seven functions and discussed their significance to understanding the contribution of socialization processes in language development. We consider these same functions to determine whether the

functions of language disintegrate as language abilities in dementia decline. The issue raised is whether the functions of language can be achieved through means other than propositional language. The functions of language sequenced according to order of developmental emergence include: (1) the instrumental function (operates to satisfy material needs, e.g., *I want* ...); (2) the regulatory function (serves to control the behavior of others); (3) the interactional function (reflects the use of language for social exchange); (4) the personal function (represents statements of personal feelings, e.g., interest, dislike, pleasure); (5) the heuristic function (operates to gather knowledge and information, e.g., *Tell me why* ...); (6) the imaginative function (serves a creative function in generating stories; and (7) the informative function (serves to share information).

Halliday (1977) claims that these functions are necessary for learning the adult language system and are useful in explaining stages of language development. These functions may also be beneficial in examining dissolution of language and perhaps consciousness in dementia.

4.2. *Framework*

The framework for defining the concept of consciousness is derived from the work of Searle (1992), Chafe (1979, 1980, 1990), and Goffman (1974). Searle's (1992) philosophical view on consciousness with regard to language is that in order to understand how language works one must consider the relationship between mind and language. He defines certain structures of consciousness that relate both to the language and social interactive systems. While there is considerable overlap in the perspectives of Searle and Chafe, Chafe (1979, 1980) focuses more on the how the verbal output provides a window into consciousness. We included Goffmann's (1974) frame analysis to describe how one organizes experiences. While Searle and Chafe both include the property of individualistic and generic interpretation of experiences, Goffman elaborates on how a frame operates and how it fails to operate.

For our purposes, we selected properties of consciousness of particular relevance to the discourse phenomena in dementia. The significance of these properties to discourse will become apparent in later discussions. The properties relate to the content and organization of consciousness as well as to properties of the speaker.

4.2.1. *Content of consciousness*

The properties characterizing the content of consciousness include:

(1) The content of human consciousness is coded via various modalities, e.g., it contains words, images, and emotions, to mention a few (Searle 1992).
(2) The content of consciousness has a limited capacity and duration (Chafe 1980).
(3) The content is always changing (Chafe 1980).

4.2.2. *Organization of consciousness*

Consciousness also has organization as manifested by these properties:

(1) In normal states, consciousness has a unified sequence that is maintained for short stretches of time. Searle exemplifies this property as follows: "When I speak or think a sentence, even a long one, my awareness of the beginning of what I said or thought continues even when that part is no longer being thought or spoken." (Searle 1992:130).
(2) There is a figure-ground or gestalt structure to consciousness (Searle 1992). This property accounts for the fact that our experiences are perceived as a figure against a background determined largely by focus of attention. This property accounts for the selective focus of attention on important information to the exclusion of less important information in consciousness.
(3) The aspect of framing in consciousness accounts for the organization and interpretation of new input or experiences in light of previous experience (Goffman 1974). Goffman asserts that individuals perceive events in terms of primary frameworks. These frameworks operate to guide the interpretation of what is going on. Frameworks are established through experience and through the internalization of certain stereotypic characteristics that serve to define an event. Searle (1992) also acknowledged the relevance of this property to consciousness which he labels 'familiarity', A person has a sense of familiarity even when a new or strange situation/place is encountered because he is able to interpret the situation by relying on what is already known. The framing of an event allows an almost instantaneous interpretation with a mere glance. Moreover, a framework accounts for how individuals are able to conjecture about what event may have preceded the present situation or what may follow. (Note that the terms framing, frame of reference, and framework are used interchangeably.)

Goffman offers a number of ways that frames may fail, two of which are considered herein. One framing breakdown is due to ambiguity and the other due to errors in framing. Ambiguity results when individuals are unclear as to what is going on. The ambiguity is realized either as vagueness

in expression of what could possibly be going on or as uncertainty as to which of several alternatives could be happening. The second kind of misframing is an error due to misperceptions or erroneous assumptions. These two types of misframings are outlined because of their relevance to AD performance.

5. Discourse phenomena relevant to consciousness in dementia

In this section, the discourse phenomena relevant to conscious processing in patients with dementia are highlighted. These findings are then interpreted in light of implications for consciousness in dementia. First, a global synopsis of discourse in dementia is presented. Then the following issues are addressed:

(1) What is the nature of propositional language in dementia?
(2) What happens to the communicative functions of language as the disease progresses?
(3) What does the content of discourse indicate about consciousness?
(4) What does the organization of discourse information imply about consciousness?

5.1. *General description*

Insidious cognitive decline is the hallmark of AD symptomatology with memory difficulties typically being the earliest complaint (Niederehe & Oxman 1994). Language dissolution particularly evident at a discourse level appear along side the cognitive deterioration presumably due to the overlap of language and cognition. Classically, the neuropathological aspect of AD include excessive neuritic plagues, neurofibrillary tangles, granovacuolar degeneration, amyloid angiopathy, loss of neurons, and atrophy of the brain. The neuropathological changes are generally most prevalent in the bilateral posterior brain regions. Although the relationship between brain pathology and consciousness in AD is beyond the scope of present paper, the relationship between localized brain damage and the breakdown of consciousness remain an important issue to consider. For our purposes, we are interested in discourse as a window to the content of consciousness in AD.

The most common characterizations of discourse in dementia include vague and empty language, verbosity, impaired cohesion and coherence, reduction in information content, disrupted thematic structure, impaired topic main-

tenance, and problems of turn-taking and speech act use in conversation (Glosser & Deser 1990; Grafman *et al*. 1991; Heller, Dobbs & Rule 1992; Mortensen 1992; Nicholas, Obler, Albert & Helm-Estabrooks 1985; Ripich & Terrell 1988; Ripich *et al*. 1991).

In the early to middle stage, patients with dementia are perceived as having little difficulty talking. Language appears to be relatively normal semantically and syntactically when viewed in isolation. However, problems become more obvious when their responses are interpreted within the communicative context. Indeed, a listener may experience considerable difficulty following the flow of the demented patient's message.

In regard to language, a common observation is that patients with dementia produce considerable language as manifested by sheer quantity of words and sentences. In contrast, informational content tends to be reduced, empty, and incoherent or disorganized (Bayles & Kaszniak 1987; Chapman & Ulatowska 1992; Obler & Albert 1981; Ulatowska & Chapman 1991). Other discourse behaviors commonly noted in dementia include: (1) excessive use of stereotypic phrases, (2) repetition of ideas, (3) irrelevant content, (4) intrusions of previous information that is no longer appropriate to current context, (5) interrupted, incomplete ideas, (6) inability to produce generalized or abstract responses, (7) impairment in use of reference, and (8) inability to take the listener's perspective. Clearly, this plethora of discourse phenomena raises questions about the intactness of consciousness in dementia. We will now look more specifically at the relationship between discourse and consciousness in dementia.

5.2. *Propositionalization of ideas in dementia*

Longitudinal and later stage studies in dementia provide clear evidence of a disintegration in the ability to produce propositional language. Patients with dementia show a decline in using novel language constructions with an increase in the usage of more automatic utterances (Chapman & Ulatowska 1992; Hamilton 1994; Schwartz & Chawluk 1990; Whitaker 1976). In an in-depth case study, Whitaker (1976) provided an account of marked disparity between propositional and automatic language in a demented patient. This patient failed to exhibit virtually any volitional or creative utterances either as initiated responses or as responses to informational requests. In a dramatic contrast, this demented patient showed relatively preserved abilities of nonvolitional, automatic aspects of language. Support for this preservation was provided by the

patient's ability to correct syntactically incorrect sentences, modifier-noun order, stress, phonemic sounds in context with objects in view (e.g., *This is a gold ling {ring}*), and to complete proverbs and song titles.

This disparate pattern between propositional and automatic language is not an isolated case. The finding has been corroborated in a number of single case studies and group studies in dementia (Bayles *et al.* 1985; Blanken *et al.* 1987; Bohling 1991; Hamilton 1994). Moreover, Schwartz & Chawluk (1990) revealed that ready-made automatic language responses may extend to larger chunks of language than simple phrases or sentences. Specifically, these researchers described preservation of a stylized personal narrative in a patient with dementia. The personal story had lost its propositionality over time, becoming almost automatic as a result of repeated rehearsal, seeming like the gramophone type behavior (as described by Mayer-Gross 1937). The stylized and stereotyped personal narrative was relatively resistant to the linguistic breakdown evident in other spoken discourse.

Hamilton (1994) suggested that signs of increasing reliance on automatic, ready-made language may appear early in the disease. As the disease progresses, an increase in automatic-type responses occur as manifested in excessive repetition of information and in frequent use of ready-made social phrases and fixed linguistic formulas. The increase in automatic language may be a strategy to remain communicatively viable in light of a growing inability to respond appropriately with propositional language (Bayles *et al.* 1985; Bohling 1991; Hamilton 1994). Conventionalized social exchanges remain intact despite marked deficits in exchanging new information (Fromm & Holland 1989; Stevens 1985). Politeness devices such as expressions of gratitude and compliments are used to 'fill' the conversational turn by patients with dementia. In the latter stages of the disease, however, even the automatic language disappears (Hamilton 1994; Schwartz & Chawluk 1990).

5.3. *Functions of language*

The ability to use language propositionally interacts with the ability to use the full range of language functions. Patients with dementia show a progressive loss in the range of language functions represented in their communicative attempts (Blanken, Dittmann, Haas & Wallesch 1987; Bohling 1991; Hamilton, 1994; Ripich *et al.* 1991). Although this pattern has not been documented empirically, it is interesting to note that the dissolution in functions may appear in the reverse order as the developmental order of acquisition as proposed by Hal-

liday (1977). If present, this regression-like pattern may well be associated with a decline in propositional language.

Patients with dementia present early on with a disturbance in the informative (giving new information), imaginative (creating novel responses and stories), and heuristic (information gathering) functions of language. In the moderate stages, the personal (e.g., expressions of like or dislike) and interactional (i.e., to continue to engage in social exchange) functions of language are still intact. These functions can be achieved through automatic expressions. The informative and imaginative functions may disappear at about the same time as the competence to use propositional language diminishes, usually in the late, moderate stage.

In the latter stage of dementia, the majority of language functions are virtually nonexistent. The residual functions at this stage include the regulatory (controlling behavior of others) and instrumental (satisfying material needs) functions of language. These functions can be achieved through minimal vocalizations and gestures. At this stage, most of the automatic, formulaic aspects of language have disappeared such that the patient is passive and almost mute.

In sum, the diminishing capacity to use propositional language corresponds with a decline in the ability to express the full range of language functions. However, patients with dementia are able to remain communicatively viable even after they have lost the ability to verbally formulate their ideas by relying on formulaic or ready-made phrases. The automatic-type language that normal speakers use with little conscious effort seems to become more effortful and manipulated for communicative purposes in dementia. Blanken and colleagues (1987) postulate that the striking loss in the ability to convey information may result from an impaired ability to form prelinguistic conceptual structures. With this in mind, we now turn to consider the content and organization of discourse in dementia in view of the implications for consciousness.

6. Content and organization of discourse: Reflection on consciousness

In this section, we focus on the properties of content and organization for discourse in dementia mentioned above under the framework for consciousness. With regard to content, the properties of interest are coding through the linguistic modality, limited capacity and duration, and changing content. Although we are primarily interested in the linguistic modality of representation, the decline in verbal discourse may have some relevance to representation in other modalities in dementia. With regard to organization, the properties delineated above include unity, figure-ground structure, and frame of reference.

6.1. *Discourse content*

The representations in consciousness as reflected in the clarity of language expression may decline as the disease progresses. Language in dementia becomes increasingly vague and empty. The vagueness arises from numerous factors, two of which include disruptions in reference and lexical specificity. The referential problems are manifested by the frequent use of indefinite reference (e.g., *thing*, *that*, *it*), use of pronouns without antecedents, and complete omission of referents (Cherney & Carter 1990; Ripich & Terrell 1988; Ulatowska *et al.* 1988).

With regard to lexical specificity, patients with dementia often use imprecise lexical substitutions associated with word-finding problems. The lexical problems have been attributed either to difficulty accessing the appropriate word (Nebes 1985) or to deterioration of the semantic features associated with the word causing a broadening of the semantic boundaries (Bayles 1985). With regard to limited capacity and duration, ideas in consciousness may appear and then fade rapidly causing the dementing patient to focus too briefly on an idea to meet the informational needs of the listener.

A common word finding strategy noted in discourse of patients with dementia is to fill the gap with an emotive or evaluative comment (e.g., *I don't like that. That's nice*) or a highly personal story. The task of trying to find the 'right' word may trigger what seems to be a free association type response in dementia. A personal, emotive commentary or personal story may be evoked when the semantic knowledge for a word is stored in the context of a particular situation and coded in episodic memory (Clark 1980; Hamilton 1994).

The increasing vagueness and growing emergence of emotive, personal commentary in discourse of AD patients is related to the reduction of linguistic resources, to the emptiness of thought and to the relative preservation in the social functions of language (Chapman & Ulatowska 1992a; Cherney & Canter 1993; Nicholas *et al.* 1985; Ulatowska *et al.* 1988). The emptiness of thought arises from a number of factors, including severe limitations in retrieving information from both short and long term memory storage and to problems holding a focus of attention in working memory. The possibility exists that the expanding losses in both cognition and language with AD progression may be associated with a blurring of the images and events in consciousness. For example, the content of consciousness may become associated with an emotion, rather than a distinct experience. Thus, as the disease progresses, AD patients may perceive events at a positive or negative level of awareness. Therefore, the level of awareness of an experience becomes too imprecise and difficult to propositionalize.

The emptiness of discourse may also be attributed to the AD patient's desire to maintain social contact despite the lack of distinct information, adequate language, or the cognitive resources to formulate discourse in the moderate disease stages. AD patients often fail to provide relevant content to the information requested. Rather, they produce stereotypic responses, confabulations, or unrelated responses to maintain participation in conversational discourse (Blanken *et al.* 1987; Bohling 1991; Obler & Albbert 1981; Ripich & Terrell 1988). It appears that AD patients rely on lower level and automatic language to maintain conversational exchange resulting in minimal addition of new information. In the late disease stages, AD patients often become mute because of a total dissolution of cognitive, linguistic and social functions.

With regard to changing content, the intrusion of tangential and irrelevant content causes an abrupt change in the directional flow of language in dementia (Bayles 1987; Emery 1988; Ulatowska *et al.* 1988). Patients with dementia change topics inappropriately by dropping certain issues in mainstream and focusing on new topics without transition (Hutchinson & Jensen 1980; Ripich *at al.* 1991). The relevance of the change in content may or may not be recoverable by the listener. The flow of language in patients with dementia appears much like an unmonitored stream of consciousness.

6.2. *Organization of discourse*

Although the above discussion would suggest that the content of consciousness contains unrelated thoughts, consciousness does have unity that is maintained over short stretches of time (Searle 1992). That is, the speaker has a general awareness of an idea or a topic that he is trying to convey. This topic serves to guide or organize the flow of information from consciousness. In discourse, the concept of unity is defined by 'coherence' whereby a chunk of text is unified by a global semantic theme.

The impairment of discourse coherence in patients with dementia is a pervasive deficit that emerges as an early indicator of pathology. The incoherence is manifested through incomplete utterances, disrupted development of meaning, and intrusions of inappropriate information (Hamilton 1994; Nicholas *et al.* 1985; Ripich & Terrell 1988) as discussed above regarding changes in content. The consequences of the failure to maintain a topic in discourse is that the listener is "led across a bridge that suddenly drops into an abyss" (Ripich & Terrell 1988:14).

Other disruptions in discourse coherence are revealed by a failure to conceptualize a sequence of pictures as a coherent narrative sequence

(Chapman & Ulatowska 1992a). Instead, patients with dementia verbally describe each frame as if it were unrelated to the next, in terms of the actions and the characters. Lack of continuity is manifested by the use of new terms to refer to previously identified characters.

The second organizational property of consciousness, i.e., the figure-ground property, consists of the focus and periphery of focus. The figure-ground aspect of consciousness may be viewed through the discourse constructs of topic and comment where topic represents the 'focus' and comment, the supporting details or 'periphery of focus'. These two constructs are relevant to hierarchical processing of information according to importance. The ability to identify important information appears to be impaired in persons with dementia. Patients with dementia do not seem to attend to the most salient features to the exclusion of others. Ulatowska & Chapman (1991) found that patients with dementia were unable to distinguish important from unimportant props as related to the central meaning of a pictorial story. Additionally, the patients failed to remove redundant pictorial information from a sequence story. The patients with dementia seemed to approach the task from the perspective that all presented information was equally important. In contrast, normal control and aphasic subjects were able to sort information according to importance and to remove redundant information.

With regard to the notion of 'framing', evidence from discourse studies in patients with dementia implicates an impairment in applying a primary framework to various contexts. Bohling (1991) proposed that a demented patient's communication is difficult to follow because they communicate from a different frame of reference. Moreover, the framework they apply is unstable, seeming to 'float in time and space' as a result of conversation or environmental cues that trigger a new frame. Thus, the framework that guides consciousness during the unfolding of language in dementia may not be established or maintained. The change in framing during discourse may help to explain the incoherence in discourse of demented patients compared to normal discourse.

Along these same lines, patients with dementia may have difficulty producing a narrative from a contextually rich picture because they fail to appropriately apply a primary framework. Without a framework to guide their interpretation of the main event, they are left unable to make conjectures about preceding or following events as is necessary for narratives. The failure to instantaneously apply a framework may be due to ambiguity and/or errors in framing, or to the fact that the patient fails to focus on the most salient information.

In summary, the discourse of patients with dementia may provide a glimpse of their thinking aloud. As stated earlier, their discourse characteriza-

tions resemble an unmonitored stream of consciousness. The question raised is whether the incoherence of discourse represents an inadequacy in the language system to achieve coherence, limitations in attention, disruption in memory retrieval, alterations in conscious awareness or some other phenomenon. The discourse in patients with dementia suggest the following behaviors relevant to consciousness:

(1) They show a decline in the ability to propositionalize their ideas and an increase in their reliance on more automatic-type language.
(2) The range of functions of language diminish as the disease progresses, however, they are able to maintain developmentally earlier functions (e.g., instrumental and personal function) through automatic-type language reserves.
(3) With regard to content of consciousness, the linguistic coding of the information becomes vague. The brief focuses of content supports a limited capacity and duration with a rapidly changing content providing a window to what seems at times as an unmonitored stream of consciousness.
(4) The organization of discourse is disrupted as manifested by incoherence (or lack of unity), problems with figure-ground (i.e., focus on most salient information), and failure to apply 'frames' appropriately.

We now provide discourse samples to illustrate the above phenomena.

7. Discourse phenomena in individual patients: Reflection of consciousness

In this section, we present sample discourse responses to illustrate the selected language phenomena related to consciousness. We would like to caution the reader that the commentary on the language and consciousness issues reflects our personal ideas and reflections. These comments should be interpreted as speculative at present until empirical studies validate their reality or prove otherwise. The samples were specifically chosen to show the diminishing propositional language, the retrieval of automatic language (even whole stories) to maintain language functions, the impairment in content, and organization. Discourse from five cases is presented for discussion. A range of tasks are utilized to show the important discourse phenomena. The various discourse tasks involved a picture sequence story (See Figure 1), a single picture event, and personal narratives. These tasks are described in Table 1.

Table 1: *Types of stimuli used to elicit discourse.*

Stimuli	Description
Cases A & B	
Picture sequence story (See Figure 1) 1) Tell a story 2) Give a title to your story	1) Depicts a dynamic, conceptually related event sequence 2) *Scene*: fox tricks dog out of his meat by causing him to wrap his leash around the tree 3) *Salient props*: fox, dog, meat, dog's leash tied to tree
Case C	
Single picture event (Norman Rockwell) 1) Tell a story	1) Depicts a contextually rich setting, with important and less important detail 2) *Scene*: a father and son waiting for a train to take the son to college 3) *Salient props*: university sticker, suitcase, books, boy in suit, father
Case D	
Autobiographical sketch 1) Attempts at writing speech 2) Complete speech (written primarily by examiner with guidance by patient)	1) An acceptance speech for award received for outstanding graduate 2) Temporal ordering of achievement
Case E	
Memorable experience story at 1) Mild stage 2) Moderate stage	1) Favorite birthday party 2) *Scene*: birthday party at friend's house in New England 3) *Salient props*: identification of place and activities

7.1. *CASE A: Formulaic narrative*

The following is a sample of discourse from an 82 year old female who was diagnosed with probable AD 6 months prior to assessment. Results from the

neuropsychological assessment indicated that she was at the moderate stage of dementia severity at the time of diagnosis. A two year history of progressive cognitive difficulties prior to the assessment was reported. Following are her responses for the tasks of telling and titling a story based on picture sequence cards (See Figure 1). These discourse responses illustrate the complex interplay between propositional and automatic language in maintaining the functions of language in a patient with dementia. Moreover, the responses exemplify the vagueness in content and the incoherence in unfolding information, particularly on the task of giving a title.

Story

Examiner: Tell me a story about these pictures.

AD patient: Well, there was a dog and he had something to eat. And a dog comes along and wants to take .... And then the other one goes along with the trick and causes him to go around .... And that's what happens. And then a ... goes around him and that's it. He lost it. And the other one got it.

Examiner: Give a title to your story.

AD Patient: Yeah, I could always say well he could have run around the tree and made us ... very quick and that was it. I didn't time you quick he did it. I didn't time how many times. I only said he went around the tree and he couldn't reach it and the other one got a hold and that's it. Well, I don't know if it would be a good title, but it's my thinking. Maybe I'm wrong. I'm not going to title it. I never did any titles. It just doesn't come by itself. No, because when I worked like that in a hospital and I knew a lot of things. We we had to keep our mouths shut. You see that's the way I am. I was just a kid and that's one of the reasons. And later on when I got married again and I was telling somebody and they said, "Alice, keep your mouth shut." When you go outside, don't say anything about the hospital. Privileged information. No, no we can't because we used to be able to do that in the hospital. But not outside. Not going out. Do be silent. And we had nuns and they were wonderful. That was a long time ago. There was only two nuns. Oh that was in '26. Well see, I was 1909 that was when I was born and I was only fourteen when I started. Just not quite sixteen, but I learned a lot. Learned a lot because I was Catholic and there was nuns.

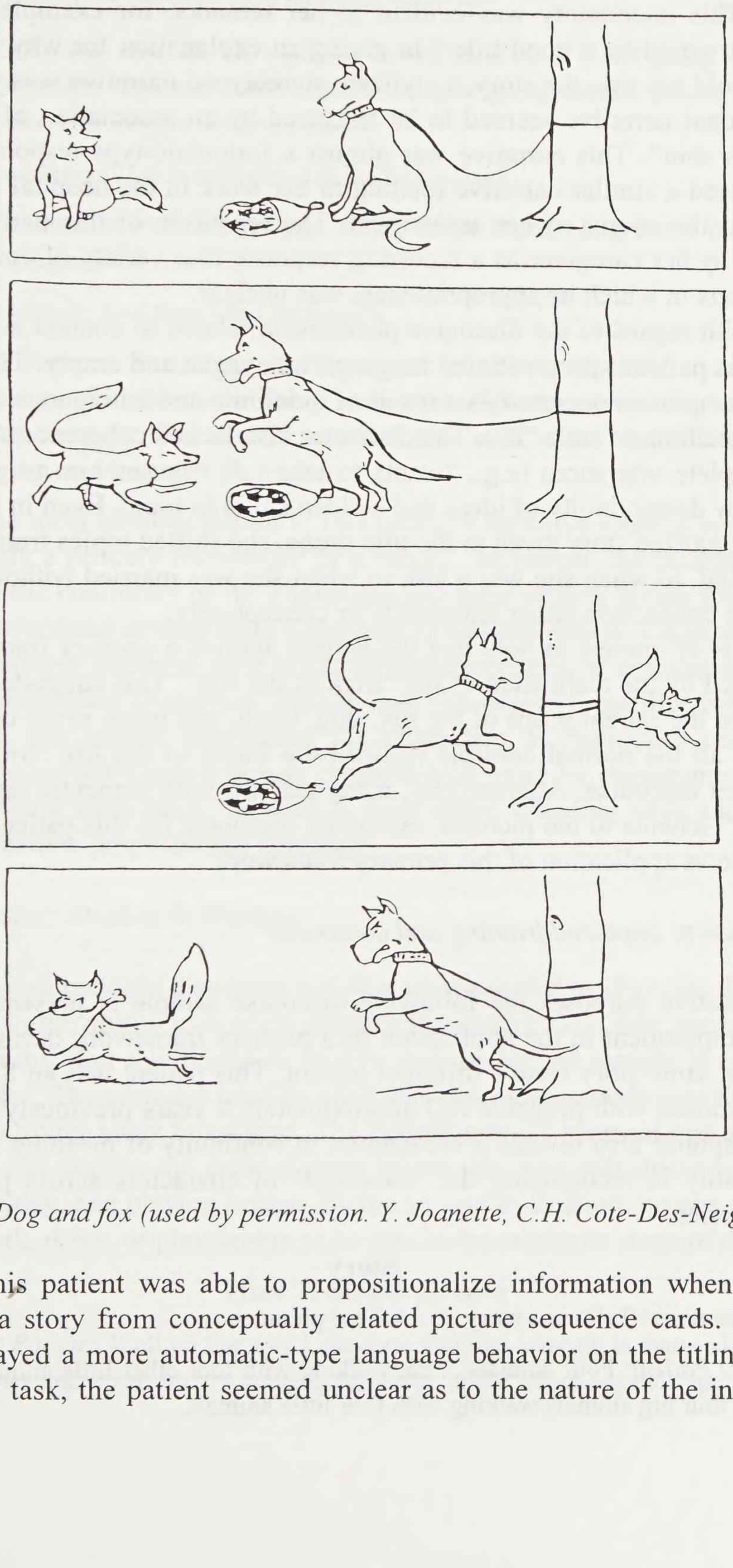


Figure 1: *Dog and fox (used by permission. Y. Joanette, C.H. Cote-Des-Neiges).*

This patient was able to propositionalize information when asked to generate a story from conceptually related picture sequence cards. However, she displayed a more automatic-type language behavior on the titling task. In this latter task, the patient seemed unclear as to the nature of the information

request. This uncertainty was evident in her remarks, for example, "I don't know if it would be a good title." In giving an explanation for why she could not or would not title the story, a stylized, stereotyped narrative was produced. This personal narrative seemed to be triggered by an association of "keeping her mouth shut". This narrative was almost a formulaic-type response in that she produced a similar narrative relating to her work in the hospital numerous times over the course of her assessment. The repetition of this narrative was validated by her caregiver as a recurring response to a variety of communicative contexts in which its appropriateness was unclear.

With regard to the discourse phenomena related to content and organization, this patient's propositional language was vague and empty. This vagueness and emptiness occurred as a result of indefinite and ambiguous references (e.g., "something to eat", "it"). The discourse also lacked coherence manifested by incomplete utterances (e.g., "wants to take ...", "causes him to go around ...") and by discontinuity of ideas and sudden shifts in topic. Even in her recurrent, personalized story given to the title probe, she shifted topics from working in a hospital, to when she was a kid, to when she was married without any decipherable connection either temporally or conceptually.

It is of interest to note that the patient applied a primary framework as exemplified by the realization of the "trick of the fox". This suggested that she attended to the salient props of the fox, dog, leash, and meat. From our normative data, all the normal controls realized the frame of the fox "tricking" the dog in their discourse. Alternatively, many patients with dementia fail to apply the "trick" schema to the pictures. However, discourse for this patient with dementia shows application of this primary framework.

7.2. *CASE B: Impaired framing and continuity*

For contrastive purposes the following discourse sample is presented to exemplify impairment in the application of a primary framework during production of the same story from a different patient. This patient was an 81 year old male diagnosed with probable AD approximately 8 years previously. This discourse response also reveals a breakdown in continuity of meaning caused by an instability in recognizing the 'sameness' of characters across picture sequence stories.

Story

Examiner: Tell me a story about these pictures.

AD Patient: Four animals ... uh, walking with four other little animals ... four big animals walking with four little animals.

Examiner: What were they doing in the story?

AD Patient: Just, ah, uh, enjoying seeing each other .. and going certain places together, some certain, certain, going certain places together. Pictures are different in life.

Examiner: What is happening at the beginning?

AD Patient: Well, they're just sitting down there, lying down there looking at each other ...

Examiner: And then what happens?

AD Patient: Well, they may have a lot of pleasure looking at each other .... And the animals may have a lot of pleasure with the other, other animals. Yes, may be crawling after each other, could be that they're crawling after each other.

The most obvious deficit in this patient's narrative attempt was the failure to apply a primary framework of a "trick". Moreover, the patient failed to recognize the continuity of the characters and their actions across the pictures. The characters and actions were expressed as isolated events. Consequently, an error in framing occurred as a result of misperceptions or erroneous assumptions regarding the characters. Rather than the depicted conflict between the characters, the patient interpreted the characters as "enjoying seeing each other". The patient's language was characterized more by stereotypic phrasing, e.g., "enjoying each other, looking at each other, crawling after each other", than by creative, propositional language.

7.3. *CASE C: Decline in framing*

The following patient's discourse samples are presented to illustrate the change over time in the ability to apply a primary framework. The first sample is elicited 3 months after the diagnosis of AD, and the second sample is elicited 18 months later. The stimulus used to elicit this discourse sample was the picture of the boy going away to college. The patient was 73 years of age at time of diagnosis and was in the early disease stages. He was still driving, going to work everyday, and playing bridge. By the second evaluation, he was no longer able to work, drive, or play bridge as he was in the moderate stage of dementia.

Time 1: Single picture

AD Patient: Well uh the way I interpret that that your uh is that—uh a father and a son uh are waiting for a bus or for some—some type of

transportation to take them somewhere and um they're just uh that's about all I can think of uh.

Examiner: Can you figure out from the picture where one of them is waiting to go?

AD Patient: Where they're going? ... Well, the boy is dressed up and the and the father isn't so maybe he is taking him to school. Uh that would be my one guess. I don't know what the dog's doing there but uh I would the dog wouldn't necessarily come along uh for that purpose so maybe that's not not the correct—uh answer.

Time 2: Single picture

AD Patient: It looks like he's I don't know what he's doing here he's looks like he's kind of disgusted or tired or ...

Examiner: This one?

AD Patient: Yeah, I don't know if that's his son or or if they're ... Yeah could be his son or maybe it's just a—a kid that's trying to find out what's going on .... I think I've seen this before but it's been a long time.

Examiner: What else is happening?

AD Patient: You mean is there anything un—unusual or uh that I'm supposed to re—I don't know what this is ...

Examiner: Looks like a lantern.

AD Patient: Is that what it is? A lantern? Okay yeah, and of course this box down here I don't know what that I—I what the significance is of that having that box there but uh there must be a reason. What does that say? ...

The point to be illustrated from these samples taken as the disease progresses is the framing breakdown appears to be due to ambiguity. At time 1, the relationship between the characters (i.e., father and son) is clearly expressed. The patient also conveys the main event, although some uncertainty is evident (e.g., "Maybe, that would be my one guess"). At time 2, the patient is not sure if the young boy and man are related (i.e., the man's son) or unrelated (i.e., "a kid trying to find out what's going on"). The patient is not able to interpret the main event of the father taking his son to college. Foreground versus background focus of attention seems impaired as he focuses on the less important

lantern as much as the more salient prop of the suitcase with a State U. sticker (which he calls a "box"). He even states that he doesn't know what the significance of the box is ... but "it must be there for a reason".

7.4. *CASE D: Fragmentation of ideas*

The discourse responses from the next patient with dementia are presented to illustrate the presence of content in consciousness despite severe fragmentation across the content. The patient was diagnosed with AD approximately one year ago at the age of 61. He still drives to the office everyday and tries to maintain some business activity, although it is growing increasingly difficult for him. He was recently awarded the outstanding graduate of his high school because of his achievements as an adult. The following are his attempts over three weeks to write a speech for the occasion. The notes are typed verbatim from his handwritten notes with the information written on different lines as shown. The proper names were changed.

First attempt

James Scott connected with
C. J. Jones & My Father having moving from St. Louis.
they started
in 1950
12 to build homes in off of
Broadway
this dream
Dad died died next
his dream month 1951
James Scott connected with

Second attempt

Was know this bow boy is honored
This was 1946 St. Louis Boy
Grafman in 1946 Tulsa from St. Louis
C. J. Grafman
1948 school out—army
come back

Third attempt

C. J. and Dad started up building. Carry
table Dad lived short time died

for the company
which they had the start and J. C.
brought me in to Grafman & Driver Company

These 3 attempts were followed by 5 more attempts in which the same disjointed content was listed in various ways. It was difficult to ascertain how the content from one attempt related to the next. He remarked that he spent many hours in developing the speech, but could not figure out how to relate the ideas and events. That is, he was aware of the ideas he wanted to express but could not organize them in a meaningful way. The following text is a speech that was finally developed over 3 sessions as written primarily by the examiner. The patient, however, approved or disapproved of each expression showing that he was aware of what he wanted to convey.

> As a freshman in high school, this boy moved from St. Louis to Tulsa in 1946. Little did I know what this meant. When we moved, my dad met a ninety year old man named James Scott while playing golf. James Scott introduced my father to J. C. Jones who had just came back from the army. J. C. and my dad decided to go into the warehouse building business. They opened Grafman and Jones in 1955 with five, $6,000 warehouses in Tulsa (which by the way are still standing and doing fine). One year after they started the business, my dad died. That left J. C. by himself. Then J. C. asked me if I wanted to come into the business. Four years later, J. C. died. That left me by myself—with a business to run, a wife, and five children. By that time we had developed a good business, but we didn't have enough money. So we got people to invest in the business to keep us going. By 1979 the business had become a successful enterprise, and we were able to sell it. I stayed in the business for another 15 years. Then in 1986, I'd decided that I'd had enough and retired. I couldn't have done half of what I've done without 2 very important people in my life. First, my wonderful wife who has been with me for 40 years and my hard working secretary who has been with me for 25 years.

This contrast between the speech that he attempted to write and the one more closely aligned with what he wanted to write shows how recollections may be loosely associated in consciousness. Clearly, he has ideas that he wants to express but he has difficulty sorting through the most salient information and establishing relationships between the ideas. This patient is notable because of the remarkable preservation in the social functions of language. He maintains a very active social life, although he acknowledges his ability to give the appropriate information is declining.

7.5. *CASE E: Decreasing vividness*

These last samples were selected to show how the linguistic unfolding of a memorable event changes as dementia progresses. The following samples were taken from a female diagnosed with probable AD at the age of 49 years. The first sample was taken at 49 years of age and the second at 18 months later. The patient was asked to tell about her favorite birthday.

Time 1: Birthday party

AD Patient: A very favorite birthday ... uh, when I was in New England I had some of the craziest friends and they were wonderful people, and they—they—they took my birthday and made a grand finale of that. So they—that was probably one of the most fun times that I've had for a birthday.

Examiner: What did you do?

AD Patient: What they did, they uh, they had all sorts of food there. They and clowns there. It was such fun, it was probably one of the most fun birthdays that I've ever had. It was just marvelous. And all of those people were just marvelous. They were wonderful, wonderful people. And I always—I still to this day I—I really like to go visit—to visit them.

Examiner: Was it a surprise party?

AD Patient: It wasn't a surprise party. They had told me they were going to do it, and we had the best time. It was probably one of the best times I'd had in a long time. It was uh it was in New England and one of my friends had her house open for the night and we just had the best time. It was great, just great, so that was good, that was real good. There—there were several gifts that I got and they were just really nice things. One of them was, it as a little bell, uh, and it had the sweetest little sound to it and I thought—I really liked it because it was very small, it wasn't big, it was very small and I just really thought it was delightful—just a delightful little gift. I loved it.

Time 2: Birthday party

AD Patient: Well, all of these people came to this house. It was a huge house that we were using. It was on a uh .. it was a ... it every person that I have seen or known was right on that porch. There it was and I

> thought, "What in the world do they do with this?" You know and I just wanted to go back one more time, and I'm probably gonna go back again, not for that kind of thing but just go back to visit with some of my friends.
>
> *Examiner*: Was this a birthday party?
>
> *AD Patient*: Yes, yeah. Uh I think it was .. I think it was essentially .. they did it two things, uh. They were using two things to get to do this. You know so I don't know uh ... Uh it was wonderful all of those people came, everybody in that in that, whatever it was wherever wherever wherever we were it was wonderful. It was wonderful.

The patient seemed to retain the 'image' of the birthday party at the latter assessment. However, the vagueness of the content had increased. The use of propositional language was reduced in that less information was conveyed. There was an increase in the reliance on repetitive ready-made language (e.g., "What in the world do they do with this?", "It was wonderful.", "I want to go back."). She retained the overall experience, but the vividness of the experience seemed to have diminished as reflected in her language. At time 1, she seemed to have the awareness of what happened, where it happened, how it happened, and even one of the gifts received. However, by time 2 the event seemed to have lost its specificity as to what, when, and how.

8. Additional factors

At this point, it is important to restate the view that language expression provides only a partial view of the full scope of conscious processing (Luria 1981). A number of other important factors have not been considered in this chapter because of the primary focus on the relationship between language and consciousness. Several aspects that are central to the relationship between language and consciousness are self, self-awareness, and real world knowledge (Chafe 1980).

8.1. *Self and self-awareness*

The content of consciousness is determined to a large extent by the speaker's desires, goals, and motivation. Chafe (1980) remarks that:

> Most of the information available to an individual is quiescent at any given time, only a small selection of it being activated in such a way

> that we would say we are paying attention to it, aware of it, or conscious of it. (Chafe 1980:11)

Consequently, consciousness has intentionality in that the self directs the focus of consciousness (Searle 1992). That is, consciousness is the mechanism that allows a person to intentionally make use of information.

The control aspect of consciousness enables an individual to activate and maintain a particular frame of reference and a primary focus of attention. The ability to activate a particular frame is highly dependent on the individual's self-reflective capabilities. The patient has to be aware of problems in order to provide a means to check responses, correct errors, clarify ambiguous information, and repair communication breakdown (Norman & Shallice 1986).

In dementia, a commonly held view is that this population has limited awareness of their deficits as a result of the disease (Merriam *et al*. 1988). Moreover, their communicative breakdown is attributed to a failure to monitor their own communicative failures. The high occurrence of referential errors, incomplete ideas, intrusions of irrelevant or tangential information, and inappropriate topic shifts is offered as evidence of their limitations in perceiving the information requirements in social exchanges. However, growing evidence from studies of patients with mild to moderate dementia refutes the claim of lack of awareness. Instead, the emerging view of dementia is awareness of both the sequelae of the disease and the communicative shortcomings at least in the earlier stages (Chapman & Ulatowska 1992; Hamilton 1994; Illes 1989). The following interview was conducted with the patient whose memorable experience of the birthday party was previously discussed. This interview occurred about 5 months prior to the last birthday party retell when she was in the moderate stage. The vivid exposition of her awareness of the disease stands in sharp contrast to the vagueness and incoherence of her other discourse responses at this same time.

8.2. *CASE F: Awareness of dementia*

> *Examiner*: Before you started having memory problems, what did you think Alzheimer's disease was?
>
> *AD Patient*: What I thought—what did I think it was? I really wasn't sure what it was, and I knew that there was only one person that I knew who had been an Alzheimer's patient, and that's when I started getting to look at what I was doing and to look at what she was doing. And that I just ... from that particular point, I just knew that I was gonna be one I don't know I don't know how or when that came to me.

Examiner: When did you first know that something was wrong?

AD Patient: Well,—when the first thing first thing that happened uh that I felt was wrong or that I was doing things that might not have been particularly appropriate at different times uh, but I just uh I—I really I really knew um that once I got here I re—I knew that I was gonna be able to be helped.

Examiner: What did you mean when you said you knew something wasn't quite right?

AD Patient: Well, yeah, yeah because I—I did know that something was wrong, and I uh I started talking to my mother about it because I felt like that I was uh there was something wrong and I couldn't quite get to the bottom of it. And so uh and so now I mean I know exactly what happened. You know it just I guess I just got that disease.

8.3. *World knowledge*

One additional factor pertinent to the relation between consciousness and language is the vast store of knowledge that a speaker has available to him. Knowledge refers to the information stored in long term memory (world knowledge) and knowledge inherent in the situation (Chafe 1980). Thus, the content and organization of consciousness is influenced to a large extent by the knowledge available to a speaker and by the speaker's intentions. This knowledge base progressively declines in dementia (Bayles & Kaszniak 1987) and will likely interact in an important way with consciousness.

8.4. *Summary*

Discourse samples from patients with dementia illustrated phenomena that suggested disintegration in (1) the ability to propositionalize ideas, (2) the range of language functions, (3) the specificity of content, and (4) the organization of content. While these behaviors are features of the discourse, they may also have relevance to consciousness. In addition, factors such as self and world knowledge remain important variables to consider in examining consciousness.

9. Implications

In this chapter, consciousness was traced through the window of selected language phenomena as displayed by patients with dementia. We made two as-

sumptions that are critical to understanding the relationship between language and consciousness. The first was that changes in consciousness are more readily perceived through propositional language than through automatic language. The second was that the social functions of language provide an important stimulant for linguistic coding of ideas from consciousness for communicative purposes.

Many theorists suggest that content of consciousness tends to be abstract and generalized in nature (Luria 1981). Moreover, the contents can be represented through various modes, e.g., linguistic, emotive, visual, or musical modes, to mention a few (Jackendoff 1992; Levelt 1989). However, the linguistic coding may be critical to preserving the vividness of the content, particularly for an individual who once had a normally functioning language system. In dementia, the growing inability to code the content of consciousness through the language system may lead to a degradation in the vividness of the representations. For example, the images in consciousness may become blurred, indistinct, and unusable over time.

The empty language in dementia seems to prohibit the propositionalization of ideas from consciousness. This is manifested by an increasing difficulty in translating the ideas into words which may diminish the clarity of consciousness over time. It is important to note that images in consciousness seem to remain after propositional language begins to deteriorate, although the vividness of the image may become imprecise (Schwartz & Chawluk 1990).

The insidious loss of propositional language is gradually replaced by automatic-type language (Bohling 1991; Hamilton 1944; Schwartz & Chawluk 1990). The ability to retrieve automatic-type formulaic responses for communicative purposes suggests that patients with dementia show a residual capacity to manipulate these aspects of the language system at least through moderate stages of the disease (Bohling 1991; Schwartz & Chawluk 1990). This preserved ability to use automatic responses for communicative purposes serves as a caution to look beyond the mere words to understand the content of consciousness in patients with dementia. Thus, insight into the content of consciousness as translated into language may be gleaned from evaluating the intended function of the communicative attempt. We would be remiss not to consider the intent of the message behind the emptiness of the language.

The relative preservation of language functions, despite marked disruption in propositional language, points to the strong personal need to maintain social interaction or even social identity. Moreover, the persistence of content in consciousness beyond the loss of propositional language in dementia may suggest that consciousness is a more resilient human capacity than language

(Luria 1981). The residual consciousness is manifested in the fact that many patients with dementia can perceive themselves, evaluate themselves, and maintain awareness of their states into the late moderate stages (Chapman & Ulatowska 1992a; Hamilton 1994; Ulatowska & Chapman 1994).

With regard to organization, consciousness is not organized in the same way as we expect language to be organized. Consciousness allows discontinuity in meaning because the content is always changing. Nonetheless, the content of consciousness has some organizational structure perhaps manifested in thematic unity (Searle 1992). Language flow of patients with dementia suggests that unity of meaning (or coherence) within consciousness may be impaired. That is, the semantic unity of consciousness in dementia may be unstable as reflected in the incoherent language. Moreover, the ability to attend to the most salient aspects and to de-emphasize the less important features may be altered in conscious processing in dementia (Ulatowska & Chapman 1991; Chapman & Ulatowska 1992a). This foreground-background property of consciousness is essential in grasping the meaning of the whole event.

In conclusion, it is important to note that we did not attempt to address the effects of short term memory, disintegration in the meaning representation of words, dissolution of world knowledge, or other cognitive impairments on consciousness in dementia. These factors will indeed interfere with the content and organization of consciousness. There remains a good deal to be learned about the preservation and dissolution of consciousness in dementia.

From both theoretical and clinical points of view, patients with dementia provide a unique opportunity for elucidating the complex interactions among language, brain, and mind. From a theoretical perspective, the dissolution of cognitive and linguistic abilities subsequent to progressive brain disease may lead to disintegration of human consciousness. From a clinical standpoint, the realization that images remain in consciousness beyond the period when they are verbally translated reminds us of the 'humanness' of these patients. The residual motivation to maintain social contact despite loss of propositional language underscores that patients with dementia should not be disregarded as people.

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References

Allport, A. 1988. "What Concept of Consciousness?". In A.J. Marcel & E. Bisiach (eds), *Consciousness in Contemporary Science*. Oxford: Clarendon Press, 159-182.

Bailey, W. 1986. "Consciousness and Action/Motion Theories of Communication". *The Western Journal of Speech Communication* 50:74-86.

Bayles, K. A. 1985. "Communication in Dementia". In H. Ulatowska (ed.), *The Aging Brain*. San Diego: College Hill Press, 157-173.

Bayles, K.A. & A.W. Kaszniak. 1987. *Communication and Cognition in Normal Aging and Dementia*. Boston, MA: College Hill Press.

Bayles, K.A., C.K. Tomoeda, A.W. Kaszniak, L.Z. Stern & K.K. Eagans. 1985. "Verbal Perseveration of Dementia Patients". *Brain and Language* 25:102-116.

Blanken, G., J. Dittmann, J.C. Haas & W.W. Wallesch. 1987. "Spontaneous Speech in Senile Dementia and Aphasia: Implications for a neurolinguistic model of language production". *Cognition* 27:247-274.

Bohling, H.R. 1991. "Communication with Alzheimer's Patients: An analysis of caregiver listening patterns". *International Journal of Aging and Human Development* 33(4):249-267.

Chafe, W.L. 1979. "The Recall and Verbalization of Past Experience". In R.W. Cole (ed.), *Current Issues in Linguistic Theory*. Bloomington, IN: Indiana University Press, 215-246.

Chafe, W.L. 1980. "The Deployment of Consciousness in the Production of a Narrative". In W.L. Chafe (ed.), *The Pear Stories: Cognitive, cultural, & linguistic aspects of narrative production*. Norwood, NJ: Ablex, 9-50.

Chafe, W.L. 1990. "Some Things that Narratives Tell Us about the Mind". In B.K. Britton & A.D. Pellegrini (eds), *Narrative Thought and Narrative Language*. Hillsdale, New Jersey: Lawrence Erblaum, 79-98.

Chapman, S.B. & H.K. Ulatowska. 1992a. "The Nature of Language Disruption in Dementia: Is it aphasia?" *Texas Journal of Audiology and Speech Pathology*, 3-9.

Chapman, S.B. & H.K. Ulatowska. 1992b. "Methodology for Discourse Management in the Treatment of Aphasia". In R.K. Peach (ed.), *Clinics in Communication Disorders* 2(1):64-81.

Cherney, L.R., & G.J. Canter. 1993. "Informational Content in the Discourse of Patients with Probable Alzheimer's Disease and Patients with Right Brain Damage". In M.L. Lemme (ed.), *Clinical Aphasiology*. Austin, TX: Pro-Ed, 123-134.

Clark, E.O. 1980. "Semantic and Episodic Memory Impairment in Normal and Cognitively impaired Elderly Adults". In L. Obler & M. Albert (eds), *Language and Communication in the Elderly*. Lexington, MA: Lexington Books, 47-57.

Duchan, J. 1994. "Approaches to the Study of Discourse in the Social Sciences". In R.L. Bloom, L.K. Obler, S.D. Santi & J.S. Ehrlich (eds), *Discourse Analysis and Applications*. Hillsdale, NJ: Lawrence Erlbaum, 1-14.

Emery, O. 1988. "Language and Memory Processing in Senile Dementia Alzheimer's Type". In L. Light & D. Burke (eds), *Language, Memory, & Aging*. New York: Cambridge University Press, 221-243.

Frederiksen, C. & B. Stemmer. 1993. "Conceptual Processing of Discourse by a Right Hemisphere Brain-damaged Patient". In H.H. Brownell & Y. Joanette (eds), *Narrative Discourse in Neurologically Impaired and Normal Aging Adults*. San Diego, CA: Singular Publishing Group, 239-278.

Fromm, D. & A. Holland. 1989. "Functional Communication in Alzheimer's Disease". *Journal of Speech & Hearing Disorders* 54:535-540.

Gardner, H. 1990. "Forward". In Y. Joanette & H.H. Brownell (eds), *Discourse Ability and Brain Damage*. New York: Springer-Verlag, pp v-vi.

Glosser, G., & T. Deser. 1990. "Patterns of Discourse Production among Neurological Patients with Fluent Language Disorders". *Brain and Language* 40:67-88.

Goffman, E. 1974. *Frame Analysis: An essay on the organization of experience*. Cambridge, MA: Harvard University Press.

Grafman, J., K. Thompson, H. Weingartner, R. Martinez, B.A. Lawlor & T. Sunderland. 1991. "Script Generation as an Indicator of Knowledge Representation in Patients with Alzheimer's Disease". *Brain and Language* 40:344-358.

Halliday, M.A.K. 1977. *Learning How to Mean: Explorations in the Development of Language*. New York: Elsevier.

Hamilton, H.E. 1994. *Conversations with an Alzheimer's Patient*. Cambridge: Cambridge University Press.

Heller, R.B., A.R. Dobbs & B.G. Rule. 1992. "Communicative Function in Patients with Questionable Alzheimer's Disease". *Psychology and Aging* 7:395-400.

Hutchinson, J.M., & M. Jensen. 1980. "A Pragmatic Evaluation of Discourse Communication in Normal and Senile Elderly in a Nursing Home". In L. Obler & M. Albert (eds), *Language and Communication in the Elderly*. Lexington, MA: Lexington Books, 57-73.

Illes, J. 1989. "Neurolinguistic Features of Spontaneous Language Production Dissociate Three Forms of Neurodegenerative Disease: Alzheimer's, Huntington's and Parkinson's". *Brain and Language* 37:628-642.

Jackendoff, R. 1992. *Languages of the Mind: Essays on mental representation*. Cambridge, MA: MIT Press.

Jackson, J. H. 1874. "On the Nature of the Duality of the Brain". *Brain* 38:80-86.

Joanette, Y. & H.H. Brownell. 1990. *Discourse Ability and Brain Damage*. New York: Springer-Verlag.

Levelt, W.J. 1989. *Speaking: From intention to articulation*. Cambridge: MIT Press.

Lum, C.C., & A.W. Ellis. 1994. "Is "Nonpropositional" Speech Preserved in Aphasia?" *Brain and Language* 46:368-391.

Luria, A.R. 1972. *The Man with a Shattered World*. New York: Basic Books.

Luria, A.R. 1981. *Language and Cognition*. New York: John Wiley.

Mayer-Gross, W. 1937-39. "Discussion of the Presenile Dementias: Symptomatology, pathology, and differential diagnosis". *Proceedings of the Royal Society of Medicine* 31:93-104.

Merriam, K.M., M.K. Aronson, P. Gaston, S. Wey & I. Katz. 1988. "The Psychiatric Symptoms of Alzheimer's Disease". *Journal of American Geriatric Association* 36:7-12.

Mortensen, L. 1992. "A Transitivity Analysis of Discourse in Dementia of the Alzheimer's Type". *Journal of Neurolinguistics* 7:309-321.

Nebes, R. 1985. "Preservation of Semantic Structure in Dementia". In H. Ulatowska (ed.), *The Aging Brain*. San Diego: College Hill Press, 109-122.

Nicholas, M., L.K. Obler, M.L. Albert & N. Helm-Estabrooks. 1985. "Empty Speech in Alzheimer's Disease and Fluent Aphasia". *Journal of Speech and Hearing Research* 28:405-410.

Niederehe, G. & T. Oxman. 1994. "The Dementias: Construct and nosologic validity". In O.B. Emery & T.E. Oxman (eds), *Dementia Presentations, Differential Diagnosis, and Nosology*. Baltimore, MD: Johns Hopkins University Press, 19-45.

Norman, D.A. & T. Shallice. 1986. "Attention to Action: Willed and automatic control of behavior". In R.J. Davidson, G.E. Schwartz & D. Shapiro (eds), *Consciousness and Self-Regulation*, Vol. 4. New York: Plenum Press, 1-18.

Obler, L.K., & M.L. Albert. 1981. "Language in the Elderly Aphasic and in the Dementing Patient". In M.T. Sarno (ed.), *Acquired Aphasia*. Orlando, FL: Academic Press, 385-398.

Ripich, D., & B. Terrell. 1988. "Patterns of Discourse Cohesion and Coherence in Alzheimer's Disease". *Journal of Speech and Hearing Disorders* 53:8-15.

Ripich, D.N., D. Vertes, P. Whitehouse, S. Fulton & B. Ekelman. 1991. "Turn-taking and Speech Act Patterns in the Discourse of Senile Dementia of the Alzheimer's Type Patients". *Brain and Language* 40:330-343.

Schwartz, M.F. & J.B. Chawluk. 1990. "Deterioration of Language in Progressive Aphasia". In M.F. Schwartz (ed.), *Modular Deficits in Alzheimer-Type Dementia*. Cambridge, MA: MIT Press, 245-296.

Searle, J.R. 1992. *The Rediscovery of the Mind*. Cambridge, MA: MIT Press.

Stamenov, M.I. 1992. "More Fundamental Questions Concerning Language Studies". *Journal of Pragmatics* 17:533-543.

Stevens, S. 1985. "The Language of Dementia in the Elderly: A pilot study". *British Journal of Disorders of Communication* 20:181-190.

Ulatowska, H., L. Allard, A. Donnell, J. Bristow, S. Haynes, A. Flower & A. North. 1988. "Discourse Performance in Subjects with Dementia of the Alzheimer Type". In H. Whitaker (ed.), *Neuropsychological Studies of Nonfocal Brain Damage*. New York: Springer-Verlag, 108-131.

Ulatowska, H.K. & S.B. Chapman. 1991. "Discourse Studies". In R. Lubinski (ed.), *Dementia and Communication*. Philadelphia: B.C. Decker, 115-132.

Ulatowska, H.K., A.J. North & S. Macaluso-Haynes. 1981. "Production of Narrative and Procedural Discourse in Aphasia". *Brain and Language* 13:345-371.

van Dijk, T.A. & W. Kintsch. 1983. *Strategies of Discourse Comprehension*. New York: Academic Press.

Van Lancker, D. 1990. "The Neurology of Proverbs". *Behavioral Neurology* 3:169-187.

Vygotsky, L.S. 1934. *Myshlenie i rech'*. Moscow: Sotsekgiz. (English translation: *Thought and Language*. Cambridge, MA: MIT Press, 1962.)

Weiskrantz, L. 1992. "Introduction: Dissociated issues". In A.D. Milner & M.D. Rugg (eds), *The Neuropsychology of Consciousness*. New York: Academic Press, 1-10.

Whitaker, H. 1976. "A Case of the Isolation of the Language Function". In H. Whitaker & H.A. Whitaker (eds), *Studies in Neurolinguistics* 2. New York: Academic Press, 1-58.

Whorf, B. 1956. *Language, Thought, and Reality*. Cambridge, MA: MIT Press.

Cognitive Context Models and Discourse

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1. Mental models

Since the early 1980s, the notion of 'mental model' has been quite successful in cognitive psychology in general, and in the theory of text processing in particular (Garnham 1987; Johnson-Laird 1983; van Dijk & Kintsch 1983; Van Oostendorp & Zwaan 1994).*

Such models have been conceptualized as representations in episodic memory of situations, acts or events spoken or thought about, observed or participated in by human actors, that is of 'experiences' (Ehrlich, Tardieu & Cavazza 1993).

In the theory of text processing, such (situation or event) models played a crucial role in establishing the necessary referential basis for the processing of anaphora and other phenomena of coherence (Albrecht & O'Brien 1993). They further explained, among many other things, why text recall does not seem to be based on semantic representations of texts, but rather on the mental model construed or updated of the event the text is *about* (Bower & Morrow 1990).

Conversely, mental models also play a role in the much neglected theory of discourse *production*, viz., as the mental point of departure of all text and talk, from which relevant information may be selected for the strategic construction of their global and local semantic structures.

Many experiments have confirmed these hypotheses, and have shown that text comprehension and recall essentially involve a strategic manipulation of models, for instance by matching text information with structures of the 'mental space' of such models (Morrow 1994; Morrow, Greenspan & Bower 1989; Zaal & Van Oostendorp 1994). The notion of 'mental space' is sometimes also used in formal linguistics as a construct that has similar functions as our notion of a mental model (Fauconnier 1985).

Models also embody the interface between episodic, personal knowledge of events, on the one hand, and the socially shared beliefs of groups. Thus, model construction and updating involves fragments of instantiated sociocultural knowledge, whereas such shared beliefs or other social cognitions are in turn partly derived from episodic models by processes of generalization, abstraction and decontextualization. At the same time, given their individual nature, models are also construed or updated on the basis of other representations in episodic or 'personal' memory, such as generalized and abstract personal models of events, personality factors, or personal attitudes. In other words, models typically embody both the (instantiated, applied) knowledge and other beliefs of social groups as well as the cognitive representations that define individual persons self-awareness (Hull *et al*. 1988).

For the discussion in the present volume, it is interesting to note that mental models, while being representations of personal experiences, in fact also provide a more detailed and empirical account of some aspects of the notion of 'consciousness'. That is, 'being conscious' of an event, action, object or person, and their properties, involves the construction or updating of episodic models. This does not mean that all information processing (of discourse, action, or other events) proceeds 'consciously'. There is enough evidence to suggest that many levels of analysis and understanding are more or less conscious, although these may always be made conscious as soon as processing occur, e.g., when unknown words, complex syntax, semantic incoherence or pragmatic inappropriateness needs to be dealt with (for details, see van Dijk & Kintsch 1983; see also Davies & Humphries 1993; Greenberg & Tobach 1983; Jackendoff 1987). Models however represent the result of the more or less conscious processing of 'knowledge' about discursive or other events (Johnson-Laird 1983).

This does not mean, however, that all levels and all details of models are always conscious. Sometimes only the higher macrolevels of events need to be conscious for active processing (understanding, production) in Short Term Memory. And conversely, when (depending on context) we need to be 'conscious' of lower levels or specific details of events, then deeper and more detailed analysis or construction of models will take place. This amount and level of processing of models may be regulated by an overall Monitor (see below), but we shall be proposing below that many of the functions of this elusive (theoretical) Monitor are in fact carried out by models of the context. This is not only true for text processing, but also for the processing of social information relevant for context model construction (for further discussion, see Bargh 1984; Mandler & Nakamura 1987; Natsoulas 1992; Shallice 1988).

Lacking alternative formats of representation, episodic models are usually conceived of as consisting of (abstract) propositions, although also 'analog' information has been proposed as a necessary element of our models of reality in order to account for people's memory of spatial or configural information about objects, places, people, or events.

Despite the rather extensive work on mental models, an explicit theoretical account of their internal structures has so far not been provided. As is true for most other memory representations, they may be thought of as hierarchically structured networks, possibly organized by a number of fixed categories, that is, as schemata of some kind. Thus, higher level, abstract nodes may represent the macrostructure of a model, and the more detailed, lower levels, the microstructure of a model, representing the actual details of events, people and situations. This familiar distinction in text processing at least explains what we know about text processing for a long time, viz., that macrostructures usually tend to be better recalled than microstructures, e.g., because of their functional relevance, structural importance (they organize much other information) and hence their accessibility.

Me may only speculate about the further features that define model structures. There is some linguistic evidence (e.g., from sentence semantics and narrative structures) that model structures may be organized by the categories that define events, such as Setting (Place, Time), Participants in various roles (Agent, Patient, etc.), an Event or Action, and possibly various Circumstances, each with their own Modifier categories. This simple structure would reflect, if not explain the characteristic semantic structure of complex propositions as well as the case structure and ordering of syntactic structures in discourse (Dik 1989). In other words, model structures should be seen as the strategic schemata people use in the fast interpretation of the events in their daily lives, and it is not surprising that such schemata would also shape at least some of the structures of the discourses engaged in by speech participants when talking or writing, reading or hearing *about* such events.

In this paper we shall also ignore the specific representational *format* of models, but simply assume that they are networks that may be represented by propositions organized by schematic categories, like 'Participant' or 'Setting'. Although many elements of the theory of mental models, such as their internal structures, or their relations with specific semantic representations of texts, on the one hand, and their relations with cognitions in 'semantic' (or rather 'social') memory, are still on the agenda, this account of the nature and role of mental models is both straightforward and persuasive. Models simply explain many properties of text processing that were hitherto obscure or ignored, or dealt with in more *ad hoc* ways.

One element virtually lacking in most theories of mental models so far, is their evaluative dimension. People not only build and use models of events in order to represent their knowledge about such events, but also in order to represent their *opinions* about them. One may have a model of a specific party, a car accident, or of a new event in the war of Bosnia, as reported in the media, and we may expect that this model will also embody some information about whether we liked or disliked the event, or some feature of the event. Obviously some of these models (like that about Bosnia) may be very complex, and consist of many partial models of separate events. The same may be true for many other opinions, and possibly even of the emotions associated with an event. That specific opinions or emotions, and not only knowledge propositions may facilitate recall of events suggests that these are somehow coded in or with the model (Bower 1980; Tan 1994).

In a similar way as personal, episodic event knowledge is associated with general, socially shared knowledge, the assumption that models also represent opinions further suggests that these opinions are also linked with social cognition, viz., socially shared opinion structures, such as attitudes, ideologies, and their underlying norms and values (van Dijk 1990, 1995). That is, our models about (events in) Bosnia are obviously a function of (among other things) our social group attitudes and ideologies: To wit, Bosnian Serbs and Muslims will have a very different 'interpretation' of the events in Bosnia. Such a different interpretation or model, not only may involve different knowledge, different points of view or perspectives, but of course also different opinions derived from different attitudes, ideologies and other social cognitions that are a function of different social, political or economic interests of the groups involved, and hence of their members. It is this 'evaluative' (or affective) nature of models that requires our main attention in future model theories.

For the discussion in this book it is especially important to emphasize that we do not vaguely consider the ideologies on which such evaluations are based as forms of 'false consciousness', as is common in the Marxist-Leninist tradition of ideology analysis (Eagleton 1991; Wood 1988). Rather, we see them as specific, schematically organized self-representations of groups (including such group categories as Identity, Tasks, Aims, Position, Values and Resources, together defining the Interests of the group) that control the attitudes and models of its members (van Dijk 1995).

2. Context models

There is however another missing link in the theory of mental models and their links with the structures and strategies of discourse. Language users not only

form or update models of events or situations they communicate *about*, but also of the *communicative event* in which they *participate.* This deictic, reflexive and pragmatic dimension of language use has been virtually lacking in current mental model theories (for an early approach, see van Dijk 1977). During a conversation, a lecture, doctor-patient interaction, reading the newspaper or watching TV, participants of course also need to mentally monitor such encounters themselves, e.g., by planning, executing, controlling or indeed understanding them. It is here proposed that such ongoing, continuously updated episodic representations should be conceptualized as a special type of models, viz., *context models*.

The structures and functions of context models are straightforward. Their structures should of course be similar to those of any kind of model: After all, a communicative event or situation, that is, a context, is not essentially different from other events or (inter)actions people participate in. In this case, however, actors self-represent themselves as speech-participants, and the activities involved are constituted by the very discourse, verbal interaction or speech acts *now* being enacted or received. That is, the categories of the model schema, such as Setting (Time, Place), Circumstances, Participants and Action (and their modifiers), including those that represent opinions), now define the mental (and hence subjective) counterpart of the canonical structures of a communicative situation or context as we know them from a vast literature in ethnography, sociolinguistics, pragmatics, microsociology and social psychology (Argyle, Furnham & Graham 1981; Cicourel 1987; Cook 1990; Dascal & Weizman 1987; Duranti & Goodwin 1992; Forgas 1985; Givón 1989; Gumperz 1989; Gumperz & Hymes 1972; Hymes 1972; Watson & Seiler 1992).

On the basis of this and other work, we shall assume that contexts typically consist of at least the following major categories, possibly each with their own internal schematic structure, as if they were 'sub-models':

- Setting: location, timing of communicative event;
- Social circumstances: previous acts, social situation;
- Institutional environment;
- Overall goals of the (inter)action;
- Participants and their social and speaking roles;
- Current (situational) relations between participants;
- Global (non-situational) relations between participants;
- Group membership or categories of participants (e.g., gender, age).

This means that, first of all, we now have a theoretical framework to begin to represent obvious elements of discourse and communicative events such as intentions, goals or purposes, as is true for any kind of action and interaction. Note though that a mental model of a communicative event is not the same as the theoretical analysis of communicative events *per se*: Context models are episodic, personal and hence subjective *interpretations* and *experiences* of the communicative event or context. That is, speech participants will usually have similar or overlapping models of the event they participate in, but their models are both theoretically and practically unique and different, as is true for all models: Rather trivially, speech participants have different goals, perspectives, knowledge, opinions, etc., about ongoing text and talk. In written communication this may even be more pronounced, given the obviously different models of writers and readers, models that also have different information in their Setting (Time and Place) category. Indeed, 'routine complications' in talk may be largely based on conflicting context models, and negotiation may be necessary to strategically manage such conflicts.

More than mental models of events, context models are under permanent *change*. Especially in spontaneous conversation, participants need to constantly monitor the other participant(s) as well as the other elements of the context and adapt their context models accordingly in order to be able to participate appropriately and competently (Slama-Cazacu 1961, 1973, 1981). Hence, context models are routinely and ongoingly updated, negotiated, challenged, and interactively managed. Indeed, much of the conversational 'work' being done in interaction pertains to the mutual control of participants' context models. In written communication such immediate interaction takes another form, e.g., the strategies writers use to manage the context models of the readers, for instance by genre markers, self-descriptions as communicators, explicit definitions of the context or speech act ('this is a threat'), making their goals or intentions explicit, asking for cooperation or the benevolence of readers, and so on. Many of these strategies are well-known since classical rhetoric.

If we assume that context models have the same basic structure as event models, and that such a structure is strategically built up just prior to and then updated during discourse processing (conversation, reading, writing), we still need to know *how* such a (partial) model is actually used during processing. In the same way as not all information of the previous parts of the discourse is relevant for later understanding (and the same is true for all details of the model constructed for such a text), we may assume that the complexity of the context and of its mental model also does not allow people to 'keep track' of all relevant context factors. This means that again notions of importance and relevance

are involved, as we also know them from the macrosemantics of discourse: Language users therefore will typically abstract (micro)details of the context and infer overall, macro-concepts describing the ongoing (and ongoingly relevant) aspects of the context, such as the macro speech act now being engaged in, the ongoing (sub-)genre, overall setting information (approximate time and place), main actors, and the overall goal of the interaction. This will allow them to disregard local context details during the rest of the discourse, and focus to what is important. Only when things go wrong, or when special focus on details is required, a re-activation search may be done for lower level details of the context model. Moreover, instead of detailed and focused attention to context characteristics, (different) language users may generally process context information very sloppily, again depending on context as well as on individual differences, as is generally the case in reading. In all these cases, then, we assume that contexts are typically accessed and strategically used primarily at the overall macro-level. This macro-level information will be more or less conscious during discourse processing, whereas micro-level (detail) information about the context will only be attended to as the moment it is processed, and later only when necessary.

Another issue that needs to be dealt with is the relationship among, and the integration of different context models. Theoretically, they have been postulated as distinct or discrete representations. Yet, when conscious, people build context models all the time, viz., of contexts that are temporally continuous and structurally contiguous: time, place, participants and actions of these models usually overlap. It is however precisely one of the functions of mental modeling to interpret events as being distinct even when they are integrated part of ongoing activities and occurrences. That is, people self-represent (and hence recall) the event of a conversation or of reading the newspaper as a more or less discrete event. The relevant criteria for such segmentation of the continuous social situation in which they participate may be overall (macro-)interpretation of the ongoing act ('I am now talking to X in room Y' vs. 'I am now leaving room Y', etc.), as well as a number of contextual changes (different goal, different time, different place, different participants, etc.). Yet, even within the 'same' context, we may have sub-contexts, as is the case in for instance a meeting, a court trial, and so on, which may have different, functional parts that are also defined by different sub-contexts (e.g., entry of witnesses as the beginning of the sub-genre of an interrogation in a trial). We surmise that locally connection and coherence of models takes place through the usual abstract rules of local coherence (e.g., conditionality, causality, etc., of events) whereas globally integration takes place by macro-abstraction: A sequence of settings, participants and acts

are mapped onto higher level, abstract propositions that organize the context (e.g., of a trial) as a whole: Main participants, main overall actions, main setting, and so on, as we have seen above for the reduction of contextual details to manageable overall macrostructures for models.

As is true for all mental models, also context models feature evaluative propositions, or *opinions*: Speech participants usually have opinions about each other, about the actual text and talk of the other as well as about other features of the context (time, place, circumstances, etc.). Communicative conflicts may thus also be based on clashing opinions about the ongoing talk, or the present text, and may need to be resolved by negotiation or other problem-solving (meta-)talk about the present interaction.

As is the case for the general knowledge with which communicative models are related (general knowledge about the language, discourse structures or structures of speech acts or conversational strategies), also these opinions are linked with general, *socially shared representations*, representing the typical attitudes or ideologies of the groups and their members about specific communicative events. Teachers and students, doctors and patients, police officers and suspects, women and men, etc., may have different points of view, perspectives, norms and values, and hence different attitudes and ideologies of the verbal interaction they engage in.

Finally, within the general theory of the architecture and functions of episodic memory, we shall assume that *text representations* (or 'text models') are part of context models. In earlier work on text representations (van Dijk & Kintsch 1983), this relationship and the episodic nature of textual representations (TR's) remained undefined. There are however good reasons to suppose that TR's need to be embedded in context models. If a context model is a representation of the whole communicative event, and if text or talk is part of that event, then also the representation of discourse is (special) part of the context model, as is true for other relevant social interaction of the present situation.

Indeed, in many or most situations, the very goal or point of the communicative event is to accomplish this particular text or talk (either in production or reception), and the goals of the interaction can hardly be represented separately from the interaction itself. This is obviously true for dialogic, spoken interaction, and there is no reason why this should not be so for written communication. Note though that, unlike abstract 'finished' TR's, we here typically have to do with a developing, changing representation, as it is constructed in ongoing speaking, writing, reading or listening.

This conception is a natural implication of our 'strategic' approach to text processing (van Dijk & Kintsch 1983): Discourse representations are

'gradually' being constructed both by speakers/writers as well as their recipients, and are inherent part of the unfolding context, both being influenced by (other) factors of the context as well as influencing or defining that context. That is, both 'past text' as well as 'planned (or expected) text' will thus become part of the context and 'available' for all participants. This hypothesis also nicely emphasizes the close interaction and integration of text and context as represented by these participants. For instance, what 'has just been said' is thus both part of the text/talk 'under production' but at the same time becomes part of the context, e.g., in the sense that it is known, shared or 'done' together by the participants. One may expect that in experimental situations subjects would therefore often confuse the information they obtained from the text and the information they inferred from their observation or participation in the context. In the rest of this paper, however, our argument will generally be theoretical and not dwell on possibilities of empirical testing of the hypotheses developed here about the nature, the structure and the functions of models.

The problem of the relations of text representations and context models is not solved by simply postulating that 'text models' are part of context models. It seems trivial that if a discourse is always 'part' of a context also their representations are thus related. For ongoing actions, this may not be too difficult to represent: Speech acts and other 'verbal acts' are natural part of the sequence of ongoing action, and in such a case text and context seem to merge in one type of representation. However, if it is the case that language users construct a separate 'model' for what is actually said or written, that is, for the various structures of the utterance, we get different types of representations that are not as easily integrated or merged. That is, the social act of 'being impolite' may well be represented separately, viz., as an interpretative inference, from the use of a specific pronoun, a use that may be represented (and hence recalled) separately. This would empirically be proven if language users are able to recall that someone was 'impolite' ('informal', etc.) to them, but do no longer remember the special verbal means of being impolite. We therefore assume that communicative events are built up from specific sub-events (or sub-states) that each may need its own format of representation. Thus what a participant (or speaker), a location, or time, look like in representation will be different from the representation of what people now are 'doing' and what they now are actually 'saying', i.e., sequences of words, sentences, and other structures being assigned to the utterance. It is this latter part of the context model we would designate as the 'text representation'—in the same way as we may have participant representations, which also have their characteristic structure, e.g., organized by person schemata.

3. Functions of context models

Context models are used to manage communicative events. They represent the intentions, purposes, goals, perspectives, expectations, opinions and other beliefs of speech participants about each other, about the ongoing interaction or currently written or read text, or about other properties of the context, such as time, place, circumstances, constraints, props and any other situational factor that may be relevant for the appropriate accomplishment of the discourse. That is, context models have multiple communicative functions. These functions also affect the structures of text and talk, and *vice versa*, structures of discourse may in turn affect the structure or contents of context models. In the remainder of this paper, we focus on these relations between context models and the (processing of) discourse structures and their (other) underlying mental representations. For each major (pragmatic, semantic, syntactic, expression) level or dimension of discourse we shall examine how its structures may be constrained by the information of the underlying context model.

3.1. *Context models as interface between event models and discourse*

The first major function of context models is to mediate between event or situation models on the one hand, and (semantic structures) of discourse on the other hand. This is one of the many aspects of mental modeling of discourse that has hardly received any attention. That is, it is commonly assumed that event or situation models represent the knowledge of language users about the event being talked or written about. Such knowledge may be very detailed, either because of own observation or experiences (as in personal stories), or because of the integration of instantiated general (social) knowledge. Only a fragment of such knowledge is usually expressed in text or talk. Indeed, precisely because language users are normally able to supplement information in discourse with their own activated, inferred or otherwise construed personal or social knowledge, discourses need not be very explicit. The obvious metaphor is that, semantically, they are the tip of the proverbial iceberg (of consciousness), and the models the large hidden part. In other words, models are much richer in information than the discourses that are based on them, both in production as well as in comprehension.

This discrepancy between discourses and their (event) models, however, poses the obvious problem how to manage such differences. That is, given a speaker who wants to tell a story about a personal event, a journalist having to write about a political event, or a scholar writing a research paper, they are all

confronted with the mental and practical task what information they have about the events talked about should be expressed, and what should not or need not be expressed in their actual text or talk. It seems obvious that the strategies managing this selection are based on information supplied by the context model of the speaker or writer.

The crucial concept summarizing these criteria is 'relevance', and the simple overall strategy is that only the information in the context model that is *relevant* in the present context must (or needs to) be expressed in the (semantic structures of the) present discourse. Note though that 'relevance' is a broad and essentially fuzzy notion (Sperber & Wilson 1986), and hence needs to be made explicit precisely in terms of context structures. One obvious criterion of relevance is intended knowledge of recipients: If S knows *p* (i.e., *p* is part of the event model of S), and if S believes that H does not know *p*, and that H should know *p* or would be interested to know *p*, then *p* should be included in the semantic representation (henceforth SR) of the discourse. Indeed, this simple and obvious rule is similar to the crucial condition of the speech act of assertion. This also means that context models do just that: *They define the ongoing speech act*. Hence, whereas event models essentially have a *semantic* role, context models have a *pragmatic* role.

Now, the relevance condition just formulated has a typically abstract and normative nature, as is the case for traditional speech act theory. We know from more realistic discourse and conversation theories (as well as from theories of natural text processing) that actual speakers may know this rule, but do not always follow it—for a number of, again contextual reasons. Indeed, we routinely tell people things they already know, or things we know they do not want to know, or indeed things we don't actually know ourselves. Hence, traditional views of pure 'communication', in which language users rationally 'exchange information' as specified by this rule of assertion, have been generally replaced by a more flexible and realistic conception of what language users actually do when they speak or write, listen or read. That is, the actual theories of interaction, as well as of the mental models managing such interaction are more complex and much more messy.

Thus, the partial condition about the mutual knowledge of speech participants, would need to involve such typical context conditions as the interests of the participants, the importance of the information, and the social relations between the participants, among other things. Complicating the normative rule given above (which remains the overall, abstract strategy of most assertions), a proposition *p* of a model M, represented as M(*p*), may well be selected for inclusion in the semantic representation of a discourse D, represented as D(SR),

also for other more or less good social or interactional reasons, which may be partly co-dependent:

- *p* is very important information in the present context (importance);
- S has special interest in H's knowledge of *p* (*s*-interests);
- S knows that H has special interest in knowledge of *p* (H-interests);
- S wants to make sure that H does know *p* (reminders);
- S is not sure whether H knows *p*;
- H acts in such a way as if he/she does not seem to know *p*;
- S is emotionally involved in communicating *p*, etc.

Many types of context and hence different context models may be specified that satisfy such conditions. The security instructions on board of a plane are (for many travelers) repeated even if the company and the speakers know (most) hearers know. However, the information is deemed to be so important (and some hearers may *not* know) that it is expressed anyway. Teachers may want to repeat information for pedagogical reasons and conversationalists may do so when they have doubts about, or forgot whether the recipients already knew the information, or when they are so enthusiastic about an event that they need to describe it several times to the same recipient (as is typically true in conversations between close partners), and so on.

That is, institutional constraints (air safety regulations), social relations (teacher-student), opinions and emotions of language users and their personal interests, or lack of memory are among the many further contextual constraints that may modify the actual application of the pragmatic knowledge rule of assertions, that is, the conditions that regulate the selection of model information for inclusion in semantic representations.

Note that various types of context and genres also may have differential effect on knowledge management, and the inclusion of model-beliefs in discourse. For instance, in interrogations by the police or in court, speakers (actors, witnesses, etc.) may be obliged to 'tell all they know', sometimes in considerable detail. The same may be true for students during examinations, novelists telling a story, scholars writing a paper, and so on, that is, for all those contexts and genres where 'expressing all we know' is either legally or morally required, or in the interests of the language user(s).

The converse is obviously true for the *non-inclusion* of information in a SR. There are many social and personal reasons why known information is not expressed, suppressed or concealed from recipients, first of course irrelevance (S knows that H already knows *p*; S knows that H is not interested in knowing

p; *p* is trivial; *p* may be inferred from *q* which is expressed, etc.). However, H's knowledge of *p* may also be not in S's interest, S and H are in a social relation in which knowledge about *p* is not shared (taboos, intimate information, etc.), and so on. Indeed, apart from privacy criteria, there are many general, social criteria, derived from attitudes, ideologies, norms and interests about communicative events, that require that known information is not expressed, typically so for taboos, secrets, intimacies, and any other knowledge of which sharing is not in the interests of the speaker or his/her group or institution. Strategies of face keeping, politeness and impression formation are partly articulated on the basis of such regulation about things that are said or remain unsaid (Brown & Levinson 1987). Thus, as a rule information that may hurt the self-image of the speaker or the hearer, will tend to remain unsaid, unless special context criteria prevail (as in attacks, reproaches, punishment, etc.).

We see that even the formulation of one single set of criteria regulating the relations between event model knowledge and discourse, may require complex context models. That is, context models may need no feature information about beliefs of participants about each others' knowledge (or beliefs), about social relations, personal and group interests, social norms, institutional rules, laws (like the Official Secrets Acts in the UK), personal involvement and emotions, face keeping and politeness.

Obviously, depending on the context, not all context models need to be that specified, in the same way as not all discourse needs to be based on detailed event models and vice versa. Again, such choices are regulated by context models. This also implies that context models need to be self-regulating (so as to avoid an infinite regress of models regulating of context models, etc., etc.), although it has often been assumed that all text processing is regulated by an overall Monitor that allocates resources, controls depth or length of memory searches, distributes time over processes, and so on, and hence also regulates the ongoing construction and change of context models. Indeed, we may focus on the communicative context (e.g., because it is important, difficult, new, etc.) or process context information routinely and superficially. At this point we have no way of deciding which functions of an overall monitoring device are exactly played by context models. Below we shall briefly come back to the relation between context models and consciousness (Section 3.3; see also Baars 1988).

It was already suggested that the context criteria that regulate the expression of knowledge, and hence mediate between event models and semantic representations in fact define the normative or more realistic appropriateness conditions of the speech act of assertion. The same is true for all speech acts.

That is, the usual normative appropriateness conditions of speech acts are defined in terms of context conditions such as mutual knowledge (of the knowledge of actions) of speech participants, their wants and wishes, their expectations and their social relations. Promises, threats, congratulations, and other typical speech acts require that the semantics of discourse is regulated in such a way that they match these contextual criteria. Thus, a speaker who wants to threaten someone needs to express information about an action in a future action model (a plan) which is seriously incompatible with the wishes or interests of the recipient if the latter does (or does not) do what the speaker wants. Such an expression presupposes mutual knowledge about each others knowledge, beliefs, actions, abilities to act, interests, wishes, life goals, and so on. In sum, different configurations of context model information provide the normative and actual characteristics of speech acts. Hence also the important pragmatic nature of context models.

Semantically, the result of such context model constraints on event model expression is not merely relevant for the inclusion of propositions in semantic representations, but also conditions the very semantic *structure* of discourse. That is, contextual relevance of any kind also determines the relations between semantic macrostructures and microstructures, between overall topics and lower-level details. Thus, which information will be included in a summary, abstract, lead, title or headline, which information will be placed first or last, does not only depend on the conceptual or semantic importance (inclusiveness or rank) of the propositions, but also on their contextually determined prominence or importance. That is, information that is relatively and contextually more important, that is relevant for the speech participants, may generally be expressed first, on top, or in special discourse categories such as titles or summaries, or be repeated several times. In other words, context constraints also underlie semantic (and other) discourse structures.

Similarly, as was suggested above, some discourses may need to be more or less *explicit* or *implicit* than others. Regulations, laws, scholarly discourse, manuals, and many other discourse genres may need to be very explicit, whereas everyday conversations, poems, advertising, propaganda, political discourse may be relatively implicit for a variety of contextual reasons (large mutual knowledge, esthetic criteria, face keeping, keeping secrets, or manipulation of the audience).

All these complex constraints require equally complex situation models, which variously embody self-representations of speakers and their own beliefs, wishes, purposes, goals and interests, other-representations of similar properties of recipients, social relations, institutional constraints, knowledge of gen-

res, opinions and attitudes about decency, privacy, appropriateness, and so on. This complexity of context models is baffling when we even try to think of the possible formats such context models should have. Indeed, *they are the ongoing and everyday 'application' in the current communicative situation of a fully fledged naive theory of communication and interaction*, whose complexity is only matched by that of a grammar or our knowledge of discourse structures. Obviously, contexts and their models cannot simply consist of, e.g., the knowledge and the goals of the speakers. Only the regulation of the relations between event models and semantic representations, among the many other relations between the mind and discourse, requires a very complex set of conditions and hence very complex context models.

3.2. *Context models and discourse structures*

Context models do more than act as interface between event models and semantic representations. We already suggested that they also seem to regulate the very *structures* of meaning. The order of prominence of propositions in text or talk is also a function of relevance, and hence of context. Information may be more or less implicit for similar contextual reasons. Local coherence between propositions may be established in a more or less explicit or implicit way, with 'missing links' spelled out or left to the understanding processing of the recipient. Thus, information may be presupposed or not for contextual reasons, such as genre, clarity, pedagogical criteria, social relations, or group interests. Information may be repeated or not, summarized or not, for similar reasons, again defining some aspects of discourse structures.

Thus, the theoretically largely ignored semantic phenomena of *levels of description* and *degree of completeness* (van Dijk 1977) also are context-sensitive. That is, the events as represented by a model may be described in text and talk at different levels of specificity, e.g., at a rather high level of summarization or abstraction (e.g., 'He robbed a bank' or 'They lost the war'), or at more specific levels where more detailed, specific or basic actions are being described ('He stopped before the bank, parked his car, got out, etc.'). Various levels of description may be conventionally defined for specific genres (stories, news reports, police reports, etc.), or have specific functions, such as calling and focusing attention of the recipients, creating suspense (as details of dangerous acts do in a movie or story), or signaling importance or relevance. The same is true, at *each* of these levels for the degree of completeness: Not all information at each level is equally interesting or relevant, as described above. That is, sometimes a detail is relevant, sometimes it is not, again depending on

genre or context, and hence regulated by context models as described above. The point here is not so much what is included or not included in the SR of a discourse, but also the effect of such contextual constraints on the overall or local *organization* of meaning, such as prominence, ordering, and variations of level, specificity, explicitness, and amount of detail.

What is true for the context constraints on semantic structures is by definition also true for a large variety of surface structures, such as those of lexicalization, syntax, style, overall schematic organization, rhetoric, non-verbal expressions (gestures, face-work), phonological and phonetic structures as well as graphic representations. Some of these structures are regulated, as we have seen, through the intermediary of semantic representations (e.g., headlines express macrostructural propositions), whereas others seem to be monitored *directly by underlying context models*. For instance, opinions or emotions of speakers may be signaled directly at the level of expression (stress, tone, graphical emphasis). Let us examine these and other relations between context models and discourses more closely.

3.2.1. *Semantic structures → surface structures*

Surface structures or 'expression' structures (actual words, sounds, graphics, lay-out, etc.) are a function of both meaning and context. That is, part of the surface structure is controlled by semantics, and this semantics is in turn controlled by event models, as we have seen above. Other aspects of the surface structure is however directly controlled by the context model. The best known example of this direct context control is the use of pronouns of address: whether language users in French select *vous* instead of *tu* does not depend on meaning (or the event model), but directly on constraints (such as social relations between speech participants) represented in the context model. On the other hand, contrastive intonation is a surface phenomenon that (often) requires input from underlying (contrasted) semantic representations. (For the general cognitive constraints on surface structure 'formation', see Levelt 1989.)

Discourse meanings influence many aspects of surface structures, such as lexical selection, as well as inter-clause ordering in a more or less familiar way. But *hierarchical* semantic structures, e.g., those linking topics (macropropositions) to the propositions actually expressed by sentences (microstructures), must be mapped onto the *linear* structures of text and talk. This is one of many 'linearization problems' that language users face when connecting mental representations with the linear sequence of words (Levelt 1982). This means, for instance, as we have seen above, that topically 'important' information may be expressed earlier in the text, or in special

schematic categories, such as headlines or summaries. Locally, the same is true for clause type and ordering in sentences, such that for instance repeated or presupposed propositions tend to appear in dependent clauses. In other words, event model structures map in specific ways on textual meaning structures, which in turn influence expression structures (position, order, etc.), but both processes are controlled by information in context models. Let us therefore examine this form of contextual monitoring of the processing of various textual structures in somewhat more detail.

These and other processes of ongoing comprehension and production of discourse are traditionally located in Short Term (or Working) Memory (STM) (Baddeley 1992). More specifically, we presume that these processes have a strategic nature (for details, see van Dijk & Kintsch 1983). This means that they are fallible but fast, on line, context-dependent and goal-directed processes, that may operate at several levels at the same time, and that in comprehension allow fast inferences from incomplete data: As is well-known from commonsense proverbs: A good understander only needs half a word. In discourse production, this means that we should not assume that full propositions, text representations or models are already activated or construed before surface structures or details of a text are already taking place. Similarly, although semantic macrostructures (topics) usually need to control local semantic processing (otherwise one does not know 'what one was talking about'—and people regularly show confusion when having 'lost' their topic of talk), local processing and context constraints (e.g., the apparent delicacy of topic) may well lead to strategic changes of topics. As is particularly clear in conversation, people develop and change semantic representations on the fly, as a direct function of ongoing context (or rather of their models of such a context). This flexible, strategic way of 'expressing' underlying meanings or knowledge allows full adaptation to the variable conditions of the context. This brief summary of information processing in STM (short-term memory) again shows how important currently updated context models are also for processing information in working memory: They indeed seem to act as the Control System (or at least as the information base of the Control System) that accounts for the ongoing 'focus of attention' or consciousness with which texts are being processed.

3.2.2. *Event models → semantic structures → schematic structures*

Global meanings (topics) of discourse may also be organized by conventional schematic structures (superstructures), such as those of narrative, argumentation or other conventional genres or interactional organization (van Dijk 1980). We already saw that main topics are typically (though not necessarily) ex-

pressed in the Headline category of a news report, or in Titles of other genres. Similarly, important implied information in an argument is typically realized in the Conclusion category, whereas macropropositions that describe place, time or circumstances of an event may be realized in the Setting category of the narrative schema of a story, whereas the main practical conclusion from an experiential story typically appears in the Conclusion or Coda of such a story. Similar observations of relations between global meaning and 'global form' may be made for psychological articles, conversations or institutional dialogues, such as courtroom proceedings or classroom talk. Details of these relationships are outside the scope of this paper.

3.2.3. *Context models → schematic structures*

The question here is whether global form, as defined by conventional categories and their rule-based or strategic ordering, is also controlled by underlying context models. They do, and in various ways.

First of all, schematic structures also organize interaction, and may be controlled by interaction regulation in context models. To wit, the conventional opening and closing categories of conversations, such as Greetings or Leave-takings, or the Opening of a meeting or session in many forms of institutional dialogue, are obviously 'firsts' and 'lasts' in interaction, and hence represented as such in the context model of such interaction. As such they have various interactional, social and institutional functions, such as marking beginning and end of a communicative event, defining the type of event, addressing or defining participants, and establishing the institutional validity of such an event (e.g., a meeting or session can only start, and hence do the business it is supposed to do, when opened, etc.) (for details, see e.g., Boden & Zimmerman 1991; Drew & Heritage 1992).

In a different but similar way, Headlines 'open' news reports, and define their beginning (and thereby often the end of another), and thus regulate reading and comprehension. Also, some schematic categories seem to be defined primarily in contextual terms. For instance the news report category of 'Previous Information' usually serves as a 'reminder' of knowledge presupposed by the journalist to be known by the reader on the basis of earlier news reports. Similarly, Evaluation or Prediction categories in news or other genres may code for the opinion and hence the social or political perspective or position of newsmakers (van Dijk 1988a).

Secondly, context models may affect schematic structures also in a different way, viz., by controlling various types of 'transformations' of normal ordering. For instance, although the normative rule would be that main topics

are expressed in headlines (subjective) contextual information may upgrade lower-level topics or even microstructural details by putting such information in the Headline category, while at the same time downgrading the prominence of the main topic. That is, contextual or 'pragmatic' criteria may supersede semantic criteria of ordering or schematic organization. For instance, in news reports there are various criteria that define the 'relevance structure' of such discourse, and besides semantic importance, we may also have pragmatic relevance, such as (assumed) interest of the readers, and the implication of news values, such as that of recency. This means that sometimes information about more recent events may take precedence over semantically more important information, and thus get expressed in the headline, pushing back the main topic to the Lead or a minor headline (van Dijk 1988a, 1988b).

Changes of normal or canonical ordering (which also occur in semantics, e.g., when a mapping of events on a normal, chronological order of propositions is changed for an order determined by prominence, relevance or other criteria, see also Levelt 1982) are often the result of a contextually controlled strategy or the functional moves that constitute such a strategy. This is also true for schematic organization. Instead of the 'normal' ordering of stories, e.g., beginning with a Summary, Setting and Orientation, stories may begin with 'in medias res', as we know from the classical theory of the novel as well as from conversational story analysis. That is, there may be contextual constraints that change the canonical order into an order that is controlled by non-semantic criteria as relevance (interest of the participants), urgency, or cognitive and social constraints, such as creating suspense in stories, or skipping normal greetings or leave-taking formulas in relations of power abuse or dominance in conversations. In other words, as is the case for sentence syntax, also overall discourse forms are flexible in the expression of underlying (global) meanings, and such variation may be taken advantage of by contextual criteria as represented in context models. Indeed, up to a point, virtually all canonical forms may at some point be changed as a function of much more prominent constraints than those of (context-free) rules or conventions, viz., current contextual necessities or preferences.

Of course, there may be some strictly obligatory conventional categories, without which the very genre or type of interaction would no longer be properly defined or socially recognized: Headlines in stories, Titles and Abstracts of psychological articles, Conclusions in argumentation, Openings in meetings, or an Indictment in a trial. Here contexts are themselves constrained by convention, rule or law in such a way that deviance in discourse would make the discourse structurally inappropriate or 'invalid' in any particular

context. In other words, despite the broad influence of context, we should not forget that language use and discourse also are controlled by (more or less) context-free rules and conventions.

3.2.4. *Context models → lexicalization (style)*

Although lexical choice is of course largely monitored by event models and meaning structures of discourse, there often are (near) synonyms defined precisely by their semantic similarity as well as by their different presuppositions and implications of 'use', that is, by context. Hence, as is well known, the stylistic variation of lexical choice may be a function of categories represented in context models. Indeed, one of the useful shorthand definitions of style is that it is the "trace of the context in the text".

One classical example is constituted by contextually varying forms of address, such as pronominal deictics (like French *tu* vs. *vous*), the use of titles (*Professor*, *Dr.*, or *Mr. President*, etc.), or the use of first or last names. In different cultures, thus, variations of address may depend on a complex structure of social relations, such as those of family membership, kinship role, institutional role, hierarchical position, social or personal power, fame, and so on. This is well known from the ethnography of speaking, sociolinguistics and pragmatics and need, as such, no further analysis here (see, among many studies, e.g., Brown & Levinson 1987).

Our point is that in discourse production and comprehension what counts is not the 'real' social context, but how this is represented by the speech participants in their context models. Thus, the conventional effect of 'real' social position may well be canceled out by the way speakers actually define their own position or role in the present context. They may refuse to be polite, pay respect or conversely express admiration or subordination when none is due. Hence, rather trivially of course: Despite the constraints of the social context, it is the subjective representation of such contexts that controls text and talk, and such a subjective representation may very well violate socially shared rules for a number of more or less valid reasons: resistance and challenge, creativity and originality, urgency and emergencies and other special circumstances. Although perhaps trivial from a cognitive processing perspective, this point is not always sufficiently recognized in exclusively socio-cultural approaches to the influence of context on stylistic variation, which is by definition unable to define personal variation, deviation, change and creativity. Much in the same way as the macro and the micro constraints of society and culture need to be taken into account in a theory of discourse and its conceptualization, we also need a cognitive component that describes and explains the way social actors deal with such social and cultural constraints.

Secondly, lexical items not only code for knowledge, but also for opinions, as the famous triple 'freedom fighter', 'guerrilla' and 'terrorist' and many other socially and politically constrained variations show. Though referentially able to denote the same objects, persons, actions or events, such variable use expresses the more or less positive evaluation of the speaker. This evaluation was earlier represented in event models: They represent the present interpretation of an event but may also feature an opinion about such an event or its components. We have seen that such opinions may be strictly personal (like my like or dislike of this apple or vacation), but often also instantiate socially shared attitudes, as when whites think or say negative things about blacks, men about women, or Christians about Muslims, that is underlying attitudes (e.g., prejudices) and ideologies.

However, such opinions are not always context-free, and again depend, for each concrete discourse, on the ways speech participants define their own social position. Thus one may speak or write 'from' the Left or Right, or as a feminist or as union representative, and so on. Such positions, whether assumed, challenged or suspended (also a feminist may sometimes break the 'rule' and speak 'unfeministically') in the present context need to be represented in the context model, viz., in the self-representation of speakers, that is in speakers' contextual self-models. The same is true for the other-models of the speaker, who may select different lexical items as a function of the social category, position or role of the recipient, as is well known in all social processes of accommodation as well as discrimination: Parents speaking differently to children than to adults, women differently to other women than to men, or whites differently to blacks than to other whites, and so on. In other words we here find a broad array of types of contextual social constraints, as subjectively represented in context models, that control lexicalization.

Note though that theoretically we should distinguish between the control of event models by social cognitions (such as knowledge, attitudes and other beliefs), explaining the kinds of opinions people may have about events, on the one hand, and the (episodic, personal) control of such event models by underlying context models, on the other hand. That is, the context model defines the ways language users socially self-define themselves and other participants *in the present communicative situation*. This self-definition may be both subjective and *ad hoc*, as we have seen for the occasionally 'unfeminist' lexical choice of the feminist in specific situations.

Such a contextually specific constraint accounts for the multiplicity of social group membership. Thus a black female liberal journalist has at least four possible allegiances, and for each social situation, these might need to be

managed in such a way in everyday interaction and discourse that specific combinations of positions and opinions, or some contextually more prominent position controls what she will actually write in a specific news report or feature article, say in a dialogue with news sources or in a conversation with her boss. In other words, whereas social cognitions explain and control context-independent and relatively stable group membership of language users, episodic context models explain uniqueness and variation as a function of the possibly ad hoc constraints of the present situation.

The contextual control of lexicalization of course not only operates in production but also in comprehension process: The use of specific words allows for inferences by recipients of the social position or ad hoc contextual 'position' speakers. The repeated use of 'terrorist' by a given speaker may define him or her as a conservative, or as a liberal who in this specific situation disagrees with the violence of those with whom he normally feels solidarity.

What has been said here about the stylistic variation of lexical alternatives expressing social or political opinions, of course also holds for the contextual constraints on meanings more generally. That is, topic selection, propositional meanings, coherence relations, as well as their semantic or schematic organization in discourse, may also be controlled by such contextually variable positioning. In this respect, lexicalization is simply part of a broader pattern of contextualized ideological control of the meaning of text and talk.

3.2.5. *Context models → syntactic structures (style)*

Similar arguments and examples may be put forward for the analysis of the contextual control of syntactic structure. Obviously, even when such control is partly autonomous, it is always co-control with semantic structures: Syntactic structures are primarily a function of semantic organization, such as the structure of propositions and their underlying event models: various agency roles, responsibility, or the semantic consequences of old and new information, focus or other cognitive factors that control the expression of information of event models in text and talk (Levelt 1989)

However, as is the case for lexicalization, we also have (stylistic) variations of syntactic structures that are not controlled by event model structures, but by more 'pragmatic' features of the situation as represented in context models. Word order, even when signaling topic-comment articulation and as expressing differences between given-new or presupposed-asserted information, may thus also have a pragmatic dimension. For instance whether information is assumed to be known by the recipient depends on the model speakers have about (the knowledge of) recipients, which is a contextual criterion.

Similarly, what information is more or less relevant or important, may also depend on the self-representation of the goals or positions of speech participants, and such criteria may be coded also by word order or clause dependency and position. The same is true for spatial, social or political perspective.

A well-known example of such positional and hence contextual control is the way semantic agency is dealt in syntactic structures. A headline like *Police killed demonstrators*, thus, attributes not only agency role and responsibility to the police, but also emphasizes such a role by syntactic subject position and topical position up front, as would not be the case for the passive variant *Demonstrators killed by police*, and even less by *Demonstrators killed*. In the latter examples, different syntactic structures code for different focus and topicality (we are now speaking about demonstrators, depending on textual structures), but also because of their later position and hence lower prominence, downplays the agency role and the responsibility of the police. This is a familiar ideological effect in the media portrayal of ingroups and outgroups (Fowler *et al*. 1979; van Dijk 1991).

That is, depending on the way speakers or writers self-define themselves in their context models, they also have a different perspective on events, and hence on the ways such events are selected for inclusion in semantic representations as well as in the ways such semantic representations are in turn formulated. More generally we may therefore assume that in addition to semantic control there is autonomous, parallel, control from context models in such a way that syntactic structures tend to be selected that signal the prominence, relevance or importance of the perspective, point of view, social position or ideological interest of the speaker. This means, among other things, that events are expressed in such a way that agency, responsibility, causality, etc., as they are syntactically coded, are a function of the goals, intentions, position, opinions or ideologies of the speaker.

The overall contextual strategy involved in syntactic formulation, thus, is: Emphasize the (structure of the) events that are positive for our group or for me, de-emphasize the events that are negative for our group or for me, and conversely, emphasize 'their' negative properties and de-emphasize 'their' positive ones. This social or ideological US-THEM polarization, well-known for instance in racism and ethnocentrism, and more generally in group dominance or conflict, thus also affects the self-representation and hence the roles and strategic goals of speech participants as group members, and thus the ways events from even models are syntactically formulated (van Dijk 1993, 1995).

3.2.6. *Context models → rhetorical structures*

Whereas stylistic variation is the typical textual 'locus' of context coding, it may be asked whether also the specific structures of rhetoric (or rather of rhe-

torical 'elocutio'), such as metaphors, alliteration, litotes, mitigation or irony have a contextual basis. Obviously, and has been emphasized since classical rhetoric, such specific structures have persuasive functions. Semantically speaking they may, as such, have no or a marginal function. Rather, they may call (or cancel) attention to specific forms, meanings or actions. That is, they typically manage processing and the structures of representation. As we have seen for the structures of semantics and syntax, thus, rhetorical devices of prominence may signal importance or contextual relevance, which is at least partly a contextual constraint.

On the other hand, rhetorical devices may be called for by genre, as is the case for specific structures (like rhyme or alliteration) in poetry, literary prose or advertising, or irony in conversation and argumentation. The more specific question though is whether such rhetorical devices may be contextually controlled in a more specific sense of coding the spatial, temporal or social position of speech participants. This would, more generally, be the case for those cultures where specific rhetorical figures should be used (or not) by specific social categories, e.g., on the basis of age, gender, class, social relation or kinship. Thus, it may well be that those in dominant relationships in such cultures may be reserved the right to use specific metaphors, mitigation or exaggeration. Further research will be necessary to examine the contextualization of rhetoric as intended in this paper.

3.2.7. *Context models → expression structures*

The same argument again applies in the control of the structures of 'expression', viz., those of sound structures, graphical structures and non-verbal structures. That is, personal opinions, social position, social relations between participants, and even institutional roles of speakers may be multiply and autonomously coded at the level of intonation, stress, standard language, sociolectal or dialectal pronunciation, as well as gestures, face-work, proximity, and so on. Politeness and deference, as a form of social relation, may thus be coded by a more formal speech pronunciation, volume (speaking softly), bodily position (e.g., bowing), distance, and so on. Conversely, lack of respect, racist or sexist power abuse and all forms of social inequality may be 'marked' in the expression structures in many ways: an insulting 'tone', loudness, threatening or domineering bodily position, and concomitant face work and gestures. Such contextually dependent expression structures are partly autonomous because they may intentionally or unwittingly be at variance with meaning: Polite formulas may be expressed with insulting intonation, face-work or gestures. This is well-known, and need no further analysis. The point here is that in a theory

of text processing the variation of 'surface' structures of expression is not merely controlled by underlying meanings or event models, but also by the context as subjectively represented by participants in their context models, allowing both for social and cultural conformity as well as for personal or local 'deviation'.

Similar remarks hold for the contextual control of graphical structures, such as news report lay-out, print size, pictures and photographs, and so on. Social and ideological position of journalists may for instance be signaled by the emphasizing or de-emphasizing lay-out associated with the expression of the actions of specific social groups. For instance, minority crime, especially of black youths, tends to be emphasized not only by semantic topicalization, schematic positioning in headlines, but also by size of headlines, position of articles on the page, within the paper, or by the use of photographs that have negative implications (van Dijk 1991). Ingroup favoritism, prejudices about outgroups, and in general group relations thus also shape the way language users represent their context of communication, identification and membership, which in turn controls the perspective and the opinions with which events of models are expressed in text and talk.

3.3. *Context models and consciousness*

After this theoretical analysis of the nature and functions of context models and of the ways they control the various structures of discourse, let us finally briefly get back to the problem of consciousness. It has already been suggested that this vague term needs to be analyzed in terms of properties of cognitive processing and representation. Following the current literature, we also have suggested that some aspects of model construction, updating and discourse control may be more or less 'conscious'. Of course, such a gradual measure need be made explicit, and hence differentiated at various levels and stages of processing, from level of general arousal and alacrity of perception, to the allocation of various cognitive resources, such as the activation of more or less knowledge in understanding, and the flow of information between STM and Long-Term Memory (LTM), among many other aspects of consciousness discussed in this book.

One commonsense aspect of consciousness is 'awareness of who I am and of what I am (now) doing (thinking)'. This may imply specific attention, and hence explicit processing of the representation of self, one's actions and one's present environment. For consciousness in discourse, communication and interaction, part of this processing and representation is precisely accounted for

by context models. In this sense, 'conscious' talk and text—at all levels—also means that one represents the communicative context and its features, and controls discourse production and reception as a function of such features, as explained above. That is, discursive and interactional reflexivity is a crucial property of context models and their function. They represent not only (in general) 'who I am', but also 'who I am *now*', viz., 'as what I am now acting', as we shall see in the example of a parliamentary debate analyzed below. That is, context models as defined (and the same is true for all mental models of social practices in which people are involved) provide the necessary parameters for the *dimensions* or *types* of consciousness involved, such as consciousness of other participants, consciousness of where I am, and consciousness about what I am doing and why. Indeed, in this respect a theory of context models would be a major component of a theory of consciousness.

We have also suggested, however, that fully fledged context models may be very complex. They most certainly will not entirely fit in Working Memory. As is the case for event models that represent what we think or talk about, thus, they need to be represented in episodic memory, or at least in a memory region (or state of accessibility) that makes such context model immediately accessible. In actual discourse and interaction control, thus, only strategically selected fragments of context models need be actively applied, attended to, changed or updated, for instance, as suggested: overall, main or macro aims, goals, participants, roles and setting.

This means that although language users are aware of the properties of the context in which they are speaking and acting, all these properties need not be attended to, actively, in STM. Some of them are allocated fewer cognitive resources ('attention') at any one moment. But, the fact that as soon as something 'goes wrong' with the match between text and context or global and local context features (e.g., a sudden impolite pronoun) people will often notice that, shows that the *whole* context model is actively monitoring talk and interaction. However, some of its features (e.g., Time or various Roles) may at any one moment be more in focus, or now being processed in STM, rather than other features. Despite these differences or degrees of cognitive focus, attention or resource allocation, we provisionally assume that context models account for many of the intuitive aspects usually associated with (mental) consciousness: Who am I? Where am I? What am I doing? Why, etc.

4. An example: A debate in the U. S. House of Representatives

By way of illustration, we may finally examine some properties of a fragment from a debate in the U.S. House of Representatives. This debate was held on

June 4, 1991, and dealt with the Civil Rights and Women's Equity in Employment Act. One year earlier President Bush had vetoed a similar Bill proposed by the Democratic majority, a veto that however could not be overturned by Congress. The main conservative argument against both the previous and the present Bill was that it was a 'quota' bill, that not only would be bad for business (an argument less explicitly formulated) but that would only be a boon for lawyers, and would not help minorities (as in the 1990 Bill) or minorities and women (as in the present 1991 Bill). Although the present version of the Bill expressly prohibits quota hiring, the Republican opposition nevertheless keeps repeating the Q-word, and rejects the bill accordingly. In the fragment we analyze (cf. the Appendix), the floor is given to Representative of the Republican Party from California, Mr. Rohrabacher.

Since a fully fledged description of the relevant context and the ways Mr. Rohrabacher models it for his intervention would not only be speculative, but also very lengthy, we may summarize the most relevant properties of the speaker's context as follows (actual contents of relevant model categories are in full propositional format, which is expressed here in noun phrases):

1. Overall interaction and type of speech event: Congressional debate;
2. Location: The floor of the U.S. House of Representative;
3. Date, Time and timing: June 4, 1991, about 4:45 PM, Yielded time of speaking (by debate organizer Mr. Hyde): 3 minutes.
4. Participant role: Current speaker;
5. Professional Role: House Representative of California;
6. Affiliation: Republican Party;
7. Political ideology: Conservative;
8. General position on civil rights: Against extension;
9. Gender: Male;
10. Race: White;
11. Immediate Opponent(s): Democrats;
12. General Opponents: Liberals;
13. The Social Others: Minorities and Women;
14. Current role: Speaker of intervention;
15. Hearers: The House;
16. Formal Addressee: The Chairman of the House;
17. Overhearers: Public, voters, etc.;
18. Intention: Hold a good speech against Bill;
19. Purpose: Defeat Bill;
20. Overall goal: Defend business interests.

In this non-exhaustive list, we first of all find the characterization of the communicative event as whole. Without representing the type of overall event, Mr. Rohrabacher would not know where he is and what to do: His very action must be self-represented (in his context model) as a local 'intervention' and an ongoing 'contribution' to the overall event of a congressional debate.

It is also this overall event that, as a macro-category will influence genre, style and other properties of interaction, such as formal addressing the Chairman. As the previous speaker, Mr. Hyde, also shows, part of the interventions in the debate are purely formulaic ("I'm pleased to yield 3 minutes to the gentleman from California"), so much so that the Congressional Record needs to specify the tacit contextual information that this "gentleman" is in fact Mr. Rohrabacher. The latter will than not formally reply to the previous speaker, as would be the case in most dialogues, but to the Chairman, who also will be explicitly addressed as such with a special, polite phrase in first position: "Mr. Chairman". These and several other formal and stylistic properties of this text are obviously controlled by context features, or rather, as we propose, by the way the speaker subjectively construes and ongoingly 'implements' this context.

Although the overall speech event of a congressional debate generally requires rather formal language (and indeed, speeches are seldom spontaneous, but read prepared statements), contextual reasons of persuasion may lead to intentional stylistic 'deviations', as is Mr. Rohrabacher's informal use of the phrase "up the ying-yang" (line 9). Apart from locally implementing the overall intention to hold a good speech, and the overall purpose to get the Bill defeated, such uses of informal style also have other contextual presuppositions and implications, viz., to convey and construct a desired speaker model in the context models of the audience, e.g., 'This is an informal, laid-back guy'. This example also shows how one surface structure phenomenon (lexicalization or metaphor) may serve several contextual categories and functions at the same time.

In the same way as Mr. Rohrabacher (henceforth abbreviated as 'R') must be aware of the current communicative event, he of course also consciously realizes in what Setting he is acting, that is, what his physical location (lectern, floor) and institutional location (House) are, and what time it is. Temporal representations in context models such as these are crucial, since speaking time is explicitly limited by the previous speaker to three minutes. Such speaking 'slots' are rather precisely monitored, since each party or group will be allocated only a fixed amount of time for its intervention, and speaking longer means that next speakers will get less time. We may therefore further

assume that in the unfolding context model of R, the category of time will be continuously self-monitored as well.

A central and crucial cluster of categories represented in the context model of R are those of self-representation: R obviously knows who he is, as what he is present, for whom he is speaking, and so on. That is, his context model needs categories for these various 'identities', viz., his personal identity (Rohrabacher), his professional role (Representative), his affiliation or group membership (Republicans) and so on. Some of these context categories will feature purely personal information, such as R's own self-image of his character (e.g., 'I am an informal guy'), others are instantiations of social and shared information and opinions, such as 'We are members of the Republican Party', etc. These various structures of Identity categories in the context model will also influence the relations to the other participants in this context, such as his Democratic opponents, liberals in general, and indirectly, the groups (minorities, women, lawyers, etc.) talked about, and represented in his ongoing event model of his speech.

This is particularly clear in the various categories that define the (present) Position and Goals of R, in which for instance his ideologies and aims of the present intervention are represented: to make sure, with his speech, this Bill will be defeated. The disparaging remarks about "politicians and political activists who cannot find work doing anything else" (line 16-17) and "so-called liberal leaders" (line 61) exhibit negative opinions about his political and ideological opponents that not only characterize the event model (about the Bill and who is involved in its defense and benefits), but also the context model. Debate and argument on the floor of the House precisely presuppose ideological dispute and hence self- and other-positioning on the points of views, opinions and attitudes at stake.

Self- and other-representation in context models, and the display of such identities and allegiances in talk, usually also show in the choice of pronouns. It is well-known that *we* is the most powerful political and ideological pronoun in this case, as is true for political discourse in general (Wilson 1990). The most obvious referent for this pronoun in R's speech would be his group or party or conservatives in general. But when he says "We just do not need any more laws in this area" (line 6-7), he does not merely voice conservative opinion, but seems to suggest to speak for all Americans, a well-known rhetorical ploy of populist democracy. Similarly, when he says "We have got an underclass of people of all races trapped in poverty" (line 24-25), *we* similarly seems to indicate 'we in America'. In other words, whether superficially in his rhetoric, or more deeply in his context model, R identifies with being an American

in this context, and as representative claims to speak for the people. The same is true in the pragmatically more active sentence, "We cannot sit by and watch our own citizens being bypassed", where *we* is ambiguously referring to 'we Republicans', or to 'we Americans', as the pronoun *our* in "our citizens" suggests.

However, when he suggests "Let us level with these people" (line 83), then *us* seems to self-refer to 'we in Congress', or to 'we Republicans', while precisely distancing himself from the others by the distancing demonstrative "these people", well-known in discriminating talk (van Dijk 1987). When he finally calls "Let us defeat this legislation", he obviously displays his contextual membership of those who oppose this Bill, whereas the previous sentence, "Let us quit playing the cynical game of ward politics at the national level", the use of *us* may again denote either his opponents (implicitly accused of playing 'wards' of minorities), or 'we politicians' in general, who should not engage in playing wards. In sum, at each point of the text and context, various self-definitions of the identity, membership and allegiances of the speaker must be presupposed in his context model.

Note also that the various identities also express themselves in many other ways in the text. Thus, as a Representative he can appropriately call to "defeat" this law, an action and speech act that is restricted to Legislators. As a politician he may refuse to act as a 'political warden' of minorities, and as a politician and American he may propose "not to sit by and watch our own citizens being bypassed". Similarly, we also may note the overall semantic coherence of Us and Them throughout the text. That is, the Others (Opponents, Democrats, Liberals) are consistently associated with negative opinions, as represented in his event model of this debate, opinions that are however controlled by the conservative ideologies and attitudes of his party, and the ways he espouses them personally by implementing them in his context model. Strategically, he does so effectively by especially focusing on lawyers, the most hated professionals in the U.S., and by thus discrediting the Bill as a boon for those, and by associating his political opponents with those who want to make lawyers richer, while at the same time doing nothing for women and minorities.

Indeed, although defeat of this Bill will of course hurt women's and minority's chances to defend themselves effectively against discrimination at the job, so that socially speaking these are R's opponents, R makes sure to avoid characterizing them as such, for obvious reasons of face keeping and impression management. That is, crucial in this debate, is that the Republicans who want to defeat the Bill must make sure that they do not present themselves as anti-woman and anti-minorities, lest they are called sexist and racist. This is a

general strategy of positive self-presentation (viz., the avoidance of a negative impression) by the elites in general, and by politicians in particular (van Dijk 1993). This does not mean, of course, that elite speakers represent themselves as racist and merely try to hide it, or that they are 'unconscious' racists (see also Haskell 1986). They usually know full well what they stand for, but will simply deny that such attitudes and policies are 'racist'.

The overall strategy, on the contrary, must be to present themselves as those whose real aims are to protect "an underclass of people" against "so-called" liberal politicians and lawyers. This complex management of self- and other-impressions is obviously monitored by the respective self- and other-representations in the models of the participants, as explained above. Part of these representations (and hence the need of R to present himself as the 'friend' of "these people") is R's self-representation as both male and white. His rhetorical affiliation with "these people" is expressed by well-known moves of Apparent Empathy, for instance in lexical expressions such as "trapped in poverty, living in wretched conditions, enveloped in helplessness and hopelessness".

Finally, the point of the local and global semantics of R's talk, viz., to provide arguments against this Bill, is of course a strategic implementation of the overall, pragmatic purpose of his intervention, viz., to defeat the Bill. That is, the coherent selection of negative words to express negative opinions about extending legal measures against discrimination, and the expression of propositions that have negative implications for his Opponents, are the central part of the execution of the context model. These meanings implement a conservative model of this Bill and debate, and are thus indirectly enacting the attitudes and ideologies of the Republican party and of those whose interests in this debate it really serves, as explained above. Many expressions in the text, besides the opposition to Civil Rights legislation, show R's conservative concerns, such as 'the breakdown of the family', the 'failure of inner city schools', and especially 'the unwillingness of some to take entry level jobs'. That such a position is indeed merely an apparent form of empathy is rather clearly expressed by R's denial of discrimination and racism as a major problem of U.S. society.

The point of this semantic level of our analysis is that although obviously the meaning of the talk is controlled by the evaluative beliefs in the mental model of the conditions and intended effects of this Bill, these opinions in the event model, and especially their explicit defense in the present debate, are also controlled by the self-representation of the speaker and his aims and goals in the context model. That is, very few properties of his talk are not directly or indirectly controlled by R's context model of his intervention in this

debate, and of the debate in general. However, the opinions in both the event model and the context model are of course based on underlying conservative attitudes about Civil Rights legislation and white and male ideologies about the position of women and minorities in U.S. society (for a more detailed discussion of these relationships between models and underlying attitudes and ideologies, see van Dijk 1995; for an analysis of the ethnic ideologies and strategies of the elites, see van Dijk 1993).

5. Final remarks

In sum, at all levels of discourse structure we find traces of the context, or rather of the context as subjectively construed and socially constrained by the speech participants. They will in many ways mark, signal, or directly express in expressions, syntax, lexical items, semantic structures speech acts or conversational management, the ways they interpret the present communicative situation, including themselves and the other participants.

They do so also by controlling the ways events of event models are included, excluded and structured in semantic representations. That is, whereas event models generally control semantic 'content', 'what' will be said, or what will be talked 'about', context models control how speakers formulate such event model information. These modes or styles of text or talk, as well as their contextual variation, are thus a function of a very complex array of those properties of the social situation that are relevant for the production or comprehension of the discourse, viz., of the context as represented mentally by the speech participants.

The array of context structures thus represented is extremely complex. Discussed above, among other criteria are the following:

- Assigned relevance and importance (to information, events, etc.);
- Roles, positions and social relations of participants,
  specifically: relations of power, dominance and inequality;
- Goals, intentions, purposes of participants;
- Group membership and social affiliation of participants,
  e.g., age, race, gender and class;
- Personal association and identification with social groups;
- Social attitudes and ideologies;
- Setting: Location, timing and organization of the interaction.

It is not very difficult to spell out, also on the basis on our insights in contextual constraints in ethnography and sociolinguistics, the specifics of these overall contextual criteria controlling text and talk and their processing. However, we have as yet no idea what specific structures, schemata or strategic processes are at work in the organization and uses of context models, and how they may change and updated continuously.

This also means that we don't yet know how context models are formed (or activated) exactly in discourse and communication. Language users obviously build and update mental representations of the social situation in which they are speaking or writing at present, but we need to know by what strategies such a situation is analyzed and represented, and what schemata may be involved in their episodic storage. Indeed, what elements or information of the social context is attended to and found more or less important. In our analysis, for instance, we did not pay any attention to the 'strength' of each contextual factor in the control of text structures. Some factors, e.g., those of temporal and spatial setting and speaker roles, may have obligatory consequences for discourse (e.g., in the use of deictics), others may be socio-culturally compulsory, as may be the case for social roles, social relations and group membership (e.g., in politeness strategies), whereas others may have optional (e.g., stylistic) consequences, such as marking of focus, importance, and relevance.

We further need to know the architecture of both context models and their links with other representations in episodic or social memory. They obviously are the interface between event models and (the mental) strategies and representations of discourse structures. That is, they in many ways have the role of a Control System regulating not only the flow of information between models and text, but also the whole interaction in the present situation. They may ignore, suppress, enhance, de-emphasize or otherwise modify semantic information of such models, and are needed for speech participants to monitor their discourse also as a function of their position, perspective and interests.

However, although we still need to fill in many details of our theory, for the discussion in this volume this chapter provides insight into one crucial example of the management of consciousness, viz., the ways participants monitor communicative contexts. We discussed the nature, the levels, categories, types and strategies of more or less consciously processing the very complex information needed in discursive interaction. Speakers may not at each moment be explicitly aware of who they are, as what they are speaking, what they are doing, or what the conditions and consequences are of what they say. However, they are unable to interact intelligibly and effectively without a complex context model monitoring the context of their talk and controlling the many dis-

course features that signal and ongoingly construct that context. In this way, the theory of context models is at the same time a contribution to an important dimension of the theory of consciousness, viz., the flexible and context-dependent management of knowledge, attention, awareness and focus in effective understanding and interaction.

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References

Albrecht, J.E., & E.J. O'Brien. 1993. "Updating a Mental Model: Maintaining both local and global coherence". *Journal of Experimental Psychology: Learning, Memory, and Cognition* 19(5):1061-1070.

Argyle, Michael, A. Furnham & J.A. Graham. 1981. *Social Situations*. Cambridge: Cambridge University Press.

Baars, Bernard J. 1988. *A Cognitive Theory of Consciousness*. Cambridge: Cambridge University Press.

Baddeley, Alan D. 1992. "Working Memory: The interface between memory and cognition". *Journal of Cognitive Neuroscience* 4(3):281-288.

Bargh, John A. 1984. "Automatic and Conscious Processing of Social Information". In R.S. Wyer & T.K. Srull (eds), *Handbook of Social Cognition*, Vol. 3. Hillsdale, NJ: Erlbaum, 1-43.

Boden, D., & D.H. Zimmerman (eds). 1991. *Talk and Social Structure. Studies in ethnomethodology and conversation analysis*. Cambridge: Polity Press.

Bower, Gordon H. 1980. "Mood and Memory". *American Psychologist* 36:129-148.

Bower, Gordon H. & D.G. Morrow. 1990. "Mental Models in Narrative Comprehension". *Science*, 247(4938):44-48.

Brown, P. & Stephen C. Levinson. 1987. *Politeness: Some universals in language usage*. Cambridge: Cambridge University Press.

Cicourel, Aaron V. 1987. "The Interpenetration of Communicative Contexts: Examples for medical encounters". *Social Psychology Quarterly* 50(2):217-226.

Cook, G. 1990. "Transcribing Infinity: Problems of context presentation". *Journal of Pragmatics* 14(1):1-24.

Dascal, Marcelo & Elda Weizman. 1987. "Contextual Exploitation of Interpretation Clues in Text Understanding: An integrated model". In Jeff Verschueren & Mas-

simo Bertucelli-Papi (eds), *The Pragmatic Perspective—Selected Papers from the 1985 International Pragmatics Conference*. Amsterdam: John Benjamins, 31-46.

Davies, Martin, & Glynn W. Humphreys (eds). 1993. *Consciousness: Psychological and philosophical essays* (Readings in Mind and Language, 2). Oxford: Basil Blackwell.

Dik, Simon C. 1989. *The Theory of Functional Grammar. Part I: The structure of the clause*. Dordrecht: Foris.

Drew, P. & John Heritage (eds). 1992. *Talk at Work: Interaction in institutional settings*. Cambridge: Cambridge University Press.

Duranti, A. & C. Goodwin. (eds). 1992. *Rethinking Context. Language as an interactive phenomenon*. Cambridge: Cambridge University Press.

Eagleton, T. 1991. *Ideology. An introduction*. London: Verso Eds.

Ehrlich, M.F., H. Tardieu & M. Cavazza. 1993. *Les modèles mentaux. Approche cognitive de représentations*. Paris: Masson.

Fauconnier, Gilles. 1985. *Mental Spaces: aspects of meaning construction in natural language*. Cambridge, Mass.: MIT Press.

Forgas, J.P. (ed.). 1985. *Language and Social Situations*. New York: Springer-Verlag.

Fowler, R., B. Hodge, G. Kress & T. Trew. 1979. *Language and Control*. London: Routledge & Kegan Paul.

Garnham, A. 1987. *Mental Models as Representations of Discourse and Text*. Chichester: Ellis Horwood.

Givón, Talmy. (ed.). (1989). *Mind, Code and Context: Essays in pragmatics*. Hillsdale, NJ: Lawrence Erlbaum.

Greenberg, G. & E. Tobach (eds). 1983. *Cognition, Language and Consciousness: Integrative levels*. Hillsdale, NJ: Lawrence Erlbaum.

Gumperz, John J. 1989. "Contextualization Cues and Metapragmatics: The retrieval of cultural knowledge". *Papers from the Regional Meetings, Chicago Linguistic Society* 25(2):77-88.

Gumperz, John J. & Dell Hymes (eds). 1972. *Directions in Sociolinguistics: The ethnography of communication*. New York: Holt, Rinehart and Winston.

Haskell, Robert E. 1986. "Social Cognition, Language, and the Non-conscious Expression of Racial Ideology". *Imagination, Cognition and Personality* 6(1):75-97.

Hull, J.G., S.J. Ashford, B.W. Andrus, P. Propsom & R.R. Vantreuren. 1988. "Self-Consciousness and the Processing of Self-Relevant Information". *Journal of Personality and Social Psychology* 54:452-465.

Hymes, Dell. 1972. "Toward Ethnographies of Communication: The analysis of communicative events". In P.P. Giglioli (ed.), *Language and Social Context*. Harmondsworth: Penguin, 21-44.

Jackendoff, Ray. 1987. *Consciousness and the Computational Mind*. Cambridge, Mass.: MIT Press.

Johnson-Laird, Philip N. 1983. *Mental Models*. Cambridge: Cambridge University Press.

Levelt, Willem J.M. 1982. "Linearization in Describing Spatial Networks". In S. Peters & E. Saarinen, (eds) *Processes, Beliefs and Questions*. Dordrecht: Reidel.

Levelt, Willem J.M. 1989. *Speaking: From intention to articulation*. Cambridge, Mass.: MIT Press.

Mandler, George & Y. Nakamura. 1987. "Aspects of Consciousness". *Personality and Social Psychology Bulletin* 13(3):299-313.

Morrow, D.G. 1994. "Spatial Models Created from Text". In H. van Oostendorp & R.A. Zwaan (eds), *Naturalistic Text Comprehension*. Norwood, NJ: Ablex, 57-78.

Morrow, D.G., S.L. Greenspan & G.H. Bower. 1989. "Updating Situation Models During Narrative Comprehension". *Journal of Memory and Language* 28:292-312.

Natsoulas, Thomas. 1992. "Is Consciousness What Psychologists Actually Examine?". *American Journal of Psychology* 105(3):363-384.

Shallice, Tim. 1988. "Information-processing Models of Consciousness: Possibilities and problems". In Anthony J. Marcel & Edoardo Bisiach (eds), *Consciousness in Contemporary Science*. Oxford: Clarendon Press/Oxford University Press, 305-333.

Slama-Cazacu, Tatiana. 1961. *Langage et contexte*. The Hague: Mouton.

Slama-Cazacu, Tatiana. 1973. *Introduction to Psycholinguistics*. The Hague: Mouton.

Slama-Cazacu, Tatiana. 1981. "Interpersonal Relations and Dialogue Structuring: On 'dialogic syntax'". *International Journal of Psycholinguistics* 4(24):57-103.

Sperber, Dan & Deirdre Wilson. 1986. *Relevance: Communication and cognition*. Cambridge, Mass.: Harvard University Press.

Tan, E.S. 1994. "Story Processing as an Emotion Episode". In H. van Oostendorp & R.A. Zwaan (eds), *Naturalistic Text Comprehension*. Norwood, NJ: Ablex, 165-188.

Van Dijk, Teun A. 1977a. "Context and Cognition: Knowledge frames and speech act comprehension". *Journal of Pragmatics* 1(3):211-231.

Van Dijk, Teun A. 1977b. *Text and Context. Explorations in the semantics and pragmatics of discourse*. London: Longman.

Van Dijk, Teun A. 1980. *Macrostructures. An interdisciplinary study of global structures in discourse, interaction, and cognition*. Hillsdale, NJ: Lawrence Erlbaum.

Van Dijk, Teun A. 1988a. *News Analysis. Case studies of international and national news in the press*. Hillsdale, NJ: Lawrence Erlbaum.

Van Dijk, Teun A. 1988b. *News as Discourse*. Hillsdale, NJ: Lawrence Erlbaum.

Van Dijk, Teun A. 1990. "Social Cognition and Discourse". In Howard Giles & W. Peter Robinson (eds), *Handbook of Language and Social Psychology*. Chichester: John Wiley, 163-183.

Van Dijk, Teun A. 1991. *Racism and the Press*. London: Routledge.

Van Dijk, Teun A. 1993. *Elite Discourse and Racism*. Newbury Park, Cal.: Sage Publications.

Van Dijk, Teun A. 1995. "Ideology and Discourse Semantics". *Discourse & Society* 6(2):243-289.

Van Dijk, Teun A. & Walter Kintsch. 1983. *Strategies of Discourse Comprehension*. New York: Academic Press.

Van Oostendorp, H. & R.A. Zwaan (eds). 1994. *Naturalistic Text Comprehension*. Norwood, NJ: Ablex.

Watson, G. & R.M. Seiler (eds). 1992. *Text in Context: Contributions to ethnomethodology*. London: Sage.

Wilson, J. 1990. *Politically Speaking*. Cambridge: Basil Blackwell.

Wood, A.W. 1988. "Ideology, False Consciousness, and Social Illusion". In Brian P. McLaughlin & Amelie Oksenberg Rorty (eds), *Perspectives on Self-deception* (Topics in Philosophy, 6). Berkeley, Cal.: University of California Press. 345-363.

Zaal, R.A. & H. Van Oostendorp. 1994. "Spatial Information and Naturalistic Story Comprehension". In H. van Oostendorp & R. A. Zwaan (eds), *Naturalistic Text Comprehension*. Norwood, NJ: Ablex, 97-114.

Appendix

House of Representatives

Civil Rights and Women's Equity in Employment Act of 1991
(Continued)

Mr. HYDE. Mr. Chairman, I am pleased to yield 3 minutes to the gentleman from California [Mr. Rohrabacher].

[1] Mr. ROHRABACHER. Mr. Chairman, there is already legal recourse for the victims of discrimination. Legal suits can be brought or, in [5] employment cases, complaints can be filed with the EEOC. We just do not need any more laws in this area. We have civil rights legislation and regulations up the ying-yang, Federal, State, [10] county and local laws. The only ones who are going to benefit from this unneeded legislation are those who will benefit from unnecessary litigation. This is right, the lawyers are the ones [15] who are doing the benefit.

Of course, politicians and political activists who cannot find work doing anything else also expect to gain from this legislation. And who will not be [20] helped by this obtrusive civil rights bill? The less fortunate of our fellow citizens. That is who will not be helped.

We have got an underclass of people [25] of all races trapped in poverty, living in wretched conditions, enveloped in helplessness and hopelessness. We need

economic growth, business, expansion, not more civil rights, legislation [30] that is redundant and useless.

Mr. Chairman, the breakdown with the family, the failure of our inner city schools, drug and alcohol abuse, the unwillingness of some to take [35] entry level jobs, a welfare system that provides the wrong incentives to people who need an inspiration to change, not pressure to remain the same, these are the factors that will [40] make a difference between deprivation and self-government.

We care about these people living in horrible situations, whatever their race, and they come in all colors. Our [45] hearts break and we really feel a terrible pain for these people who are living a painful existence. Far too many Americans find themselves in these horrible situations.

[50] Rarely is this a result of bigotry. During the 1980's, not only did we not get enterprise zone legislation passed, but the rhetoric from liberals who thwarted that effort deterred the self-improvement [55] of those who needed it the most.

The job explosion experience throughout America during the Reagan years was for far too many a [60] missed opportunity. They were listening to so-called liberal leaders who were telling them that they should not try because they did not have a chance rather than listening to conservatives [65] who were telling them to go for it.

As a result, immigrants who flooded our cities easily found entry level jobs, poor immigrants from Mexico, Asia, and, yes, Africa and black Caribbean [70] islands began to support themselves with dignity, and with hard work and their own personal perseverance they began their personal economic ascent.

We cannot sit by and watch our own [75] citizens being bypassed. The first step is to recognize that racial discrimination plays only a minor role in the economic tragedy befalling our inner cities. We need to talk about getting [80] our economy moving, creating new jobs and personal economic advancement of our citizens.

Let us level with these people. Let us create jobs and opportunity in their [85] neighborhoods. Let us quit playing the cynical game of ward politics at the national level. Let us defeat this legislation. It is going to hurt those it claims to help.

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Language and an Epistemology of Dialogism

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I view language primarily as an expression of the dialogical relationship between the self and the other. It is in this relationship that the self becomes an object of its own thought, i.e., it becomes reflexive or self-conscious. In other words, self-consciousness or reflexivity is an ability to comprehend the effect of one's own language on others, to interpret the other person's language and the effect of language of both (all) interlocutors on the process of communication. In addition to self-other reflexivity, one can talk, in a broader sense, about the reflexive relationship between text and its interpreter. Thus Bakhtin (1979/1986) refers to "any coherent complex of signs" as a text in which he includes not only human language but also music, history of art, etc. A text is not a neutral, or the same for everybody, entity and thus, the second consciousness, that is, the consciousness of the perceiver, cannot be eliminated from the process of communication (Bakhtin 1979:107). For Bakhtin, the text is an expression of consciousness and it is something that reflects. Therefore, when the text is cognized, it becomes doubly reflected, i.e., it is the reflection of a reflection (Bakhtin 1979:113). I shall thus use, in this chapter, the terms 'reflexivity' and 'self-consciousness' as synonyms. It is to be hoped that these initial remarks make it clear that the conception of consciousness, as discussed in this chapter, is a fundamentally social conception: consciousness is conceived both as a product and as a modifier and a catalyst of social communication.

1. Two epistemologies: Monologism and dialogism

One can distinguish between two fundamentally different epistemologies. In a rather brief and simplified manner, they can be described as follows. The first type of epistemology conceives of the objects of knowledge as discrete entities.

In the process of knowing, the knower does several things. He or she analyses these discrete entities, preferably in an 'objective' manner, i.e., from some neutral point of view. He or she relates them together and cognizes them as parts of bigger systems, e.g., of hierarchical organizations. Examples of the approaches to knowledge that can be subsumed under this description are Cartesian epistemology, logical positivism, logical atomism or Chomskyan linguistics.

For the other type of epistemology, the starting point of knowing are not discrete entities but relational wholes. For this epistemology, the objects of knowledge exist only in relation to something else. In the process of knowing, the knower takes a particular perspective of the objects of knowledge rather than examines them 'objectively'. Examples of the approaches to knowledge that can be subsumed under this description are phenomenology, interactionism and constructivism. Dialogism, too, belongs to this type of epistemology.

Those who pertain to dialogism, attempt to dissociate themselves from the former type of epistemology, i.e., from monologism. Dialogism as an epistemology is concerned with the knowledge of social objects (rather than of natural objects) (Bakhtin 1979/1986). Such knowledge, or better understanding (to use Bakhtin's preferred term), is fundamentally reflexive. Understanding presupposes an active involvement of the self- and other-aware human subjects. For Bakhtin, all understanding is dialogical in nature (Vološinov/Bakhtin 1973:102).

Objects of knowledge in dialogical epistemology are conceived as relational wholes, like figure and ground. Consider, for example, the objects of knowledge such as individual words, communicative actions or language as a system of signs. Vološinov/Bakhtin (1973) never conceive of individual words as analytical units on their own. Rather, individual words are parts of relational wholes, they are two-sided acts. Words are both the speaker's and the listener's words and they bridge the distance between the two interactants: "If one end of the bridge depends on me, then the other depends on my addressee" (Vološinov/Bakhtin 1973:86). Similarly, any communicative action, for example a gesture or an utterance, is always an action constructed jointly by the involved communicative participants. One participant starts the action but it is the other who completes it by giving it a particular meaning (Mead 1934). This implies that in order to co-construct meanings, the two interlocutors must be self-other conscious: they must be able to take, at least partially, the perspective of each other. Finally, a dialogical point of view conceives of language as a system that is maintained and continuously renewed through individuals' speech. As Humboldt (1836/1971) argued, language is a living body, an *ener-*

geia that must not be treated, under any circumstances, as a dead plant. A language that nobody uses is a dead language, while living languages unceasingly develop and change in the process of social interaction. Therefore, all these three examples, i.e., individual words, communicative actions and language as a system of signs, point to the mutual interdependence between two complements belonging to the relational whole in question.

In contrast to dialogism, monologism as an epistemology of language is characterized by the search for ultimate invariants, i.e. for the immutable and timeless elements of knowledge. For example, since the seventeenth century until today language has been viewed, within monologism, as a system of signs that can be disembodied into its elements (Linell & Marková 1993). Each element can be microscopically examined on its own, and only subsequently in relation to other such elements.

There is, though, more to dialogism than reflexivity (self-other consciousness) and treating the objects of knowledge as relational wholes. In presupposing that the objects of knowledge are relational wholes, dialogism is a way of thinking and communicating. As Rommetveit (1990) maintains, it is not a matter of mere choice for a researcher to study or to explain human cognition and communication either from a dialogical or from a monological point of view. The researcher is a member of a particular cultural community in which either dialogism or monologism is embedded. Thus, in addition to different sets of explicit statements about language and communication, both dialogism and monologism rest on distinct webs of implicit, often unacknowledged or only partially reflected upon, presuppositions. Rommetveit calls these presuppositions 'pre-scientific'. They shape the individual's thoughts and pervade his or her scientific concepts (Rommetveit 1990:84). Dialogism and monologism are two different paradigms (Marková 1982) and one cannot, by one's own choice and by a temporary scientific conviction, switch from thinking in one to thinking in the other paradigm.

The explicit claim that dialogism is an epistemology of human sciences comes from Bakhtin (1979/1986). He maintained that exact sciences are concerned with the knowledge of things. Such knowledge is monological because human subjects cognize natural things, i.e., non-cognizing objects. In contrast, any knowledge that involves cognizing people and their products, e.g. texts, is based on understanding and interpretation. It is dialogical in the sense that in the process of knowledge human subjects reflexively cognize other human subjects and their products (Bakhtin 1979/1986:161). Vološinov/Bakhtin (1973:95) understood 'dialogue' very broadly. For them it meant 'not only direct, face-to-face, vocalized verbal communication between persons, but also

verbal communication of any type whatsoever'. Dialogism as an epistemology is explicitly based on language and for Bakhtin, all human social sciences, for example psychology, literature and anthropology, made sense only in terms of dialogue. It was his view that all human sciences are based on communication and on understanding of what is being communicated.

Dialogism was a subject of study of the religiously orientated Neo-Kantian philosophers who presumably coined the term 'dialogism' (Rosenzweig 1921; Marková 1994). The Neo-Kantians absorbed many of Hegel's ideas and particularly those of self-consciousness. According to this conception of self-consciousness, the individual acquires both his or her own self-concept simultaneously with the concept of the other person, that is, through the process of mutual acknowledgment (or recognition) of one individual by the other. The Neo-Kantians were concerned with the 'dialogical principle' involved in the relationship between the 'I and Thou' that is established and maintained through speech and communication. Having had direct contacts with the Marburg school of Neo-Kantians, it is likely that Bakhtin adopted the term 'dialogism' from them. He actually used this term (although Holquist denies that; cf. Holquist 1990:15) when referring to human thinking or to Dostojevsky (e.g., Bakhtin 1979, the Russian edition, p. 316; also p. 336; the term was also used in the English translation of Bakhtin, e.g., p. 119).

Although these two epistemologies, the one based on discrete entities and the one based on relational wholes, both originated in ancient Greek philosophy, they have never held equally prestigious positions in European thought. It is the former approach, the one based on the objects of knowledge as discrete entities, that has always been dominant in the European science and philosophy. It appears that this approach intuitively appeals to common sense, at least in European thought. In the ancient Greek science, physical elements were thought to be the ultimate constituents of material objects. Greek axiomatic geometric reasoning, categorical thinking and the Aristotelian logic of true and false propositions, were all based on particles, elements, categories or discrete entities (Lloyd 1966). Constructing knowledge of the world progressively from discrete entities appears to provide the knower with clarity and with certainty of being correct at each stage of the process of knowing.

In contrast, those epistemologies that are based on relational wholes, are more difficult to comprehend. How should the individual, socialized into the culture that implicitly conceives of discrete elements as the constituents of knowledge and that socializes the child into binary computing functions, comprehend relational concepts such as subject/object, structure/process, statics/dynamics, internal/external, and so on? Moreover, such concepts usually

come from humanities, literature, philosophy and arts rather than from hard sciences (although there are exceptions, e.g., the theory of relativity), and there have not been enough attempts to make these concepts clear, and therefore workable, for scientific purposes. As a result, their meaning remains obscure to many interested readers. Therefore, the epistemologies using such concepts appear to be equally obscure.

Historically, it is meaningful to distinguish between two stages in which dialogism as an epistemology has been established. In the first stage, dialogical ideas emerged as particular insights, conceptions or views about language, but no attempts were made to formulate them systematically. Leaving out of this discussion ancient Greek philosophy, where, indeed, at least in Europe, dialogical ideas seem to have originated, one can start with the ideas of modern philosophers such as Vico, Herder and Humboldt.

2. Historical background of the concept of statics/dynamics in language

2.1. *Descartes and Vico*

Since the time of René Descartes and of his younger contemporary Giambattista Vico, one can distinguish, quite clearly, between two main approaches in the study of language, one leading to the concept of statics, i.e., synchrony, and the other to dynamics, i.e., diachrony. The first approach can be described as a universalistic-ahistorical and the second as a cultural-historical. From the seventeenth century until today, the former approach has been associated with rationality and scientific rigor. The latter approach has emphasized the role of poetry, of different historical epochs, of culture, of *Völkerpsychologie* and of an emotional expression in the origin and evolution of language.

Descartes was not concerned with the study of language as such but he expressed his views in correspondence. Language, to him, was a matter of scientific interest only to the extent that it could be subjected to rational thought and to the analysis using mathematical methods. For Descartes, there were only two things that could be learned about language: the signification of words and the grammar. The construction of a universal language was for him a question of finding suitable ways of arranging thoughts in clear and simple units, in the same manner as numbers in mathematics (Descartes to Mersenne, 20 November 1629). Several attempts were made at the time to establish such a universal language. Amongst these attempts, the Port-Royal *Grammaire générale et rai-*

sonnée, published in Paris in 1660, is best known. Descartes acknowledged the effect that culture has on people (cf. Jahoda 1992), but it was only in the context of his general observations about life and not in the context of science. For Descartes, historical studies had nothing to do with rationality and with the search after truth. He expressed his views on this subject most clearly in his *Discourse of the Method* (1637/1911, I, p. 84) when he compared historical study with travel. He maintained that while it is good to know a little of the traditions of past centuries, just like with traveling, one must not exaggerate such endeavors. When one travels too much, whether in other countries or in history, one may become a stranger in one's own country or in one's own time. Descartes' search after truth led him to reject not only the study of history but also of all other 'simple forms of knowledge' such as languages, geography and all other subjects that, to his mind, could be acquired through experience rather than through rational thought (*ibid.*, p. 309). Rational thought can be based only on clear and distinct ideas obtained through intuition and deduction.

Giambatista Vico rebuffed Cartesian a-historic approach and, in particular, his notion of clear and distinct ideas as the ultimate constituents of knowledge. He argued that just as the light of lamp at night illuminates an object but hides what surrounds it, so the mind, perceiving clearly and distinctly the object in question, loses sight of what is in its shadow. For Vico, mathematical knowledge was irrelevant to the study of human language. Instead, in *New Science*, Vico (1744/1968) presented a picture of language as originating from historical, social and cultural processes. In contrast to his contemporary Condillac, Vico did not view language as a product of individuals who had agreed on a common code in order to communicate. Rather, he argued, people are born into communication. In early historical stages, primitive people did not communicate by words. Speech was born out of mute gestures as sign language (*ibid.*, 401) and of gestures that had some relations to the ideas people wanted to express. Later in history, such 'mute acts' became words. The first language, according to Vico, was poetical and was used by theological poets. He maintained that the first language was not reflexive because, for example, it did not express irony. Irony must be based on the ability to reflect. One must be conscious of one's own ideas and he or she must be able to take the perspective of the other person. Irony "is fashioned of falsehood by dint of a reflection which wears the most of truth" (*ibid.*, 408).

Very much ahead of his time, Vico discarded the distinction between literal meanings of words and metaphors. He argued that people in primitive historical stages used metaphors naturally as part of their thinking; what we call today 'literal meanings', in past were metaphors. Vico discussed the use of

metaphor in great detail, pointing out that a large part of metaphors in all languages was related to the human body, senses and passions. He viewed metaphors as a highly creative and imaginative feature of early peoples' effort to understand their world (*ibid.*, 405). Berlin (1976:46-7) maintained that his deep insight into the questions relating to the intellectual world of so called literal speech and of the world of metaphors, was one of Vico's most revolutionary discoveries.

Clearly, the focus on the historical study of language has brought into attention the question of self-consciousness. In his *New Science*, Vico drew attention to the importance of looking at the previous historical stages reflexively, through the eyes of peoples who belonged to those epochs and not through one's own eyes. Viewing a phenomenon from a historical point of view instigates one to acknowledge the differences between various perspectives: for example, between one's own perspective and the perspectives of other historical periods and cultures. Vico maintained that in order to discover during his twenty years of study the way in which 'human thinking arose in the gentile world', he had to learn to decenter. From his own present world of refined human natures he had to descend to the world of savages and proceed from their own metaphysics in order to understand how that metaphysics has led to the present 'gentile world'. Such a projection of the self into the beginning of the humanity is very difficult (*ibid.*, 340).

The idea, that verbal language originates from gestures, later reappeared in Wundt and in Mead. Wundt (1916) turned his attention to the linguistic and expressive analysis of dialogue, to gesture-language in primitive people and in the 'deaf and dumb'. For him, the origin of human language was to be found in the development of human gesture and, particularly, in its expressive, imitative and pantomimic functions. Mead (1934), in his turn, building on Wundt's work, also studied gesture (a non-significant gesture) as a basis of symbolic conversation (a significant gesture). That is to say, Mead studied how communication that in its origin is social but not necessarily conscious becomes, through conversation of gestures, a self- and other-conscious process.

2.2. *Herder and Humboldt*

The study of the historical development of language in the eighteenth century formed a counterpart to the Cartesian, and to that extent to the Kantian, epistemology. Much of this emphasis on cultural-historical development of language was based on a mixture of theories and speculation, complemented by selected

examples of observations, of colorful, often poetic images and metaphors, and of folk traditions.

Hamann, one of the largely forgotten figures of German expressivism, maintained that language was constitutive of cognition. In contrast to the Cartesians, he argued that human knowledge is based on senses rather than on reason. Although it still remains unclear to what extent Hamann was influenced by Vico (cf. Berlin 1976:76n; Brown 1967:32), his ideas are remarkably similar to those of Vico. Hamann argued that there is an underlying similarity between all languages due to an underlying human nature. Just like Vico, he emphasized the role of poetry and of *Völkerpsychologie*.

Herder was Hamann's student and his historical approach, again, was very similar to that of Vico. Herder (1877-1913) studied primitive cultures and their expression of *Volkgeist*, e.g., in poetry and myths. He argued that in order to appreciate other cultures and their traditions properly, one must attempt to take their own perspective and their own point of view. He appreciated that it is an enormous task to empathize with other nations and with other cultures. It is difficult enough to empathize with a single individual and to understand his or her feelings and actions. Herder argued that in order to 'feel oneself into everything' (cf. Marková 1982) that concerns other nations, one must have an ability to picture their ways of life, habits, desires, characteristics of their environment and so on. Such a reflexive ability, for Herder, was particularly important with respect to language. Language must be studied as a historical creation. It expresses the collective experience of the nation and it mirrors the nation's actions, history and emotions. The eventual outcome of this process is self-consciousness, i.e., the ability to look at the self through the eyes of others. For these reasons, the study of the self and of language are intimately interrelated.

Humboldt (1767-1835), similarly, emphasized historicity and the processes of change in the study of language. In contrast to Hamann and Herder, Humboldt was able to support his claims by empirical results based on the languages he studied in detail, such as Kawi, Malayan languages and Sanskrit. He carried out systematic linguistic studies and was one of the founders of comparative linguistics. He argued that language arose instinctively from the collectivity of people. In contrast to Harris (1751/1968) and Condillac, Humboldt's (1836/1971) view was that language did not arise from any sort of social pressure. It was an inner need of people to communicate that had led to the development of language. People are reflexive animals and they express their emotions in songs and poetry. Language is a living organism, it is never a finished product.

In conclusion, in the work of Hamann, Herder and Humboldt, the notions of 'statics' and 'dynamics' in language were interdependent: there could

be no statics without dynamics. Language was viewed as a historically established and a relatively stable system of signs, yet, at the same time continually changing and developing through its use. However, although the notions of 'statics' and 'dynamics' were clearly intertwined in the work of the Humboldtians, the actual nature of that intertwining was yet to be determined.

2.3. *Synchrony/diachrony*

As already pointed out, it was only in the early part of the twentieth century, that the term 'dialogism' was coined and that suggestions about dialogical epistemology were made by Bakhtin (1979/1986). The concept of synchrony/diachrony was postulated approximately at the same time both by the Bakhtinians and by the linguists of the Prague Linguistic Circle (see below), independently of each other.

It appears that the concept of synchrony/diachrony was first elaborated by Mathesius (1911/1964), the founder of the Prague Linguistic Circle. Mathesius' paper "On the Potentiality of the Phenomena of Language" was presented on 6th February 1911 to the Royal Bohemian Learned Society. Mathesius pointed out that his ideas on the difference between static and dynamic (synchronistic and diachronistic) linguistic problems were "first clearly envisaged by the present writer when he was reading, during his university studies, T.G. Masaryk's remarks on linguistics" in 1887. To my mind there are two important ideas in Mathesius' paper. First, the notion of potentiality in language, and second, the difference between static and dynamic characteristics of language. The term 'potentiality' refers to static oscillation (as opposed to dynamic change), that is, to instability within various aspects of language at a given period of time. For example, there is an oscillation of speech amongst the individuals speaking a particular language; or there is an oscillation in the semantic characteristics of speech, words having semantic potentialities rather than strictly defined meanings. Mathesius defines linguistics as "a science whose task is to analyze, in a static [= synchronistic, J.V.] manner, the language materials used by a language community at a given time, and, in a dynamic [= diachronistic, J.V.] manner, its historical changes" (Mathesius 1911/1964:22).

Mathesius continued to say that linguists should examine the speech of individual speakers so that such studies can reveal "the full extent of the potentiality of the concerned language". He modestly pointed out that his theory of language potentiality was not entirely new and that some of the ideas presented in his paper were to be found, implicitly or explicitly, in the work of other lin-

guists. However, he did not refer to Saussure, which to me indicates that he did not know Saussure's work at that time. Wellek (1976), in a brief biography of Mathesius, points out that this important paper, when read by Mathesius in 1911 at the Royal Bohemian Learned Society, was totally ignored and not a single question was asked; although Mathesius' ideas were influential in the Prague Linguistic Circle, the paper itself remained unnoticed until 1964 when in was reprinted by Vachek.

When the Prague Linguistic Circle was established in 1926, Mathesius' concept of synchrony/diachrony was part of the Circle's overall philosophy. Saussure's *Course of General Linguistics* was published in 1915 and the Prague Circle's approach was critical of Saussure's strict separation of synchrony/diachrony, and of language (*langue*) from speech (*parole*). For Saussure, *langue* represented the scientific basis for the study of language and he insisted that it must be separated from those individual features of *parole* that are arbitrary, accessory and more or less incidental (Saussure, 1915/1959).

The Russian formalists, who came to Prague during the nineteen twenties, also held a dialogical perspective of synchrony/diachrony and were critical of Saussure's separation of synchrony and diachrony. As Tynjanov and Jakobson put it:

> The opposition between synchrony and diachrony was an opposition between the concept of system and the concept of evolution; thus it loses its importance in principle as soon as we recognize that every system necessarily exists as evolution, whereas, on the other hand, evolution is inescapably of a systemic nature. (Tynjanov & Jakobson 1928/1971:79)

Karcevskij (1929) viewed the dialogical nature of synchrony/diachrony in terms of a constant asymmetry between the meaning of the word as it appears in the dictionary and the way the speaker appropriates it in his or her speech. He argued that each speaker uses a particular word in a slightly different way at any time he or she speaks and thus destabilizes language and contributes to its change. Jakobson himself adopted Karcevskij's thesis arguing that 'the asymmetric structure of linguistic signs is the essential precondition of linguistic change' (Jakobson 1932:5).

Similarly, for Vološinov/Bakhtin (1973) the synchronic system was not a real entity at all. They argued that the concept of the system of language is a descriptive construct, useful for the analyst in order to cope with the multitude and complexity of his or her observations. It is a book-keeping system but no system exists apart from any real moment in historical time. For Vološinov/Bakhtin, the static nature of Saussure's synchronic model and its artificial

separation from the ceaselessly changing continuum of the creative flow of language, is nothing more but the revival of the Cartesian spirit in the area of linguistic investigation.

3. Complementarity

In the previous section I have been concerned with language both as a relatively static and a relatively dynamic phenomenon. As a relatively static phenomenon language forms an essential part of our social environment. As people are born into language, they accept it as their social reality. Once the child acquires language, he or she uses it largely habitually and without conscious monitoring. Thus he or she may be unaware how particular words he or she uses might affect other people's cognition and feelings. Once learned, language is taken for granted in the same way as, for example, cars, houses, physical environment, etc. Yet, language is also dynamic. Although word meanings are passed from generation to generation and used largely unconsciously, it is in situations of conflict and misunderstanding that they often come into awareness. It is then that the individual may reflect on their meanings, and on a discrepancy between, say, a dictionary meaning and the word's daily usage. In other words, one may become aware of words meanings through their actual use. At the same time, the use of meanings in particular situations is not constructed *in vacuo* and arbitrarily but in interdependence with dictionary meanings. They may be, of course, turned into irony or they can be used metaphorically. Depending on the context, genre and idiosyncratic features of communication, only parts of dictionary meanings might be relevant in particular situations. It is because human beings are self-conscious and able to take perspectives of others that they can use irony, metaphor or partial meanings. Dictionary meanings, therefore, obtain their actual meanings through concrete use. That is to say, statics in meanings is understood in terms of dynamics and *vice versa*: they are in an interactive relationship. Yet the question that remains to be answered is: What exactly does it mean to say that two phenomena interact with each other? This is by no means simple to find an answer. The concept of interaction implies different issues in monological and in dialogical epistemologies as we now shall see.

3.1. *Interaction between two phenomena in a monological epistemology*

I have already pointed out that a monological epistemology conceives of the objects of knowledge in terms of discrete entities and therefore, it presupposes

that there is no *a priori* conceptual interdependence amongst them. Fisher's statistical notion of interaction is prototypical of the mainstream scientific thinking in natural sciences and it has invaded social sciences as well. This notion of interaction is based on the assumption that two orthogonal, i.e., independent entities or variables, say, A and B, produce particular effects when operating together. Such effects cannot be conceived in terms of the sum of isolated effects but only in terms of their 'interaction'.

The flow of influence is usually conceived as a two-way flow, i.e., from A to B and from B to A. The traditional picture of 'interaction' would be something like this (cf. Figure 1):

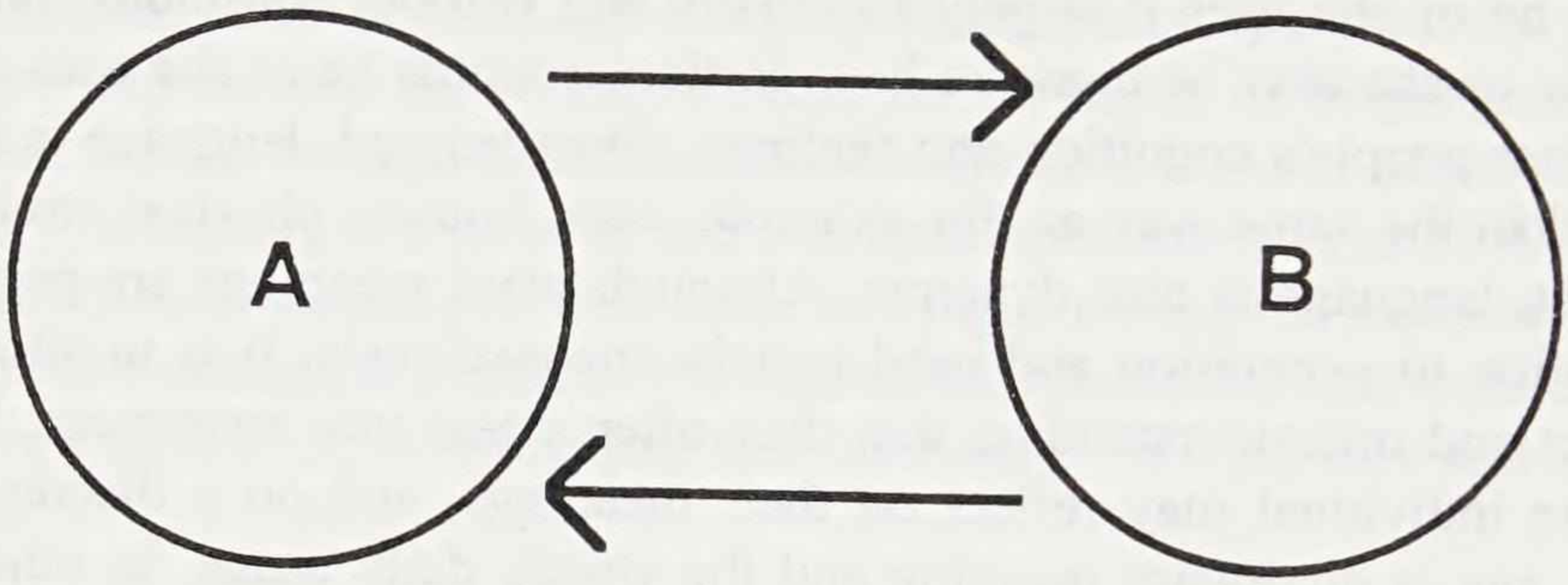


Figure 1: *Inter-action between A and B (dualistic).*

This, however, is a very simple model and if we also want to capture, say, sequential social interactions, we need a more complex model. For example, if we want to capture the time scale and the strength of interaction between A and B, we might refer to Jones & Gerard's (1967) model. These researchers presented schemata of four types of sequential social interactions, namely, pseudo-contingency, asymmetrical contingency, reactive contingency and mutual contingency. In Figure 2, solid arrows indicate the predominant type of influence and the dotted arrows show a minor influence. Thus, each of these four contingencies represents a different combination of dominant and weak influences. Their model assumes all other events that might influence interaction to be constant (Figure 2). The authors developed this model to represent interaction between two individuals although the model could be applied to other interacting entities. For example, if synchrony and diachrony are treated as two independent concepts referring to two separate phenomena, then the model is applicable to interaction between such phenomena. The model would not apply, though, if synchrony/diachrony is treated as a single concept as implied in the

work of Jakobson, Tynjanov, Karcevskij and Vološinov/Bakhtin. For these authors, interaction was conceptualized within synchrony/diachrony rather than between synchrony and diachrony.

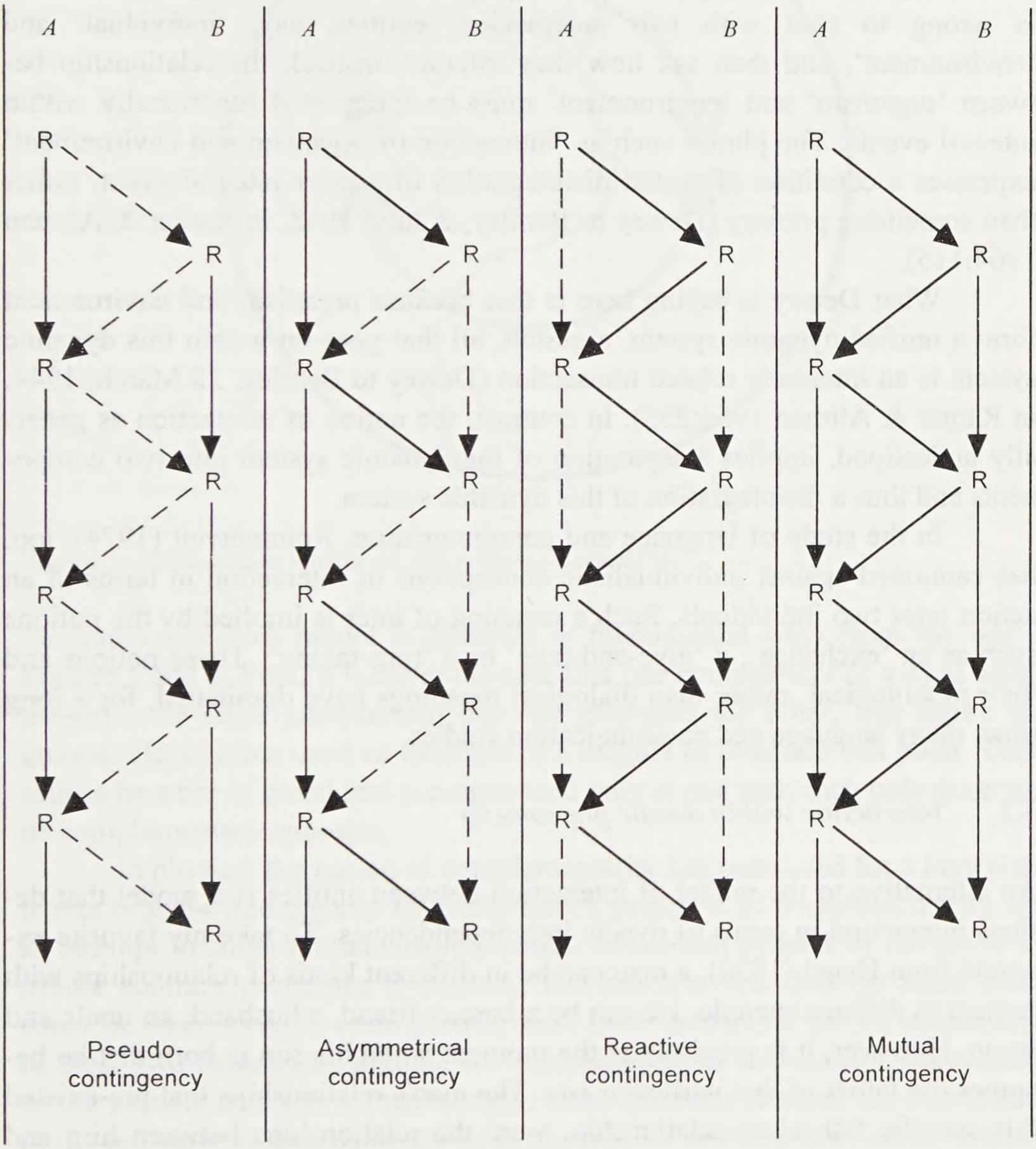


Figure 2: *Dyadic interaction: A conceptual framework.*

Some scholars have criticized the 'between-model' of interaction as individualistic or dualistic rather than mutualist or dialogical. Leudar (1991) re-

fers to Dewey who rejected the term 'interaction' as misleading. Dewey (Dewey to Bentley, 2 July, 1942, in Ratner & Altman 1964:115) argued that we should be guarded against misrepresentation of the term 'interaction' because "it is easily taken to imply two or more prior existences". Dewey argued that it is wrong to start with two independent entities, say, 'individual' and 'environment', and then ask how they interact. Instead, the relationship between 'organism' and 'environment' must be interpreted functionally within integral events. The phrase such as 'interaction of organism and environment' expresses a condition of partial disintegration of a prior integral event, rather than something primary (Dewey to Bentley, 2 July, 1942, in Ratner & Altman 1964:115).

What Dewey is saying here is that because organism and environment form a unified dynamic system, a gestalt, all that goes on within this dynamic system is an internally related transaction (Dewey to Bentley, 28 March, 1944, in Ratner & Altman 1964:235). In contrast, the notion of interaction as generally understood, implies a separation of the dynamic system into two components and thus a disintegration of this dynamic system.

In the study of language and communication, Rommetveit (1974), too, has cautioned against individualistic conceptions of interaction in terms of an action inter two individuals. Such a meaning of inter is implied by the notions such as an 'exchange', a 'give-and-take' or a 'turn-taking'. These notions and their monological, rather than dialogical meanings have dominated, for a long time, many language and communication studies.

3.2. *Interaction within dyadic phenomena*

An alternative to the model of interaction between entities is a model that defines interaction in terms of dyadic interdependencies. To take my favorite example from Hegel (1830), a man can be in different kinds of relationships with respect to different people. He can be a boss, a friend, a husband, an uncle and so on. However, it is precisely at the moment when his son is born that he becomes the father of that particular son. The man's relationships that pre-existed this specific father/son relationship, were the relationships between him and other people or between him and other things.

The father/son come into their existence together. It is a dyad that is the conceptual reality for dialogical epistemology. The dyad is a relational whole (Marková 1987) and the split between the two complements occurs precisely at the moment that they enter their dyadic relationship (cf. Figure 3).

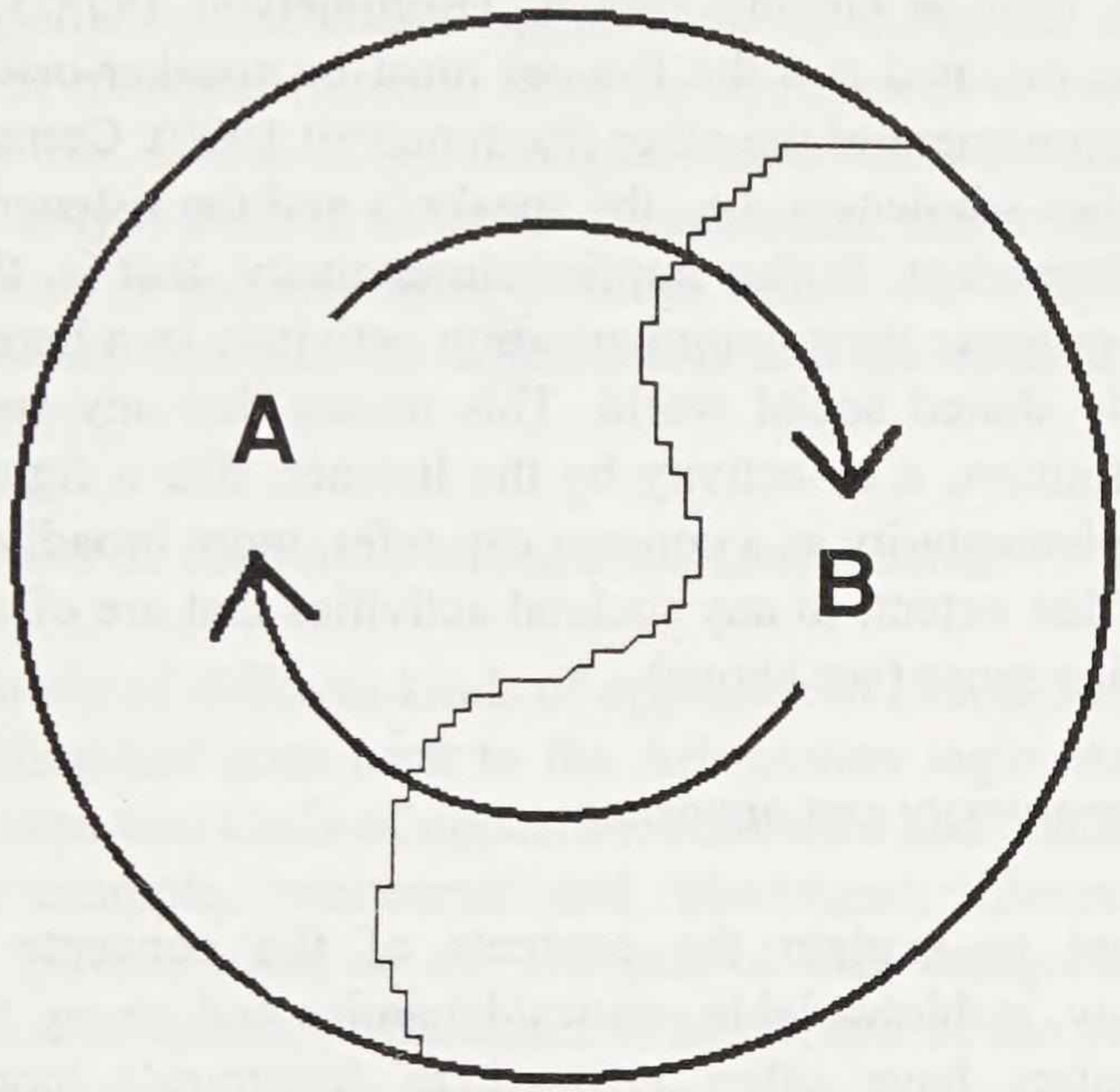


Figure 3: *Inter-action within an AB system (mutualist).*

To summarize, this model is different in fundamental ways from the one in Figures 1 and 2. First, it is never the case that one complement of a dyad would pre-exist the other complement but one generates the other, like figure and ground. Hegel often used an example of a magnet to illustrate this point. There cannot be a bar of metal that is magnetized only at one end: each pole generates its complementary opposite.

In physics, the notion of complementarity has been used for a long time. It was brought into physics by Bohr. Bohr's principle of complementarity was an attempt to solve the untenable position of modern physics of having to attribute contrary properties to objects. The problem was that the same entity could be both wave-like and particle-like. Bohr reconciled the incompatibility of these two theories by arguing for complementarity and not for contrariness of the particle and wave. Interestingly, although Bohr stressed the importance of the principle of complementarity in physics, he was emphatic about its fruitfulness in other scientific domains, especially in biology and in psychology.

I consider the concept of complementarity to be fundamental in dialogical epistemology. Rommetveit (1974) characterized complementarity as a mutual dialogical engagement of the participants. According to the principle of complementarity, i.e., "a reciprocally cognized asymmetry between I and you

with respect to what is already known" (Rommetveit 1974:37), the speaker must be listener-oriented and the listener must be speaker-oriented. They are attuned to the attunement of the other (Rommetveit 1990). Complementarity, in this sense, implies wholeness, i.e., the speaker's and the listener's activities are mutually interdependent. It also implies simultaneity, that is, the speaker and the listener co-ordinate their communication activities in a here-and now, i.e., in a temporarily shared social world. This means that any speaker's activity implies, by definition, a co-activity by the listener, like a figure and ground. However, complementarity as a concept can refer, more broadly, to any human activity and to that extent, to any societal activities that are of a dialogical nature in Bakhtinian sense (see above).

3.3. *Complementarity and opposites*

In their attempt to explain the contents of the concepts such as synchrony/diachrony, stable/variable, statics/dynamics and so on, the dialogically orientated scholars have often referred to 'contrary', 'contradictory' or 'opposite' entities, between which 'strifes', 'battles' or 'confrontations' take place. For example, Bakhtin (1981:276, 314) spoke about one point of view opposing the other, and creating a dialogical tension. Veltruský (1940/1977) viewed the static units of meaning as opposing the resistance of the contextual pressure. For Mukařovský (1940/77:46-7), the "semantic statics and dynamics are two forces mutually opposed but nevertheless intrinsically linked, and together, they create the basic dialectic antinomy of every semantic process". Karcevskij viewed dialogue as a duel in which the interlocutors impose on each other their own will, emotions and thoughts: "L'attaque de l'un provoque une riposte de l'autre" (Karcevskij, 1931/64:209).

I argue that the very words used by dialogical scholars, such as 'opposites', 'contraries', 'antinomies', etc. have added much to confusion and to misunderstanding of the dialogical point of view by non-dialogical scholars. These terms, when used to explain or to describe dialogical (or dialectic) concepts and within-interactions, invite images of conflicts between discrete entities rather than complementary relationships within a dyad. Both in ordinary language and in everyday life the terms such as 'battle fields', 'resistance to pressure' and 'confrontation' evoke pictures of two separate and bounded entities opposing each other, be it armies, dissident movements or political opponents, and thus fitting into the above model in Figure 1. They have a confusing and misleading effect on the individual socialized into such a culture in which the dominant epistemology is based on discrete entities.

The important point about 'oppositions' in dialogical epistemology is that they must be treated differently from the oppositions in ordinary language and in everyday life. That is to say, dialogical oppositions are complements that are meaningful only if defined in terms of each other, rather than as two opposite forces separate from each other. In other words, one must distinguish between the opposites that refer to differentness and the opposites that refer to complementarity.

3.4. *Oppositions as contraries and as complementarities*

Interest in the study of different kinds of opposites in European philosophy has been long-standing and goes back to the Aristotelian logic. Aristotle made a distinction between two kinds of opposites, contraries and contradictions. Contraries are, for example, 'whiteness' and 'blackness', 'illness' and 'health', 'richness' and 'poverty', and so on. The pair of such categories does not exhaust the universe of colors, of the states of health and of the states of material possessions, respectively. Such pairs are contraries in sense that between the extremes, e.g., black and white, there could be other colors, e.g., grey, red, green, etc. Similarly, between health and illness there can be states of not being positively healthy nor positively ill—grey states of in-between, described, for example, by Herzlich (1973) in her exploration of the representations of health and illness in the Parisians. In contrast, the other kind of opposites, contradictions, are mutually exhaustive. They include categories such as 'white' and 'non-white'; 'health' and 'un-health' and so on. In other words, there can be no other colors between white and non-white; and between the states of 'health' and 'un-health'. Aristotle's interest in different kinds of logical opposites was to classify them and to examine mutual compatibility and incompatibility of different categories of entities. However, Aristotle was not concerned with interactions between or within contrary entities.

Aristotle's typological perspective of opposites has been embodied in the laws of thought, for example, 'a thing cannot both be something and not be that thing at the same time' (the law of non-contradiction) and 'a thing either has a property or does not have that property, and there is no third possibility' (the law of excluded middle). As a result, this perspective has become an implicit feature of European thought, logic, language and common sense. Differentness as a fundamental feature of opposites has become a social representation (Moscovici 1984) both in philosophy and in everyday life. In everyday life, opposite categories separate the good things from bad things; the youngs from the olds; medicines from poisons; and so on.

Aristotelian perspective of opposites as separate categories was not questioned until the nineteenth century. However, the *Zeitgeist* of evolutionary and developmental thinking has brought the question of opposites into focus. Hegel (1830), in the early nineteenth century took interest in contradictions (not in contraries). For him, all living phenomena involve internal tension of contradictory forces. Contradiction is "the very moving principle of the world and it is ridiculous to say that contradiction is unthinkable" (Hegel 1830:223). Such claims, however, were seen by many as a matter of intellectual perversity. For example, William James (1890) ridiculed Hegel's dialectics by identifying it with a pantomime where everything is turned into its opposite, old women becoming young men and people jumping at each other's throat.

In my view, the source of such misunderstandings of Hegel's 'contradiction' was due to the fact that it was generally conceptualized in terms of Aristotelian differentness rather than in terms of complementarity. While Aristotle was concerned with contradictory categories, Hegel was concerned with contradictions within dyadic interactions. For example if we consider 'healthy' and 'unhealthy' as two separate physical states, then, clearly, to be in one of these states excludes the possibility of being in the other. For example, one may wish to produce statistics comparing a number of healthy and unhealthy people in the UK and in France. Using particular criteria that define categories of 'healthy' and 'unhealthy', each citizen in the UK and in France can be slotted into the one or the other category. Such an exercise can provide information about a particular state of affairs at a particular time. However, if one is interested in the study of change in terms of healthy and unhealthy and *vice versa*, say, in the UK, the meanings of 'healthy' and 'unhealthy' should be viewed as mutually co-defined. What is considered as healthy and unhealthy will be determined with respect to particular medical knowledge, socio-cultural conditions, etc. Being part of a more complex societal system, the components of the concept of healthy/unhealthy are interdependent with respect to each other and their meanings will change together. They are defined with respect to each other like figure and ground, and as inseparable parts of a relational whole. The meaning of one component, i.e., 'healthy', generates the meaning of its complementary opposite, i.e., 'unhealthy'. It is in this sense that contradictions (complements) are inseparable.

Amongst those who warned about the misleading meaning of the term 'opposition', was the already mentioned Sergej Karcevskij, one of the less well known members of the Prague Linguistic Circle. Karcevskij studied in Geneva and was a pupil of Saussure. He (1929) maintained that pure and single opposition necessarily leads to chaos. True differentiation as a feature of dialogicity

is based both on a simultaneous resemblance and difference. Karcevskij (1929:51) was emphatic that we have to be careful about the use of the terms such as 'opposition' because it could lead to absurdities. He used, instead, the term of 'asymmetric dualism', by which he meant interrelated entities in opposition to each other. He maintained (Karcevskij 1929:51) that it has become common to say that "linguistic values exist only by virtue of their opposition to one another". However, so stated, this idea leads to an absurdity: a tree is a tree because it is neither a house nor a horse nor a river... Opposition pure and simple necessarily leads to chaos and cannot serve as the basis of a system. True differentiation presupposes a simultaneous resemblance and difference. Concepts form a series founded on a common element and are opposed only within this series (*ibid*., p.51).

In conclusion, although Hegel's conception of contradictions influenced the dialogical scholars, others, for example, Durkheim, Saussure and Freud, continued using the concept of opposition more in an Aristotelian than in a Hegelian sense, i.e., as referring to separate, rather than to inseparable entities. However, while dialogically orientated scholars have adopted a dialogical concept of oppositions, i.e., oppositions as complements, they have continued using ambiguous terminology thus invoking images fitting into a monological epistemology.

3.5. *Complementarity and different kinds of interdependencies*

Although complementarity always presupposes interdependencies of the entities involved and is characterized by wholeness, within-interaction and simultaneity, one must distinguish between different kinds of conceptual interdependencies. Certain kinds of interdependencies are of the 'same order', e.g., subject/object, synchrony/diachrony, self/other, and so on. For example, the joint construction of elementary contributions in dialogue is based on the 'same order' complementarity and it refers to sense-making activities in interaction. Sense-making activities cannot be divided-up between individual contributors but both contributors are jointly responsible for their construction (Collins & Marková 1995; Linell & Marková 1993). The term 'the joint construction' refers not only to activities leading to intersubjective understanding and shared meaning but also to those activities that lead to misunderstanding or non-understanding (Linell 1995; Foppa 1995).

Another kind of complementary interdependence is embeddedness, i.e. one entity is embedded in a ' higher-order' entity, such as an utterance/activity-type or a phoneme/activity-type. For example, the listener's identification of

phonemes, e.g., *b* versus *p* is contingent upon their embeddedness in a communicative activity ('come in my lab' versus 'come in my lap') (Rommetveit, personal communication). Or, sequentiality refers to the fact that each contribution obtains its meaning from its position in interaction. For example, admission of guilt in a court trial is an activity that must come as a response to the judge's question that is asked in a particular way and at an appropriate stage of the trial. Linell (1991) and Linell *et al*. (1993) have shown how this is done and they have drawn attention to different ways in which this collaborative process may be carried out. The context restricts what each participant may say at a given place in dialogue. There is a complementarity (embeddedness) between the contribution and its position in the sequence, with each contribution being context-shaped and context-renewing (Heritage, 1984; Linell & Marková 1993).

Act-activity dependence refers to complementarity (embeddedness) between the dialogical contribution and the activity type (or genre) in which that contribution is embedded. An example of Rommetveit's (1990:97) hero Mr. Smith will clarify this point. When Mr. Smith is mowing the lawn on a Saturday morning, this action of his can be interpreted as co-constituted as a particular activity-type (Levinson 1979). It is likely that his wife, Mrs. Smith, knows the dictionary meaning of 'working', i.e., being involved in 'the action of WORK'. Mr. Smith is a fireman and on that Saturday morning Mrs. Smith has two telephone calls leading to two different scenarios, or activity types. On the first occasion, the caller inquired whether Mr. Smith is in bed and Mrs. Smith answers: "No, Mr. Smith is working this morning, he is mowing the lawn". On the second occasion the caller would like Mr. Smith to go fishing with him and he inquired whether Mr. Smith is on duty today: "No, Mr. Smith is not working this morning, he is mowing the lawn".

In this example, the meaning of 'working' in the first case was in a complementary relationship with 'not being in bed, being active, doing something useful in the house'. In the second case, 'working' was in a complementary relationship with 'not doing the duty of a fireman'. In each of the two cases the activity type was different. In each case, the conversation about working would continue within a different complementary relationship until the topic were to be changed or a conversation closed.

What remains common to all kinds of complementarity, though, is that one's understanding of a particular communicative event can be complete and conceptually coherent only if that communicative event is viewed in terms of interdependencies with its conceptual complement.

4. Conclusion

In this chapter I have tried to do several things:

1. I have pointed out that there are two fundamentally different types of epistemology. Epistemologies of one type first seek knowledge of discrete entities and only then of the ways in which these entities are related. In contrast, the second type of epistemologies seeks knowledge of interdependent entities.
2. Dialogism belongs to the latter type of epistemologies. It is based on language and it concerns reflexive understanding and interpretation of the social and human phenomena.
3. From the historical point of view, it makes sense to distinguish between dialogical ideas that have been emerging in social science since the seventeenth century, and the epistemology of dialogism. Dialogism as an explicit epistemology has been formulated in the nineteen twenties and thirties, by dialogical scholars such as Bakhtin, and by the scholars of the Prague Linguistic Circle. I have chosen the concepts synchrony, diachrony and synchrony/diachrony to draw attention, selectively, to some issues distinguishing monological and dialogical epistemologies, and to ideas underlying the notion of complementary relations.
4. The fundamental concept of dialogical epistemology is complementarity. Complementarity refers to a conceptual interdependency between the entities that are part of a relational whole, e.g., subject/object, inner/outer, synchrony/diachrony and so on. In addition to this kind of interdependency involving phenomena of the 'same order', another kind of interdependency is embeddedness, e.g., utterance/genre. Complementarity must be distinguished from differentness.
5. Complementarity is the principle of interaction in face-to-face dialogue. Each dialogical contribution has several characteristics, each of them manifesting complementary relations. These characteristics involve: the joint construct-ion; sequentiality; and act-activity dependence.
6. While reflexivity is fundamental to any conceptual thought and therefore, to any epistemology, dialogical epistemology, in addition, is reflexive in several ways. First, dialogical epistemology is concerned with a reflexive understanding of the self-other phenomena. Second, dialogical epistemology involves self-reflexivity, this being a product of self-other reflexivity. Thirdly, dialogical epistemology is concerned with reflexivity between text and its interpreter. These multiple reflexivities are concerned with language

as a totality of human life. It remains a challenge for a psychologist working in the field of language and communication to capture the multitude of such different levels of consciousness that cannot be reduced, under any circumstances, to 'verbal behavior'.

References

Bakhtin, M.M. 1979/1986. *Estetika slovesnovo tvorchestva.* Moskva: Bocharov. Trans. by V. W. McGee as *Speech Genres and Other Late Essays* (ed. by C. Emerson & M Holquist). Austin: University of Texas Press, 1986.

Berlin, I. 1976. *Vico and Herder. Two Studies in the History of Ideas*. London: The Hogarth Press.

Brown, R.L. 1967. *Wilhelm von Humboldt's Conception of Linguistic Relativity*. The Haque & Paris: Mouton.

Collins, S. & I. Marková. 1995. "Complementarity in the Construction of a Problematic Utterance in Conversation". In I. Marková, C.F. Graumann & K. Foppa (eds), *Mutualities in Dialogue*. Cambridge: Cambridge University Press, 238-263.

Descartes, R. 1629/1970. "Letter to Mersenne, 20 November". In A. Kenny (trans. & ed.), *Descartes: Philosophical Letters*. Oxford: Clarendon Press, 1970, 22-23.

Descartes, R. 1637/1911. *Discourse on the Method of Rightly Conducting the Reason and Seeking for Truth in Sciences*. In E.S. Haldane & G.R.T. Ross (trs & eds), *The Philosophical Works of Descartes*, Vol. I. London & New York: Cambridge University Press, 1911, 79-130.

Foppa, K. 1995. "On Mutual Understanding and Agreement in Dialogues". In I. Marková, C.F. Graumann & K. Foppa (eds), *Mutualities in Dialogue*. Cambridge: Cambridge University Press, 149-175.

Harris, J. 1751/1968. *Hermes: or, a Philosophical Inquiry Concerning Language and Universal Grammar*. London: H. Woodfall. Reprinted in the series *English Linguistics*, no. 55, 1500-1800. Selected and edited by R.C. Alston. Menston, England: The Scholar Press, 1968.

Hegel, G.W.F. 1830. *The Encyclopedia of the Philosophical Sciences*. Part I: *The Science of Logic*. In W. Wallace (trans.), *The of Logic of Hegel*. London: Oxford University Press, 1873.

Herder, J.G. 1877-1913. *Sämtliche Werke*. Ed. by B. Suphon. Reprinted Hildesheim: George Olms, 1967.

Heritage, J. 1984. *Garfinkel and Ethnomethodology*. Cambridge: Polity Press.

Herzlich, C. 1973. *Health and Illness: A social psychological analysis*. London: Academic Press.

Holquist, M. 1990. *Dialogism: Bakhtin and his world*. London: Routledge.

Humboldt, W. von. 1836. *Linguistic Variability and Intellectual Development.* Trans. by G.C. Buck & F.A. Raven. Coral Gables: University of Miami Press, 1971.

Jahoda, G. 1992. *Crossroads Between Culture and Mind. Continuities and change in theories of human nature*. Hemel Hempstead: Harvester Wheatsheaf.

Jakobson, R. 1932/1971. "Zur Struktur des russischen Verbums". In Roman Jakobson *Selected Writings*, Vol. II. The Hague & Paris: Mouton, 3-15.

James, W. 1890. *The Principles of Psychology*. Vol. I. New York: Dover.

Jones, E. E., & H.B. Gerard. 1967. *Foundations of Social Psychology*. New York: Wiley.

Karcevskij, S. 1929. "Du dualisme asymetrique du sign linguistique". *Travaux du Cercle Linguistique de Prague* 1:33-38. Reprinted as "The Asymmetric Dualism of the Linguistic Sign". In F. Steiner (ed.), *The Prague School: Selected writings, 1919-1946*, Austin: University of Texas Press, 1982, 47-54.

Karcevskij, S. 1931/1964. "Sur la phonologie de la phrase". *Travaux du Cercle Linguistique de Prague* 4:188-227. Reprinted in J. Vachek (ed.), *A Prague School Reader in Linguistics*. Bloomington: Indiana University Press, 1964, 206-251.

Leudar, I. 1991. "Sociogenesis, Coordination and Mutualism". *Journal for the Theory of Social Behaviour* 21:197-220.

Levinson, S. 1979. "Activity Types and Language". *Linguistics* 17:365-399. Reprinted in P. Drew & J. Heritage (eds), *Talk at Work*. Cambridge: Cambridge University Press, 1992.

Linell, P. 1991. "Accommodation on Trial: Processes of communicative accommodation in courtroom interaction". In H. Giles, J. Coupland & N. Coupland (eds), *Contexts of Accommodation: Developments in applied sociolinguistics*. Cambridge: Cambridge University Press, 103-130.

Linell, P. 1995. "Troubles with Mutualities: Towards a dialogical theory of misunderstanding and miscommunication". In I. Marková, C.F. Graumann & K. Foppa (eds), *Mutualities in Dialogue*. Cambridge: Cambridge University Press, 176-213.

Linell, P., L. Alemyr & L. Jönsson. 1993. "Admission of Guilt as a Communicative Project in Judicial Settings". *Journal of Pragmatics* 19:153-76.

Linell, P. & I. Marková. 1993. "Acts in Discourse: From monological speech acts to dialogical inter-acts". *Journal for the Theory of Social Behaviour* 23:173-95.

Lloyd, G.E.R. 1966. *Polarity and Analogy. Two types of argument in early Greek thought*. Cambridge: Cambridge University Press.

Marková, I. 1982. *Paradigms, Thought, and Language*. Chichester & New York: Wiley.

Marková, I. 1987. "On the Interaction of Opposites in Psychological Processes". *Journal for the Theory of Social Behaviour* 17:279-299.

Marková, I. 1994. "Sociogenesis of Language: Perspectives on dialogism and on activity theory". In W. De Graaf & R. Maier (eds), *Sociogenesis Reexamined*. New York & Berlin: Springer-Verlag, 27-46.

Mathesius, V. 1911/1964. "O potenciálnosti jevů jazykových". Reprinted in J. Vachek (ed.), *A Prague School Reader in Linguistics*. Bloomington: Indiana University Press, 1-32.

Mead, G.H. 1934. *Mind, Self and Society*. Chicago: University of Chicago Press.

Moscovici, S. 1984. "The Phenomenon of Social Representations". In R.M. Farr & S. Moscovici (eds), *Social Representations*. Cambridge: Cambridge University Press, 3-69.

Mukařovský, J. 1940/1977. "Two Studies of Dialogue". In J. Mukařovský (1941) *Kapitoly z české poetiky*. Praha: Melantrich, 145-179.

Ratner, S. & J. Altman (eds). 1964. *John Dewey and Arthur F. Bentley. A philosophical correspondence, 1932-1951*. New Brunswick & New Jersey: Rutgers University Press.

Rommetveit, R. 1974. *On Message Structure: A framework for the study of language and communication*. New York: Wiley.

Rommetveit, R. 1990. "On Axiomatic Features of a Dialogical Approach to Language and Mind". In I. Marková & K. Foppa (eds), *The Dynamics of Dialogue*. New York & London: Harvester Wheatsheaf, 83-104.

Rosenzweig, F. 1921. *Stern der Erlösung*. Frankfurt: Kauffmann.

Saussure, F. de. 1915/1959. *Course in General Linguistics*. Glasgow: William Collins.

Tynjanov, J. & R. Jakobson. 1928. "Problems in the Study of Literature and Language". In Roman Jakobson, *Selected Writings*. Vol. III. The Hague: Mouton, 1981, 3-6.

Veltruský, J. 1940. "Výstavba významových kontextů". In B.Havránek & J. Mukařovský (eds), *Čtení o Jazyce a Poesii*, Prague. Reprinted as "Construction of Semantic Contexts". In L.Matejka & I.R.Titunik (eds), *Semiotics of Art*. Cambridge, Mass.: MIT Press, 1986, 134-144.

Vico, G. 1744/1968. *The New Science of Giambattista Vico*. Trans. by T.G. Bergin & M.H. Fisch. Ithaca, NY: Cornell University Press.

Vološinov, V.N. & M. Bakhtin. 1973. *Marxism and the Philosophy of Language*. Trans. by L. Matejka & I.R. Titunik. New York & London: Seminar Press.

Wellek, R. 1976. "Vilem Mathesius (1882-1945). Founder of the Prague Linguistic Circle". In L. Matejka (ed.), *Sound, Sign and Meaning* (Michigan Slavic Contributions, 6). Ann Arbor: Department of Slavic Languages and Literature, The University of Michigan, 6-14.

Wundt, W. 1916. *Elements of Folk Psychology*. London: Allen and Unwin.

Adverbial Theories of Consciousness

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Discussions of perception in recent American philosophy often contain expressions such as 'being aware here-ly', 'is appeared to redly', 'senses redly', 'senses rhomboidally', 'sensation of the of-a-red-triangle kind', 'senses a-pink-cube-ly'.*,[1] We owe this innovation in philosophical terminology to the so-called adverbial theory.[2] But, the adverbial theory of *what*? The answers usually given are: of appearing, of sensing, of sense-impressions, of sensation. But all these terms are suitable in this context only if understood as technical terms, of unclear sense and uncertain reference, not as they would be understood in common discourse. And the adverbial theory is precisely a theory of that which is supposed to require their introduction as technical terms and an explanation of how they should be understood. Therefore, it is not with a statement of the adverbial theory that we can begin a discussion of the adverbial theory. We must begin at the beginning, with the conceptual roots the theory must have in common discourse if it is to be intelligible.

I

If we speak as we do before our immersion in philosophy, we may say that it is a characteristic feature of perceiving (seeing, tactile feeling, hearing, smelling, tasting), of imagining, of thinking, perhaps of everything that is, or in some manner involves, what may conveniently be called consciousness, that one can perceive, imagine, think of, perhaps in general be conscious of, things that do not exist. That this is so in the case of imagination and thought is unequivocally supported by common discourse. In the case of perception, common discourse is not unequivocal. We may correctly say of the delirious drunk, about whom philosophers often write, that he sees a pink rat and of an ophthalmologist's pa-

tient that he sees stripes where there are none. But we may also say that the drunk only thinks he sees a pink rat and that the patient only thinks he sees stripes. Should we conclude from this that 'see' has at least two senses? *Pace* Austin, I believe that we should, though mainly for the sake of terminological convenience. What is important for our purposes here is that we recognize the distinction, not that we regard it as a distinction between senses. For it is only in that distinction in common discourse that some of the central terminological proposals of the philosophy of perception can be anchored. Indeed, we may also detect in common discourse a third sense of 'see', in which what one sees must not only exist but also be causally related in an appropriate way to oneself. (Not: to one's seeing, for in this third sense of 'see' the seeing would include, perhaps even be identical with, the causal relation.) And, possibly, a fourth sense may be detected: that, in addition to what one of the first three requires, the perceiver have some belief about the thing he sees; but the evidence for the existence of such a sense seems to consist merely in the fact that sincere first-person uses of 'see' presuppose, trivially, that the speaker, who is the perceiver, have such a belief; sincere other-person uses presuppose this, again trivially, regarding the speaker but not at all regarding the perceiver. Corresponding distinctions of senses can be made with respect to all perceptual verbs.

There is no genuine philosophical question, I believe, about which of these senses is the most common or the correct one. To appeal to a distinction Ryle (1953) made, but for a purpose of which he would have disapproved, that would be a question about usages, not uses, of perceptual verbs. What ought to be clear, however, is that the first sense, that in which what is perceived need not exist, is the one of primary epistemological interest. For only in that sense can we plausibly say that perception is the source of our knowledge of the existence of material things. In the second and third senses, we can determine that the perceptual verb is used correctly only if we can determine independently that what is said to be perceived exists. And, in the fourth sense, it is not the mere fact of one's belief that one can intelligibly regard as evidence for the existence of what one perceives or thinks one perceives; such a belief is precisely what requires, not what constitutes, evidential support (except in the irrelevant case in which it may serve as indirect, inductive evidence, e.g., if we know that someone usually does not make perceptual mistakes, his having a certain perceptual belief may count as evidence for its truth). But that all this is so is not relevant to our concerns in this paper. What is relevant is that the philosophy of perception begins with a question regarding the first sense of perceptual verbs: How can one perceive something that does not exist? (We may also begin by

asking: How can one perceive something as having characteristics it does not have? But if we do, we quickly see that our answer must wait upon the answer we would give to the question about perceiving things that do not exist.)

One answer to this question is that no special explanation is required, that sometimes we just do perceive things that do not exist, that we know that this is possible because it is actual. Of course, this answer faces immediate difficulties concerning the status of nonexistent things and the notion of existence, but they are difficulties we would need to face, because of the facts about imagination and thought, even if we steadfastly refused to speak of perceiving nonexistent things. I believe that these difficulties can be met, but of course will not attempt to do so here.[3] In any case, an important advantage of this answer to our question is that it is the natural one, the *prima facie* correct one, the one that seems phenomenologically obvious.

Another answer is that what is ordinarily described as a case of someone's perceiving something that does not exist is really a case of someone's perceiving (seeing, hearing, etc.) something else that does exist but is such that it is naturally confused with the former. This other thing is usually called a sense-datum and, in the central cases of visual and tactile perception, is described as a mere perceptual expanse that has precisely the sort of qualities we ordinarily say we perceive material things as having, e.g., colors and shapes. This is why, we would be told, it is natural to confuse a sense-datum with the front surface of a material thing, to confuse perceiving a sense-datum with perceiving a material thing.[4] And to reflect the fact that ordinarily we speak of perceiving material things, it may be proposed, *solely for the sake of terminological clarity*, that we use a technical term for our perception of sense-data, namely, the term 'sensing'. But if it is added that in the case of veridical perception the sense-datum, the perceptual expanse, which one senses is identical with the front surface of a material thing, an addition difficult to defend but essential I believe to any plausible sense-datum theory, then in that case one's sensing a sense-datum would be identical with one's perceiving (as directly and immediately as one senses the sense datum) a material thing, and the sense-datum theory would coincide with direct realism. Of course, this answer also faces many difficulties which I cannot consider here.[5]

A third answer is that what is ordinarily described as a case of someone's perceiving something that does not exist is really not a case of perception, or of any other kind of consciousness, of an object at all, whether of the object we ordinarily take it to have (a material thing) or of any other object (e.g., a sense-datum). It is really a case of someone's being in a state of consciousness that has a certain nonrelational (whether sortal or qualitative) characteristic.

Since a state of consciousness is expressed most naturally with a psychological verb, its nonrelational characteristics would be expressed most naturally with adverbs modifying that verb. Hence the designation of this third answer as the *adverbial theory*. Because its proponents allow (seldom on the basis of argument) for the use of perceptual verbs only in the case of existentially veridical perception, they too introduce a technical term, indeed, usually, again 'sensing', for the psychological state in question, and would describe the theory as the adverbial theory of sensing. Adverbial theories of thinking, imagining, and believing have also been proposed,[6] for reasons similar to those behind the adverbial theory of sensing. We may therefore speak generally of the adverbial theory (or theories) of consciousness. This would make explicit the fact that what is at stake in a discussion of the adverbial theory of sensing is far more general and deeper than any issues specific to the philosophy of perception. Hence the title of this paper. But I shall be concerned directly only with the adverbial theory of sensing, though in a manner relevant to adverbial theories of other modes of consciousness. My reason for this limitation is that the former alone has been developed in any detail.

The adverbial theory of sensing may be understood in three distinguishable, though not always distinguished, ways. First, as a method of reformulating, or paraphrasing, statements in ordinary language that seem to commit us to philosophical views the adverbial theorist wishes to reject: specifically, the view that sometimes we perceive things that do not exist and the view that sometimes, perhaps always, we perceive ('sense') things that do exist but are not material objects.

Second, the adverbial theory may be understood as a philosophical description of the nature of at least some kinds of states of consciousness. Clearly, such a description must be, at least in part, phenomenological; it must be defended, at least in part, with phenomenological considerations. For what else can a *philosophical* description of a certain state of consciousness be? Even if a certain state of consciousness is identical with a certain state of a brain, we can know this only if we have an independent conception of the former as well as an independent conception of the latter (to know that the Evening Star is identical with the Morning Star we must first know what we are asserting to be identical with what). And whereas the conception of the latter would be based on anatomical and physiological facts the conception of the former surely can be based only on phenomenological facts. It should be noted that the examination of the ordinary uses of psychological terms need not be an alternative to the phenomenological approach. When practiced at its best, it can be regarded as a methodological variety of that approach.[7]

Third, the adverbial theory may be understood as a postulation of certain entities (certain 'states of consciousness') possessing certain characteristics, a postulation intended to provide an explanation of various phenomena, especially of the perceptual reports (both correct and incorrect) we make and of our so-called conceptual representations.[8]

I shall first consider the adverbial theory as a method of reformulation. Then I shall consider it as a phenomenological description. I shall not consider its third version, partly because of skepticism about philosophical explanations of phenomena, partly because of skepticism about philosophical postulations of entities, but especially because it seems obvious to me that both its rivals, the sense-datum theory and the quasi-Meinongian theory mentioned earlier, would serve the required explanatory role much better than would the adverbial theory.

II

Roderick M. Chisholm recommends that we say of a man who has "spots before his eyes" that "the man senses (is appeared to) 'spottily', or 'in a spotty manner'", rather than that he senses "a spotty appearance" or simply, as ordinarily we would, that he sees spots (Chisholm 1957:122). Elsewhere Chisholm recommends that in order "to eliminate the reference to the thing that appears," we say, "I am appeared whitely to" or "I sense whitely," instead of "Something appears white to me." (Chisholm 1977a:30). And Wilfrid Sellars suggests that to have a sensation of a red rectangle is not to stand in a peculiar relation to a red rectangle, but rather to a-red-rectangle-ly sense (Sellars 1968:168). But it should be noted that Sellars's version of the adverbial theory is part of a rich metaphysics and philosophy of mind. It is by no means a proposal of a mere reformulation, for the purpose of avoiding puzzlement. And although Chisholm usually speaks as if that is all his version is, clearly it is motivated by deep ontological and epistemological considerations.

I shall not comment here on the value of reformulation as a general method for the solution of philosophical problems or on the conception of philosophy that encourages its practice. And I shall postpone until the next section the really important question regarding any proposed reformulation, and therefore regarding those offered by the adverbial theory, namely, whether the reformulation captures the structure of the situation described by the original statement, whether it casts light on it, whether it reflects the crucial similarities and differences between it and other kinds of situation in terms of which we may make it intelligible to ourselves. (Whether the reformulation succeeds in

dissolving superficial puzzlement occasioned by the original statement seems to me of little philosophical importance.) Here I shall raise only a question so elementary as to be out of place in most cases of the practice of the method of reformulation, but certainly not in this case, namely, whether the reformulations proposed by the adverbial theory make sense. If we think of the Russellian reformulation of a statement containing a definite description as the paradigm of a philosophical reformulation, then the corresponding question about it would be, not, e.g., one of those which Strawson (1950) asks, but one that to my knowledge has never been asked, namely, whether it even makes sense. This question has not been asked about the Russellian reformulations because the answer to it is obvious: they do. Even if "There is one and only one thing that is now King of France, and that thing is bald" is not an adequate reformulation of "The present King of France is bald", there can be no question that it is a perfectly meaningful and clear statement.

Let us take the example "Something appears white to me" and its paraphrase as "I am appeared whitely to". We must keep in mind that we are asked to understand the latter in such a way that it does not entail either that something is appearing to me or that something is white. How should we understand it then? The first obvious observation is that, except in recent philosophical discourse, there is no such word as 'whitely'. But of course we may recognize that in general it is in accord with English grammar to form an adverb from an adjective by adding the suffix 'ly' and that we should understand 'whitely' as we understand the familiar results of that procedure. Thus we may appeal to an analogy with statements like "He runs slowly" (Chisholm 1976:49). But such an appeal is useless. We mean by "He runs slowly" exactly what we mean by "His run(ning) is slow", and if we were told that the former should be so understood that it is not equivalent to the latter, we would avow that then we have no idea of what it means. But we cannot understand "I am appeared whitely to" as meaning the same as "My (present) being appeared to is white", since the latter is either necessarily false or senseless. And if it made sense and also were true, then the curious result would follow, that after all "I am appeared whitely to" does entail that something is white, though not that a material thing or a sense-datum is white, but that a state of consciousness is white! The paradox is even more striking when by a similar reasoning the conclusion is reached that a state of consciousness is rhomboidal.

Indeed, C. J. Ducasse held that "'blue', 'bitter', 'sweet', etc., are names not of objects of experience, nor of species of objects of experience, but of *species of experience itself*. What this means is perhaps made clearest by saying that to sense blue is then to sense *bluely*, just as to dance the waltz is to dance

'waltzily' [...]." (Ducasse 1951:259). He claimed that "blue stands to sensing blue [...] as kind stands to occurrence of a case thereof", and explained that what he meant is that the sensing, the awareness, is "of the determinate sort *called* '*blue*', and not that it has, like lapis lazuli, the property of being blue". He also explained that "when I assert of lapis lazuli that it is blue, what I mean is that it is such that whenever I turn my eyes upon it in daylight it causes me to experience something called 'blue'" (Ducasse 1951:264-265). In *Perceiving* Chisholm (1957:127) distinguished three uses of the word 'blue' and claimed that "frequently the word 'blue' is used to designate a kind or species of appearing". And Herbert Heidelberger (1973:755-759) has suggested, in defense of Ducasse's view, that "being-a-blue-patch, being-a-blue-speck, being-a-blue-line, and being-a-blue-spot are qualities, just as being blue is a quality, and that all are exemplified by acts of sensing". It would seem that Ducasse and Chisholm would be willing to say that an awareness, or a sensing, or an appearing (a state of sensory consciousness) is blue as long as we understand the saying of this as analogous to saying that Jessie is a cow rather than to saying that Jessie is white. (Compare Aristotle's distinction in the *Categories* between being-predicable-of and being-present-in.) And I assume that Heidelberger's suggestion entails, together with the reasonable assumption that there are blue patches, that some acts of sensing are blue patches. But I suggest that it makes no more sense to speak of a state of consciousness as being of the species blue or as being a blue patch than it does to speak of it as having the property of being blue. It should be noted that Sellars's version of the adverbial theory is not open to this objection, since he holds that the attributes of sense impressions are only analogous to those of the (facing sides) of the material things that are their standard causes.[9] But I tend to think that in this manner—through trans-categorial analogies between characteristics of states of things and characteristics of things—absurdity is avoided only at the cost of excessive vagueness and perhaps vacuity.

There is a second difficulty. It is not true that "I am appeared whitely to" does not entail that something appears white to me. (That it does not is essential to the adverbial theory for dealing with the crucial case of existentially illusory perception.) Since 'appear' is not intended to be understood as a technical term, but is the term with which the admittedly technical 'to sense' is explained, this statement, on the surface singular and nonrelational, makes sense only if understood as elliptical for the general and relational statement "I am appeared whitely to by something". An analogy may make this clearer. The fact that the statement "John was shot" contains no reference to the person who shot John merely shows that it is elliptical for a certain general relational statement,

namely "John was shot by someone" or "Someone shot John"; it certainly does not show that the statement is genuinely singular and moreover nonrelational, that John could have been shot even if no one shot him. It should be noted that to introduce the verb 'to sense' as a technical synonym of 'to be appeared to' would not help. The ordinary verb 'to sense' is, of course, transitive and therefore requires an object if it is to be used grammatically. On the other hand, it cannot be intransitive if introduced as a technical synonym of 'to be appeared to', since, as we have just seen, one's being appeared to in some way entails that something appears to one in that way.

A third general difficulty arises when we consider adverbial reformulations of more complex statements such as "I see a triangular red after-image to the left of a circular blue after-image". (Some specific difficulties that such statements pose for the adverbial theory are discussed in detail by Frank Jackson (1975, 1976, 1977) and I shall not repeat them here. But I believe that, contrary to what he supposes, they do not directly affect Sellars' version of the theory.).[10] What would be the adverb that a reformulation of this statement would contain? 'Triangularly-redly-to-the-leftly-of-circularly-bluely' or 'Triangular-red-to-the-left-of-circular-blue-ly' can only be described as a syntactical monstrosity. To suggest that the use of such a phrase would save us from philosophical puzzlement and befuddlement would be disingenuous. Chisholm attempts to deal with this objection in *Person and Object*: "And what of the sort of thing the sense-datum philosopher is trying to describe when he says 'I sense a triangular red sense datum located to the left of a circular blue one'? We needn't coin an adverb to describe the situation. We could say merely: 'There is a way of appearing which is such that (i) it is the way one is appeared to under optimum conditions for perceiving that a red triangle is to the left of a blue circle and (ii) I am appeared to in that way.'" (Chisholm 1976:5). But it is not true that we could say merely this. Chisholm's reformulation is a general statement about ways of appearing, i.e., exactly about what would be expressed by the adverbs we need not coin. Such a general statement is no more intelligible than its instantiations would be. But an instantiation of this statement would be a conjunction, the second conjunct of which (that corresponding to (ii)) would have the form "I am appeared to...", the empty place being filled precisely with the adverb we are told we need not coin. Unless we can construct such an adverb, we cannot construct the conjunction. And unless we can construct the conjunction, we cannot attach sense to Chisholm's general statement about ways of appearing which the conjunction would instantiate.

III

But the adverbial theory can also be taken as a description, sufficiently general to count as philosophical, of certain states of consciousness, i.e., of what it would call states of sensory consciousness, and its puzzling alleged reformulations of the ordinary statements describing such states may be thought of not as reformulations at all but as purely technical though phenomenologically more adequate descriptions of those states. The required adverbs would be coined and with the verb 'to appear', no less than the verb 'to sense', would be assigned explicitly technical senses. How this might be accomplished is not clear to me. But let us ignore this question. Let us ask, instead, is the adverbial theory phenomenologically adequate *in general*? If it is not, then even if it succeeds in providing intelligible technical descriptions of particular states of consciousness, these descriptions would be false or misleading or inadequate in some other way. If it is, then we would have reason to believe that the required technical descriptions can be provided and explained adequately, some day, by someone. It may be objected that it is a mistake to take the adverbial theory as phenomenological, that at least since Ducasse's work no expositions of the theory have contained serious phenomenological descriptions. But to say this is not to defend the theory; it is to point out a glaring methodological defect.

I shall begin by recalling several (by no means all!) phenomenological objections to the theory that may be found in the literature. Then I shall attempt to identify the common and deeper ground on which they rest. But they must not be regarded as formal arguments against, or counterexamples to, the adverbial theory. A phenomenological objection to a theory can only consist in drawing attention to a phenomenon, or to a feature of a phenomenon, that the theory does not fit adequately or plausibly. I do not doubt that the adverbial theorist can respond to each of the objections to follow by providing some sort of adverbialist description of the phenomenon or feature in question. What I do doubt is that his description would be phenomenologically plausible (even if it were grammatical and intelligible).

Regarding Ducasse's view that "when I see the sensible quality 'blue', this quality is related to my seeing of it, in the same way in which, when a cricketer makes a particular stroke at cricket, say a 'cut', the kind of stroke he makes is related to the striking of it [...]," G. E. Moore observed: "It seems to me evident that I cannot see the *sensible* quality 'blue', without *directly seeing* something which *has* that quality—a blue patch, or a blue speck, or a blue line, or a blue spot, etc., in the sense in which an after-image, seen with closed eyes, may be any of these things."[11] Ducasse responded by suggesting that "if the

sensible quality blue qualifies anything, what it qualifies is only some region of sensible space."[12] But Moore observed, "An after-image may gradually grow fainter, while it remains in the same sensible region: but that sensible region does not grow fainter. And an after-image may sensibly move from one region in sensible space to another: but no region in sensible space can move from one place to another in sensible space." Moore also urged that "in order that you may be seeing a resting blue spot, it is necessary that you should not only (1) be seeing the color, blue, but also (2) seeing a region (or 'place') in sensible space, and also (3) seeing the color blue as occupying that seen place. And even if the color blue could be related to your seeing as is a stroke at cricket to the hitting of it, I do not at all understand how a place could be related to an act of seeing in the same way, and still less what account can be given of seeing a color as occupying a place".[13] Ducasse's reply was that "when I observe the 'after-image' moving, all I observe is that different but continuous regions of sensible space sensibly become occupied by sensible blue at continuously successive sensible times", that "to say that the after-image gradually grows fainter while it remains in the same sensible region [means] that the sensible blues seen there at continuously successive times are blues of continuously smaller intensities", and that "the seeing of a place is an 'emergent' of two specific acts, each of which is related to a species of sensing as a 'cut' is related to hitting [...] the seeing a specific sensible place [...] is the psychological *emergent* of [sensing kinaesthetically in a specific way] and of possession of superior 'clearness' by some one of the color qualities seen at the time".[14] Later he suggested that we "may or must speak of being aware not only *bluely*, but also *briefly* (or perhaps lengthily), *extensionally* (or perhaps punctually), *here-ly* (or perhaps there-ly), *abundantly* (or perhaps scantily), etc." (Ducasse 1951:284). Readers may judge for themselves the phenomenological adequacy of Ducasse's reply to Moore.

Sellars has argued that Chisholm's 'sensing redly' would not do as an adequate description of any sensory state, that a phrase such as 'a-red-rectangle-ly sensing' is required (Sellars 1975b:312). But even the latter phrase would sometimes be inadequate, as becomes evident when we note the fact we would ordinarily describe by saying that a person may see two red rectangles, e.g., two red and rectangular after-images, at the same time. (This point is related to Jackson's but is concerned with the phenomenological adequacy of the adverbial theory, not with the adequacy of its reformulations of certain ordinary statements.) The adverbial theory must allow for phrases such as 'this-red-rectangle-ly sensing' and 'that-red-rectangle-ly sensing' if it is to do justice, first, to the phenomenological fact we would ordinarily describe by saying that we see, not mere *kinds* of after-images, which presumably would be abstract

entities, but *particular*, individual after-images; and, second, to the logical fact that if we can say, e.g., that a cow is grazing in the field then we must be able, in principle, to say that this cow, or that cow, is grazing in the field, since we do not mean that a certain abstract zoological species is grazing in the field. But, of course, the phrases I have suggested, if they make sense at all, contain reference, in virtue of the inclusion of the pronouns 'this' and 'that', to what in such contexts may only be individual things, not any properties or sets of properties of sensings. As the case of the two red and rectangular *after-images* shows, it is not true that, as Sellars says, "the question 'Impression of *which* red rectangle?' makes sense only as a request to know which red and rectangular object is *causing* the impression, rather than how the impression is to be *described*" (Sellars 1968:22).

Reinhardt Grossmann has pointed out that when a painter sees a rectangular object as trapezoidal he may draw what he sees by producing a trapezoidal shape on his canvas. And he may do this by carefully *reproducing* the shape he sees on the canvas. Surely he attends to a certain shape he sees, even though it is not the real shape of the object; he does not attend to his inner states of consciousness and their monadic properties. And even if he does the latter, why does he draw a trapezoidal shape, since no state of consciousness is trapezoidal (Grossman 1976)? Sellars, of course, would reply that the painter's visual impression of a trapezoidal shape, though not trapezoidal itself, is analogous in certain respects to physical objects that are trapezoidal on the facing side, that the latter are the model of the former. But as Romane Clark has remarked,

> the model does not illuminate what is special and interesting about sense impressions as mental phenomenon: the fact that, and the way in which, the havings of sense impressions are awarenesses of the sensible qualities of material things, or, more accurately, of the way in which they are impressions of sensibly qualified things (Clark 1975:121).

We can strengthen Grossmann's example by revising it as follows. A novice at drawing wishes to represent the rectangular side of a building as it appears to him, i.e., as trapezoidal. He looks at it through a piece of clear glass and with crayon traces on the glass the shape the side appears to him (through the glass) to have. He produces on the glass a trapezoidal shape. He simply draws the shape segment by segment so that each segment obliterates a segment of the shape the side appears to him to have. He does not look at the side of the building and then attempt to produce on the glass a shape that would appear to him in the same way that the shape of the side of the building appears to

him. No doubt some sort of adverbial analysis of what he does can be offered. But what phenomenological plausibility would it have?

Chisholm has drawn attention to a difficulty the adverbial theory faces in the case of the perception of a complex thing as complex. Ordinarily, when we see a thing we also see some of its parts. For example, we may see a hen and also see one of its feathers as well as the tip of that feather. What would be the sensory state corresponding to such a case of seeing? Chisholm suggests that we may say:

> The way in which a man senses with respect to a thing includes ways in which he senses with respect to some, but not all, of the parts of the thing, and the way in which he senses with respect to any part of the thing is included in the way in which he senses with respect to the thing. (Chisholm 1966:98; compare Sellars 1968:24-27)

James Cornman complained that "the notion of one way of sensing being included in another is at best unclear and perhaps meaningless" (Cornman 1975:75).[15] The truth, I suggest, is that this is unclear and perhaps meaningless not because the notion of inclusion just happens to be inapplicable, or not clearly applicable, to ways of sensing, but because the application of any notion, except those in terms of which the notion of a way of sensing has been introduced, to ways of sensing is unclear and indeterminate. And this is so because the notion of a way of sensing has no independent phenomenological grounding. What properties do we find ways of sensing to have? What relations? Are ways of sensing countable? What are the criteria of identity for them? To say, with Sellars, that these questions are to be answered with appeals to analogies hardly suffices.

This becomes especially evident when we enlarge the scope of Chisholm's example and ask for an adverbial phenomenological description of one's total visual experience at a given time, of a whole "visual field". Not only would the number of parts and the complexity of their organization be likely to be greater. Entirely novel phenomena must be taken into account. There is the familiar figure-ground phenomenon. Merleau-Ponty has observed:

> Already a 'figure' on a 'background' contains [...] much more than the qualities presented at a given time. It has an 'outline', which does not 'belong' to the background and which 'stands out' from it; it is 'stable' and offers a 'compact' area of color, the background on the other hand having no bounds, being of indefinite coloring and 'running on' under the figure. The different parts of the whole-for example, the portions of the figure nearest to the background possess,

> then, beside a color and qualities, a particular *significance*. (Merleau-Ponty 1962:13)

There are the differences between the part of the visual field one attends to, the immediate context of that part, and the rest of the visual field. As Aron Gurwitsch has argued,

> [...] every total field of consciousness consists of three domains, each domain exhibiting a specific type of organization of its own. The first domain is the *theme*, that which engrosses the mind of the experiencing subject, or as it is often expressed, which stands in the 'focus of his attention'. Second is the *thematic field*, defined as the totality of those data, co-present with the theme, which are experienced as materially relevant or pertinent to the theme and form the background or horizon out of which the theme emerges as the center. The third includes data which, though co-present with, have no relevancy to, the theme and comprise in their totality what we propose to call the *margin*. (Gurwitsch 1964:4-5)

Indeed, the very distinction between attending to what one perceives (senses) and not attending to it but still perceiving (sensing) it is phenomenologically crucial. I can see an after-image but not attend to it (I may be preoccupied with other things), or I can see it and also attend to it but not to its shape or color or to any other quality it may have, or attend to its color or shape but not to both and even not to the after-image itself. Even if what we would ordinarily call the seeing of the after-image were objectless, surely the attending to the after-image is not. But to attend to it is precisely to attend to *what* one sees. It is certainly to be distinguished from attending to one's seeing the after-image; one may attend to the after-image but not to one's *seeing* it (e.g., if one is interested in the kind of after-image it is, or in its peculiar color or shape), or to one's seeing it but not to the after-image (e.g., if one is interested in the fact, perhaps medically significant, that one is seeing an after-image and the circumstances in which it is occurring, but not at all in its specific characteristics). Indeed, O. R. Jones has observed that "one can be said to look at an after-image", that one "can focus one's eyes on an afterimage that is directly in front of one's eyes and thereby see it very clearly, or focus one's eyes on something in the far distance that happens to be in one's direct line of vision, thereby taking scant notice of the after-image or perhaps not noticing it at all", that "there is such a thing as having a second look at the same after-image, which also means that we could take a second count of the features of the after-image [e.g., the number of the points of a star-shaped after-image], thereby checking

on the first count", that one can make sure that an after-image "is in the direct line of vision as against being to the one side" (Jones 1972:151-152).

Moreover, an adequate phenomenology must take into account not only the internal organization of a visual field but also the fact that a visual field ordinarily includes reference to the preceding visual fields as well as to those that will succeed it, that it is given as continuous with a certain past as well as with a certain future visual field, that in a sense the awareness of it includes awareness of what precedes it and of what will follow it. Husserl observed:

> A bird just now flies through the sunlit garden. In the phase which I have just seized, I find the retentional consciousness of the past shadings of the duration likewise in every fresh now [...]. The bird changes its place; it flies. In every situation, the echo of earlier appearances clings to it (i.e., to its appearance). (Husserl 1964:149)

And elsewhere he remarked that also

> there belongs to every external perception its reference from the 'genuinely perceived' sides of the object of perception to the sides 'also meant'—not yet perceived, but only anticipated and, at first, with a non-intuitional emptiness (as the sides that are 'coming' now perceptually): a continuous *protention*, which, with each phase of the perception, has a new sense. (Husserl 1960:149)

The adverbial theory ignores such subtler yet quite unquestionable, indeed essential, features of sensory states. Can it give an account of them in adverbial terms? And, far more important, would such an account be phenomenologically plausible?

IV

I have mentioned a number of phenomenological difficulties the adverbial theory seems to me to face. Do they have a common ground? Is there a single chief phenomenological objection to the theory? I believe that there is. The adverbial theory is incapable of doing justice to the most obvious and indeed essential phenomenological fact about perceptual consciousness (perhaps all consciousness), namely, its intentionality, its object-directedness.

Indeed, insofar as it is applied to existentially illusory, e.g., hallucinatory, perceptual consciousness, the adverbial theory *begins* precisely with the denial of the intentionality of such consciousness and *consists* in an attempt to make sense of that denial. If a hallucination were intentional, if it were necessarily directed toward an object, then there would be hallucinatory objects, whether these be existent sense-data or nonexistent quasi-Meinongian material

objects. Many of the objections in the preceding section consisted in drawing attention to respects in which the denial of the intentionality of existentially illusory perceptual consciousness is phenomenologically implausible.

But does the adverbial theory do justice to the intentionality of existentially veridical perceptual consciousness? It should be noted that it is not a theory of (veridical) perception but of certain states of consciousness it calls being appeared to or sensing, which it sharply distinguishes from perception. Nevertheless, it is usually offered as a component of a theory of perception, namely, of a causal theory. (That this is so should not surprise us. The chief motive for rejecting both the sense-datum theory and the view that we sometimes perceive nonexistent material objects is that neither of these seems to agree with philosophical naturalism. But philosophical naturalism also encourages acceptance of the causal theory of perception.) Thus in *Perceiving* Chisholm defined what he called "the simplest of the nonpropositional senses of 'see'" as follows: "'S *sees x*' means that, as a consequence of *x* being a proper *visual* stimulus of S, S senses in a way that is functionally dependent upon the stimulus energy produced in S by *x*." (Chisholm 1957:149). Now a state of sensing is, according to the adverbial theory, not directed toward an object. So if seeing, in the sense defined, is to be understood as directed toward an object, this fact could consist only in the causal relation between the object and the perceiver's sensing in a certain way. This relation is dyadic and therefore there is a sense in which the perceiver's sensing is directed toward an object. But, clearly, neither is the relation *itself* a case of consciousness. Perception, so understood, is a case of consciousness in virtue of the state of sensing it involves, not in virtue of any causal relation in which that state enters. But, by hypothesis, that element of perceiving which alone can be described as a case of consciousness is also the one the adverbial theory requires us to regard as not being object-directed. To be sure, the adverbial theorist can admit all this and still insist that seeing is (by definition) a case of consciousness and also object-directed (in virtue of its involving a certain causal relation), and ignore the fact that what makes it object-directed is not what makes it a case of consciousness. But such a reply would conflict with the spirit, if not the letter, of the thesis of the intentionality of perception. The fact that *x* is causally related to S's sensing in a certain way can no more reasonably be described as S's being conscious of *x* than the fact that the presence of carbon monoxide in the air is causally related to S's having a headache can be described as S's being conscious of carbon monoxide. The classical causal theories (e.g., Locke's) are also sense-datum theories and thus can legitimately ascribe to one and the same element of perception (namely, to the sensing of the sense-datum) both the characteristic of being a state of con-

sciousness and the characteristic of being object-directed. But they deny that the perceiver is conscious of the material object perceived and for this reason usually hold that it is the sense-datum, not the material object, that is 'directly', 'immediately' perceived. Hence the familiar epistemological difficulties of causal theories. There is a clear sense in which according to them we can never get at material objects but only at our sensations. Chisholm concludes his book *Perceiving* by saying: "one *can* get at them—in the only relevant sense of this expression—by *perceiving* them" (Chisholm 1957:197). But the only relevant sense is that of our being conscious or aware of them and this is precisely what we cannot do in Chisholm's simplest nonpropositional sense of 'perceiving'.

In *Perceiving* Chisholm proceeds to introduce a more complex sense of 'see', in which S sees x only if S takes x to have some characteristic. It can be argued that this sense does capture the intentionality of perception though, so to speak, indirectly, through the intentionality of the belief ('taking') that is a component of perceiving in this sense. Indeed, this is exactly what Chisholm does argue in his most recent work on the subject, "Thought and Its Reference".[16] The chief thesis of that article, applied to perception as well as to thought, belief, and imagination, is that "we need not appeal to any 'dimension of intentionality' other than what is involved in a propositional attitude", that "given the concept of a propositional attitude—for example, *acceptance*, *entertainment*, or *endeavor*—we have all that is needed to add a theory of objective reference, or intentionality, to logic and ontology". The application of this view to perception is contained in the following series of definitions. (1) "S perceives x = D*f*. There is a property such that S perceives x to have that property." (2) "S perceives x to have the property F = D*f*. There is a proposition p which is such that: S perceives p; and p implies x to have the property F." (3) "p implies x to have the property F = D*f*. There is a property G such that (i) only one thing can have G at a time, (ii) p entails the conjunction of G and the property F, and (iii) x has G." (4) "p entails the property of being F = D*f*. p entails a proposition which is necessarily such that it is true if and only if something has the property G." Chisholm (1977b:168) adds: "Now we may say that a proposition p pertains to—or is about—a particular thing x, provided only that p implies x to have some property."

I believe that the sense of 'about' Chisholm's definitions capture is that which corresponds to the sense in which the *statement* "There is one and only one baby who will be born first in Mercy hospital next year, and that baby will receive a gift from the Chamber of Commerce" may be said to be, if true, about a certain baby, whoever that baby may happen to be. And the sense of 'intentionality', or of 'objective reference', they capture is that corresponding

to the sense in which someone who knows that the above statement is true would have been said by Russell to have *knowledge by description* of that baby. This would be so regardless of how unusual the property G in definition (3) is supposed to be. But the phrase 'intentionality of consciousness', or 'objective reference' ('reference to an object'), has ordinarily been understood by philosophers as having a very different sense and is relevant to the issue before us only if so understood. This is the sense that corresponds, even if only roughly, to what Russell meant by '*knowledge by acquaintance*'[17], and in recent philosophy of language to what is meant by 'reference' as contrasted with 'denotation' and by 'referential use of a definite description' as contrasted with 'attributive use of a definite description'. Not only does Chisholm's theory of intentionality fail to capture this standard concept of intentionality, or of objective reference, but it seems to leave no room for it. He defines even acquaintance as follows: "*s* is acquainted with *x* at *t* = D*f*. There is a *p* such that (i) *p* is self-presenting for *s* at *t* and (ii) there is a property that *p* implies *x* to have" (Chisholm 1976:30), a self-presenting proposition for *s* at *t* being one that is true and necessarily such that whenever it is true then it is certain for *s*. And oneself is the only object of one's acquaintance, even in this peculiar sense of 'acquaintance', since, according to Chisholm, a self-presenting proposition can imply only oneself to have some property (Chisholm 1976:24-30, 1977:169). It is fair to conclude, I believe, that Chisholm's theory, when applied to perception, does not do justice to the intentionality of perception, in the standard sense of 'intentionality'; it does not really allow us to say that we can get at material objects by perceiving them in the usual sense in which saying this would be understood; it allows us to be 'aware' of material objects only by description.

Of course, one can still hold, independently of Chisholm's theory of intentionality, that the intentionality of perception consists in the intentionality of the beliefs involved in perception, rather than in any intentionality of the 'sense experience' that is also involved in perception. But this view, though common, seems to me incredibly muddled. What does the intentionality of my present true belief that this page is white consist in? The answer becomes evident when we consider the statement expressing that belief and ask, In what sense is the statement "This page is white" *about* this page? The usual answer is that the subject term is used to refer to this page. But what does this successful referential use consist in? In part, though necessarily, in the fact that I pick out (single out, identify) this page. And how do I accomplish this? Obviously, by *perceiving* the page, since the statement is one expressing a perceptual belief. We should now say that the intentionality of the perceptual belief also consists, at

least in part, in the fact that it is a belief about something I have picked out by perceiving it. And *this* perceiving is nonpropositional and *its* intentionality is direct, not mediated by any belief that may happen to accompany it.

It is the intentionality of perception so understood that alone explains the crucial phenomenological fact about perception that *prima facie* it provides us with evidence for the existence of material objects, that it appears to us as a sort of contact with the external world. (Whether it *really* provides us with such evidence is of course one of the chief problems of epistemology. Its solution would rest not only on phenomenological considerations but also on a detailed philosophical elucidation and defense of a notion of evidence that could yield such a solution, if this notion is primitive; and if it is defined, then in a detailed philosophical elucidation and defense, dialectical as well as phenomenological, of the *primitive* epistemic notions in terms of which it is defined.) Both of the alternatives to the adverbial theory mentioned in section I do justice to this fact. According to one of them, in every case of perception the perceiver is conscious of a material object, even though this object might not exist. According to the other, in every case of perception the perceiver is conscious of an existent object that has properties the front surface of a material object could have and that perhaps could even be identical with the front surface of a material object. For both, the phenomenological fact that we regard perception as providing us with evidence for the existence of material objects, that it appears to us as providing us with such evidence, is completely understandable. But according to the adverbial theory, a state of sensory consciousness is an objectless state. Its occurrence may in fact constitute evidence for the existence of a material object, but it can hardly appear to one to do so. It is not directed toward such an object, or toward an object that is just like the front surface of a material object; it is not directed toward an object at all. Nor, of course, does it itself have any of the distinctive properties of a material object, even if the properties it does have were analogous to some of those of material objects. Indeed, it may be caused by a material object, but this would be precisely the sort of fact for which we require perceptual evidence, not the sort of fact that constitutes perceptual evidence. The occurrence of such a sensory state would not appear to one as evidence for the existence of the material object that stands to it in the appropriate causal relation, just as the occurrence of a headache caused by the presence of carbon monoxide in the air does not appear to one as evidence for the presence of carbon monoxide in the air.[18]

V

Of course, as I warned at the outset, the above phenomenological appeals are not conclusive. Each can be rejected by the adverbial theorist as either ques-

tion-begging or phenomenological unsound. To some extent their inconclusiveness is due to the very nature of such appeals. But, I suggest, it is also due to the fact that the adverbial theory is proposed as an account of the nature of what philosophers and psychologists have called sensations, sense impressions, sense experience. It has been argued repeatedly and by many that there are no such things at all, unless the terms 'sensation', 'sense impression', and 'sense experience' are understood in ways that make them irrelevant to the adverbial theory. If so, then we should not be surprised that our phenomenological objections to its description of them seem inconclusive. It is not so much that the adverbial theory is mistaken as that it has no subject matter.

That the terms 'sense impression' and 'sense experience' are philosophical creatures, introduced for a variety of reasons and in many, very different ways, should require no argument. The latter term is relatively innocuous, since it can reasonably be understood as a synonym of 'sense perception', i.e., as the general term corresponding to specific terms such as 'seeing', 'hearing', 'smelling', 'tasting', '(tactile) feeling', perhaps also 'feeling' as used in speaking of feeling pains in various parts of our bodies as well as feeling the motions of such parts. But the former term is not innocuous. It clearly suggests the pseudoscientific picture of sense perception as consisting in an elaborate causal chain that begins with the object perceived and terminates in a 'mental event'. Since the chain itself is the perception, this mental event must be something else, and the term 'sense impression' is coined as the name of that postulated last link of the chain. In this picture the zoological ('naturalistic') conception of man and the conception of man's mind as a ghost in a machine form a curious and unholy union.

The term 'sensation' is, of course, not a philosophical creature. But, as Gilbert Ryle repeatedly pointed out,[19] its ordinary uses are not at all those required by philosophers. Sometimes it is a name of our consciousness of such things as pains and tickles, sometimes it is applied to the objects of such consciousness. Thus it is a rough synonym of 'feeling', in one of the latter's uses, and shares its ambiguity. (We do not speak of sensing or feeling painfully, but of sensing or feeling, or having, pain in some part of our body, or of some part of our body hurting.) That there are sensations (and sensings) in this sense is phenomenologically obvious, even if, for metaphysical reasons, we were to identify them with certain states of the brain. But this is not the sense the adverbial theory needs. The sense it needs is that in which we may also speak, for example, of visual sensations. But common discourse is entirely silent on the existence of such things. If someone were to speak of having a sensation when seeing something, he would be understood most probably as meaning that his

eyes hurt or tickle, or that he is feeling nauseous or excited, and so on. And we say that the drunk sees pink rats, or at least that he 'thinks' he sees them, not that he senses, or has a sensation of, pink rats. How seriously should we take this fact about common discourse? How seriously should we take its failure to reflect the existence of what are alleged to be the most common psychological occurrences? Perhaps not very seriously if introspection revealed such occurrences. But does it? Regarding the notion of a sensation understood as just such an occurrence, Sartre remarks: "[...] it is pure fiction. It does not correspond to anything which I experience in myself or with regard to the Other." (Sartre 1956:314). Merleau-Ponty optimistically concurs: "It is unnecessary to show, since authors are agreed on it, that this notion corresponds to nothing in our experience." (Merleau-Ponty 1962:3). The similar views held by Moore and Ryle, among many other English-speaking philosophers, are too familiar to require more than mention.

Of course, the term 'sensation' could be introduced as a technical substitute for 'perception' in the latter's first sense, distinguished in section I, in which we may be said to perceive both existent and nonexistent things; or, if we accept the sense-datum theory, as a technical term for our perception ('apprehension') of sense-data; or, for the purposes of psychology, as a technical term for our perception of "a simple quality like 'hot', 'cold', 'red', 'noise', 'pain', apprehended irrelatively to other things."[20] These technical uses of 'sensation' would be entirely explicable, as they ought to be, in terms of our ordinary perceptual verbs and would be of no use to the adverbial theory, which requires that sensations be objectless states of consciousness.

I shall conclude this paper by drawing attention to the larger implications of the view that there are objectless states of consciousness. In the previous section I argued that it is incompatible with the thesis of the intentionality of perception. But even if it were not so, it would still be incompatible with the more general and more fundamental thesis of the intentionality of *all* consciousness. Is intentionality, object-directedness, an essential characteristic of consciousness? Can anything be both a state of consciousness and nonintentional? This, I suggest, is the most important question to be raised in regard to the adverbial theory. If the correct answer to it is negative, then the adverbial theory is false, for reasons far deeper than those I have discussed so far. Is the answer negative? We are told that at least being in pain and being depressed (in general, not by anything in particular) are states of consciousness that have no objects. But surely to be in pain is to feel, to be conscious of, pain in some part of one's body (even if only a phantom part), to be conscious of that part's hurting (not of our hurting!), and it is plausible to say that to be depressed in gen-

eral is to be conscious, perhaps only in imagination, of the world as a whole, or of one's life, or of oneself, as depressing.[21] But the defense of the intentionality of consciousness must rest on firmer foundations than pingpong games with examples and counterexamples. It must issue from an account of the nature of intentionality and of the nature of consciousness. Sartre has argued (as Moore (1903) in effect had also done) that to take the intentionality of consciousness seriously is to recognize that consciousness is perfectly transparent, that it has no contents, that it exhausts itself in its object, that its being consists in its revelation of its object (Sartre 1956:lxi). If this is so, then of course the adverbial theory must be false, since it consists precisely in the claim that certain states of consciousness ('sensings') have an elaborate structure of monadic characteristics ('ways of sensing'), that they are, as Sartre would say, centers of opacity within consciousness.

But if Sartre's rather Moorean view of consciousness is accepted, together with its inseparable companion, his Humean and perhaps also Moorean view that not only is the self, if understood as the subjective pole of a relation of consciousness, unobservable but the very idea of such a self makes no sense,[22] then we are led to the Sartrean conclusion that consciousness is *nothing* distinct from its object. This conclusion is, so to speak, the mirror image of the adverbial theory. Consciousness indeed cannot be a relation, since it lacks one of the needed relata, but the relatum it lacks is the subject, the self, not the object. So the further, no longer Sartrean, conclusion seems to follow that consciousness can be only a monadic characteristic, though not a characteristic of the subject but a characteristic of the object.[23] But we are now faced with considerations that go far beyond the aims of this paper.[24]

Notes

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1. I wish to thank Albert Casullo, Evan Fales, and William S. Robinson for their incisive criticism of an earlier version of this paper.

2. The theory has achieved its prominence chiefly through the efforts of Wilfrid Sellars and Roderick M. Chisholm; indeed, it is an essential part of their philosophical views. But there are important differences between their versions of the theory. Moreover, the most extended exposition and defense of it are to be found in the writings of C. J. Ducasse of several decades ago. For textual references to these philosophers, see below. Still earlier,

the main principle of the theory was defended by G. Dawes Hicks in his contribution to a symposium, with G. E. Moore, W. E. Johnson, J. A. Smith, and James Ward (cf. Hicks *et al*. 1917).

3. I discuss these difficulties in detail in Butchvarov (1979).

4. The classical exposition of the sense-datum theory is Price (1932).

5. I consider them in detail in Butchvarov (1970, part 3).

6. See, for example, Sellars (1974:97-98), Chisholm (1976:203, note 55), but contrast the doctrine in Chisholm (1977b:167-172).

7. On 'linguistic phenomenology' cf. Austin (1961:130).

8. Cf. Sellars (1968, chap. 1). But Sellars does not argue that the explanatory role of the postulated sense impressions requires that they be understood adverbially. His theory of sense impressions must not be confused, of course, with the 'theory of sense' which he imagines science as adopting in the future.

9. See, for example, Sellars (1968, chap. I; 1963:91-95; 1975:144-60). For an argument against such trans-categorial analogies see Aune (1967) and for a defense of them see Sellars (1967).

10. See Sellars' reply to Jackson in Sellars (1975a).

11. Cf. Moore (1968:659). Ducasse's (1968) view is defended in his "Moore's Refutation of Idealism", in the same volume (Schilpp 1968). This edition also includes letters that Ducasse and Moore exchanged on the topic.

12. A letter from Ducasse to Moore, in Schilpp (1968:687b).

13. A letter from Moore to Ducasse, in Schilpp (1968:687h).

14. A letter from Ducasse to Moore, in Schilpp (1968:687k-687m). Ducasse develops this view in Ducasse (1941; cf. also 1951:282-86, 304-53).

15. But I find Cornman's own formulation, "In some cases, the sensing in a wing-of-a-hen way is also a sensing in a hen-way", no improvement over Chisholm's. In virtue of what is one sensing included in both of certain two classes of sensings while another sensing is included in only one of these classes?

16. Cf. Chisholm (1977b:167-72). All quotations from this article are from pp. 167-68. Compare Ducasse (1941).

17. "I say that I am *acquainted* with an object when I have a direct cognitive relation to that object, i.e., when I am directly aware of the object itself. When I speak of a cognitive re-

lation here, I do not mean the sort of relation which constitutes judgment, but the sort which constitutes presentation." (Russell 1917:209).

18. Compare Sartre: "[...] it is sensation which I give as the basis of my knowledge of the external world. This basis could not be the foundation of a *real* contact with things; it does not allow us to conceive of an intentional structure of the mind." (Sartre 1956:314). James Cornman is sensitive to this difficulty of the adverbial theory: "Somehow [...] we must combine the adverbial sensing theory of sense experience with the perceptual presentation view of compatible common-sense realism." He admits that the statement "Each event of a person immediately perceiving a physical object, p, occurs when and only when some event of the person sensing occurs as a result of stimulus from p appropriately affecting him" expresses neither logical equivalence nor causal connection, and suggests that it expresses "a criteriological equivalence, and about that I am only able to say that it is like the relationship between right-making characteristics and being right." (Cornman 1975:340-42.) He is also sensitive to the implausibility of supposing that in veridical perception perceiving and sensing are two events, and suggests that they are contingently identical (pp. 342-43).

19. See Gilbert Ryle (1949:200-201, 240-44; 1956). At the end of the latter he acknowledges that we need some term to describe the "affinity" of "having an after-image and seeing a misprint". I suggest that the term needed becomes evident if instead of the idiomatic expression 'having an after-image' we use the no less ordinary expression 'seeing an after-image'. That term is 'sense datum', not 'sensation'.

20. James (1890:1). According to James, sensation differs from perception "only in the extreme simplicity of its object or content" (p. 2).

21. Compare Sartre's theory of emotional consciousness in Sartre (1948).

22. See Sartre (1957). Compare G.E. Moore's (1910) important but neglected article, especially pp. 51-55.

23. Although I would not describe this conclusion as Sartrean, it is worth noting that in *Being and Nothingness* he says: "If sight is not the sum of visual sensations, can it not be the system of seen objects?" (Sartre 1956:316).

24. I discuss some of these considerations in Appendix B of Butchvarov (1979).

References

Aune, Bruce. 1967. "Comments". In Castaneda 1967:275-285.

Austin, J.L. 1961. "A Plea for Excuses". In J.L. Austin, *Collected Papers*. Oxford: Oxford University Press, 123-152.

Butchvarov, Panayot. 1973. *The Concept of Knowledge*. Evanston: Northwestern University Press.

Butchvarov, Panayot. 1979. *Being Qua Being: A theory of identity, existence, and predication*. Bloomington & London: Indiana University Press.

Castaneda, Hector-Neri (ed.). 1967. *Intentionality, Minds, and Perception*. Detroit: Wayne State University Press.

Chisholm, Roderick M. 1957. *Perceiving: A philosophical study*. Ithaca: Cornell University Press.

Chisholm, Roderick M. 1966. *Theory of Knowledge*. 1st ed. Englewood Cliffs, NJ: Prentice-Hall.

Chisholm, Roderick M. 1976. *Person and Object*. La Salle: Open Court.

Chisholm, Roderick M. 1977a. *Theory of Knowledge*. 2nd ed. Englewood Cliffs, NJ: Prentice-Hall.

Chisholm, Roderick M. 1977b. "Thought and its Reference". *American Philosophical Quarterly* 14:167-172.

Clark, Romane. 1975. "The Sensuous Content of Perception". In Romane Clark, *Action, Knowledge, and Reality*. Indianapolis: Bobbs-Merrill.

Cornman, James. 1975. *Perception, Common Sense, and Science*. New Haven & London: Yale University Press.

Ducasse, C.J. 1941. "Objectivity, Objective Reference, and Perception". *Philosophy and Phenomenological Research* 2:43-78.

Ducasse, C.J. 1951. *Nature, Mind, and Death*. La Salle: Open Court.

Ducasse, C.J. 1968. "Moore's Refutation of Idealism". In Schilpp 1968:223-251.

Grossmann, Reinhardt. 1976. "Review of James W. Cornman, *Perception, Common Sense, and Science*". *International Studies in Philosophy* 8:210-213.

Gurwitsch, Aron. 1964. *The Field of Consciousness*. Pittsburgh: Duquesne University Press.

Heidelberger, Herbert. 1973. "Review of C.J. Ducasse, *Truth, Knowledge, and Causation*". *The Journal of Philosophy* 70:755-759.

Hicks, G. Dawes, G.E. Moore, W.E. Johnson, J.A. Smith & James Ward. 1917. "Are the Materials of Sense Affections of the Mind?". *Proceedings of the Aristotelian Society* 17:418-458.

Husserl, Edmund. 1960. *Cartesian Meditations*. Trans. by Dorion Cairns. The Hague: Martinus Nijhoff.

Husserl, Edmund. 1964. *The Phenomenology of Internal Time Consciousness*. Trans. by James S. Churchill. Bloomington: Indiana University Press.

Jackson, Frank. 1975. On the Adverbial Analysis of Visual Experience". *Metaphilosophy* 6:127-135.

Jackson, Frank. 1976. "The Existence of Mental Objects". *American Philosophical Quarterly* 13:33-40.

Jackson, Frank. 1977. *Perception*. Cambridge: Cambridge University Press.

James, William. 1890. *Psychology*. Vol. II. New York: Henry Holt.

Jones, O.R. 1972. "After-Images". *American Philosophical Quarterly* 9:151-152.

Merleau-Ponty, Maurice. 1962. *Phenomenology of Perception*. Trans. by Colin Smith. London: Routledge.
Moore, George E. 1903. "The Refutation of Idealism". *Mind* 48:433-453.
Moore, George E. 1910. "The Subject-Matter of Psychology". *Proceedings of the Aristotelian Society* n.s. 10:36-62.
Moore, George E. 1968. "Reply to My Critics". In Schilpp 1968:533-687.
Price, H. 1932. *Perception*. London: Methuen.
Russell, Bertrand. 1917. *Mysticism and Logic*. London: George Allen & Unwin.
Ryle, Gilbert. 1949. *The Concept of Mind*. London: Hutchinson's University Press.
Ryle, Gilbert. 1953. "Ordinary Language". *The Philosophical Review* 62:167-186.
Ryle, Gilbert. 1956. "Sensation". In H.D. Lewis (ed.), *Contemporary British Philosophy, Third Series*. London: George Allen & Unwin, 425-443.
Sartre, Jean-Paul. 1948. *The Emotions: Outline of a theory*. Trans. by Bernard Frechtman. New York: Philosophical Library.
Sartre, Jean-Paul. 1956. *Being and Nothingness*. Trans. by Hazel Barnes. New York: Philosophical Library.
Sartre, Jean-Paul. 1957. *The Transcendence of the Ego*. Trans. by Forrest Williams & Robert Kirkpatrick. New York: Noonday Press.
Schilpp, Paul A. (ed.). 1968. *The Philosophy of G.E. Moore*. 3rd ed. La Salle: Open Court.
Sellars, Wilfrid. 1963. *Science, Perception, and Reality*. London: Routledge.
Sellars, Wilfrid. 1967. "Rejoinder". In Castaneda 1967:286-300.
Sellars, Wilfrid. 1968. *Science and Metaphysics*. London: Routledge.
Sellars, Wilfrid. 1974. "Ontology and the Philosophy of Mind in Russell". In George Nakhnikian (ed.), *Bertrand Russell's Philosophy*. New York: Barnes & Noble, 97-98.
Sellars, Wilfrid. 1975a. "The Adverbial Theory of the Objects of Sensation". *Metaphilosophy* 6:144-160.
Sellars, Wilfrid. 1975b. "The Structure of Knowledge". In Castaneda 1975:305-312.
Strawson, Peter. 1950. "On Referring". *Mind* 59:320-344.

Grammar, Meaning and Consciousness:
What Sentence Structure Can Tell Us about the Structure of Consciousness

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1. Introduction

When faced with language for the first time with the orientation to find out its inner structure as available for inspection in consciousness, one's reaction could very well be like that expressed by Lashley as follows:

> When we think in words, the thoughts come in grammatical form with subject, verb, object, and modifying clauses falling into place without our having the slightest perception of how the sentence structure is produced. [...] Experience clearly gives no clue as to the means by which it is organized. (Lashley 1956:4; cited from Jackendoff 1987a:45)

In the cited opinion, there are actually two points. The first one deals with the problem that one cannot on-line witness introspectively the process of construction of the sentences—and their realization as utterances in interaction—one produces. This problem is, actually, the problem of processing encapsulation, inaccessibility on-line of the way we build up sentences in talking to each other. We do not experience the construction of sentences as a step-by-step *serial* accumulation of components until we achieve the level of well-formed structure. From this tenet, however, a second, and, in my opinion, erroneous one, is put forward (as an implication of the first) that 'the experience of language' (with its structure) cannot give us clues to the way it has been organized. To my best judgment, the experience of language, i.e., the syntactic-semantic patterns of language explicitly given in experience CAN GIVE US under certain conditions (*contra* Lashley 1956:4 and Jackendoff 1987a:45) rather suggestive and revelatory clues about its own organization.

On the other hand, there is a metaphor which has acquired at least some degree of popularity in the past—the metaphor of the 'grammar of consciousness' (cf. e.g., Moss 1993). This metaphor implies the acceptance of the belief that there is a single and reasonably well-defined set of rules the implementation of which in the mind/brain necessarily gives rise to (causes) what we experience as consciousness (in all its variegated phenomenology). This is a claim that will be emphatically NOT defended here. As a matter of fact, Mac Cormac & Stamenov (1996a:2-10) present some arguments in favor of the thesis that there is no computational uniformity in the processes and structures that can contribute to the formation of conscious experience. In other words, it is impossible to identify and pin down a single 'grammar of consciousness', or a well-defined closed (finite) set of 'grammars'. The 'grammar of consciousness', from this point of view, is a misleading metaphor.

In this article, I intend to discuss several topics whose interrelations have not been clearly conceptualized and made mutually coherent, to my judgment, in linguistics and the philosophy of mind:

(i) I will introduce and discuss the so called 'higher-order thought (HOT) theory of consciousness' and some of its presuppositions and implications for our understanding of the nature of the relationship between language structure and the structure of conscious experience;
(ii) I will consider some of the basic categories used in grammatical theory, e.g., those of transitive construction, semantic roles, syntactic relations and predicativity, in conceptualizing the nature of the verbally expressible thoughts;
(iii) I will discuss the necessarily interactive nature of the language-specific and language-nonspecific aspects of (overt and inner) speech and the ways of functioning of this interactive mechanism in the 'working space of the mind' as a realization of verbal consciousness. As a way of implementation of this mechanism, I will propose the dual-focus system in the mind's monitoring and control of performance.

The aim of my presentation will be to reveal how the study of linguistic structure can help us in the study of the structure of consciousness. In other words, I will try to show with appropriate illustrations that the analysis of language (an analysis of language structure is, basically, an analysis of its grammar) is the most accessible and straightforward way, the *via regia*, in the empirical study of some aspects of the structure of consciousness.

2. Aspects of the higher-order thought theory of consciousness: Expressing vs. reporting a thought

This differentiation of expressing vs. reporting the content of our mental states has formed the basis of the so called 'higher-order thought (HOT) theory of consciousness' (cf. Rosenthal 1986, 1990, 1993; Gennaro 1996):

> On my account, a mental state is conscious—non-introspectively conscious—just in case one has a roughly contemporaneous thought to the effect that one is in that very state. Since not all mental states are conscious, it is open for not all of those higher-order thoughts to be conscious thoughts, though having such a thought will always mean that the lower-order thought it is about is conscious. (Rosenthal 1993:199)

The main problems with this account of becoming conscious are (1) the proper conceptualization of 'rough contemporaneity of thought', and (2) the nature of the asymmetric relationship of the first thought—the lower-order thought (LOT)—to the 'roughly contemporaneous' HOT.

If HOTs are roughly contemporaneous with LOTs, the question arises: What contributes to the alleged difference between this 'higher' thought and the 'lower' one with the latter being the 'object' of the former? Rosenthal's answer (1993:205) is that HOT is, typically, not a conscious thought, while its 'object', LOT, becomes the focus of the current conscious mental state. As we will see, this is a controversial claim, especially for the theory of grammar because it turns out that, unlike the LOT, the HOT is only partially if at all included in the state of consciousness. While the LOT is within the scope of the current state of consciousness, with its subject, object, verb, adjuncts, etc., presumably this is not the case with HOT: from the structure of HOT it is only its 'object' which becomes available in the corresponding state of consciousness.

I have immediately started to introduce grammar-like concepts such as subject, (direct) object, etc., and I have done this deliberately. There is a well-established tradition in linguistics according to which the predicative link between the arguments is what makes both sentence and thought structure a holistic unit. Predicativity seems to lie at the root of sententiality, i.e., it looks 'causally efficient' for the structural well-formedness of the thoughts and sentences we produce and comprehend. If a 'roughly contemporaneous' HOT is tied up to a LOT with this type of predicative link, it will turn out that predicativity is a necessary, but not a sufficient condition, for some occurrent thought to become conscious. This seems reasonable because the argument structure of the corresponding verb falls completely within the scope of consciousness in

the case of the LOT, but not in the case of the HOT. Correspondingly, their relationship cannot be that of grammar-like subordination.

One possible answer could be that, depending on the relationship in the hierarchy, the thought which is currently in the position of a LOT becomes fully conscious, while the HOT becomes only partially conscious since only its 'object' turns out to be *accessible* to consciousness, while the subject and the predicative link between the subject and the 'object' remain an unconscious 'higher-order background' to the conscious state (due to, say, restrictions on computational grounds on the volume of the content immediately accessible to consciousness). But this explanation is not satisfactory. We can perfectly well become conscious, on every instance of a HOT, if we are willing to do so, through a HOT of second order:

(1) *I believe that the Earth is flat.*
(2) *I assert that the Earth is located right in the center of the Universe.*
(3) *I claim that the sun circles around the Earth.*
(4) *I maintain that, most probably, the universe is finite.*
(5) *I suspect that the end of the world is not far away.*

In (1)-(5) the that-sentences express first-order thoughts, while the second-order ones add the attitudinal component of belief, assertion, doubt, uncertainty, suspicion, etc. In cases like these Rosenthal maintains that the second-order thought is explicated into the manifest content of consciousness, and at the same time is linked to a still higher-order thought which itself remains implicit (not expressed verbally) and completely or at least partially unconscious.

2.1. *The case for maximal consciousness of 'roughly contemporaneous thoughts'*

Rosenthal (1990, 1993), however, does not explain why with the third-order thought we practically come to the limit of our capacity to have a state of consciousness which is a single and coherent whole, i.e., we cannot have more than three 'roughly contemporaneous' verbal thoughts distinguishable from each other. We cannot recursively apply once again this rule of embedding (cf. Stamenov 1994) in order to get to the level of an explicit fourth-order thought. Why that must be the case remains to be considered.

One possibility is that consciousness optimizes on-line its structure toward the *minimal possible scope* in the current circumstances. Optimization

and 'minimal expenses in energy and resources investment' sounds attractive, but it does not give us an account why there is such a stringent upper limit at the level of no more than three recursively embedded explicit thoughts which is practically the 'maximal scope of a *self-conscious* thought'. If thought attempts to go beyond this upper limit, then the typical effect is that one loses track of the structure of thought, e.g., as in

(6) **I believe that I suspect that I claim that the Earth is flat.*

From (6) the reader understands, if anything, that

(6') [...] *?I claim that the Earth is flat.*

under some confused assertoric conditions. We do that quite frequently in everyday circumstances—we lose track of our own thoughts, as well as of others'—but this is a different problem. If we lose track, we usually lose it while trying to establish the link of a previous thought to the next one in a chain, but not when we fail to grasp the structure of some single thought, as would be the case presumably with (6). Here we are discussing the limits of graspability of the single thought structure.

A second possibility is related to the limited volume or capacity for conscious mental information processing (cf. e.g., Miller 1956; Mandler 1975, 1989; Baars 1988). This idea still remains more of a hypothesis than an actual explanation as to why the upper limit for the embedding of cognitive content is the third level.

According to a third possibility which I will argue for here, the limitation is due to the very restricted capacity to keep track of the link (or cathexis) with the self in the recursive embedding of HOTs. In other words, the basic restriction on the volume of cognitive structure which is accessible to consciousness is due to the *subjectivity* of mental representation. Alternatively, there are states of consciousness—especially perceptual ones—where the 'amount of information' is maintained at a quite remarkable level of volume and complexity permanently (cf. Stamenov 1996). I will return to the topic of maximal consciousness and its structure in the section 2.7. below.

2.2. *The level below: Perception, feeling and reporting*

The relationships between different sensations, perceptual qualities, inner feelings and the reports about them have been discussed in different ways by philosophers (cf. Stubenberg 1997 for an overview). The nature of the problem

can be illustrated by a discussion of the relationship between the utterances *Ouch* and *I am in pain*. Are they equivalent, since they both express the same mental state, or is the latter a report about a mental state which, if executed behaviorally, would amount to the exclamation of *Ouch*, or a grimace, a gesture, etc.? Wittgenstein's (1953) opinion seems to be that perceptions, feelings and beliefs can be expressed only nonrecursively, i.e., one cannot 'report' on them, one can only refer to them and can further report about the thought which refers to them. *Ouch* and *I am in pain* are both expressions of one and the same mental state (cf. Wittgenstein 1953, II, par. X, p. 190). When commenting on Wittgenstein's opinion, Rosenthal (1993:217) points out that sentences which report one's own beliefs are on a par with those which report one's own perceptions, i.e., they could be regarded as expressions of these very beliefs and sensations. However, this possibility *to conflate expressing and reporting* is somewhat bewildering from the start.

This happens, in my opinion, because 'reporting' can mean different things (on different occasions in one language or in different languages):

(a) the first meaning of 'reporting' is the 'standard' one used in language studies. The term covers the reporting (or evidentiality; cf. e.g., Chafe & Nichols 1986) of the content of an utterance made by another person about an event or a state in the world which was not witnessed by the speaker. It would be tempting to 'project' this concept of reporting to the possible relationships between two thoughts—a HOT and a LOT—which occur in the mental continuum of a single individual. Actually, the main hindrance to the realization of this possibility to report one's own thoughts is due to the subjectivity of mental representation. In Bulgarian, for example, which has an elaborate grammatical category of reportedness (or evidentiality), this latter possibility cannot be used because one can very rarely speak about one's own experiences—past and present—from the viewpoint (please note) of a *third* person. Only a third person would be authorized to narrate about one's own verbalized experiences, by using exactly these reported forms of the verb. The reported verb forms cannot be sensibly used when the speaker narrates episodes from his/her own biography except when one talks about his/her early childhood (for example, as heard from relatives who witnessed and narrated it) or in the case of amnesia when information about what one did originates from external witnesses who do not participate in the current conversation;
(b) the second meaning of 'reporting' is related to the capacity to take a previous thought recursively as an object of the current thought. This is an ex-

tension of the 'standard' (for language) concept of reporting which extrapolates the relationship via the embedding of one's own verbalized thought to a verbalized thought of another person to the relationship between one's own thoughts. In this way, one could make the claim (among others) that one 'talks to oneself' as if oneself is 'another person' to whom the verbalized thoughts are addressed. This is, however, not a genuine case of reporting but rather 'an internal colloquy' because, as the reader may recall, the true reportedness in language is the report of a verbalized thought from the perspective of a third person. In other words, the consistent use of reported forms would amount not to *I think I am in pain* or *I think you are in pain*, but to *I think he is in pain* (speaking about one's state of consciousness). The basic problem with this 'broader' concept of reporting turns out to be related not to the restrictions for recursive embedding of the content of thought, i.e., its 'object', but to the specificity of the subjectivity of mental representation;

(c) according to a third interpretation of 'reporting', one can report verbally *about* one's own non-language specific experience. The report puts 'verbal clothes' to the previously mute experiences. The utterance reports about them by referring to them in the way the word *red* refers to the experienced quale of redness. In this sense, however, perceptions and feelings are, strictly speaking, not reportable but only capable of being referred to because we cannot 'incorporate' them into a HOT in the way we can incorporate the verbalized LOTs. We can only refer to them by making them part of the verbal mental event, but this part is external to the language-specific dynamics. In other words, the appropriate expression of the 'referring' reportedness is not *I am in pain*, but *This is pain*. The introduction of an explicit subject into the first sentence complicates the story from a different angle (cf. (b) above).

The basic restriction to the broader use of reporting is due to the subjectivity of mental representation and the capacity to establish on-line a contact and verify the content of one's own experience—of perceptions, feelings, and movements. Some ways of 'getting in touch' with the latter are acceptable, others however are excluded. For example, one cannot 'link' to one's experience from the point of view of a third person, whereas one can treat language-specific structure and meaning in an 'objectified', third-person manner, i.e., as representing some objective situation in the world which seems to be the case when Korean is compared to Bulgarian. While we can take as 'objects' of our own verbal thoughts the utterances of other interlocutors, we cannot consider them 'intentional objects' in the sense we can consider our own language-

nonspecific ones. This difference is considered so important that it has been grammaticalized in many world languages, e.g., Bulgarian, Korean, Turkish, etc.

2.3. *The level above: Attitude and belief expression and reporting*

One can express an attitude as in *The door may well be open* but one can report about one's own attitude as in *I suspect that the door is open*. One can declare *I believe that we are not alone in the universe*, but it would be rather unusual to claim *I believe that I see a chair now* while looking at this chair in the presence of an interlocutor.

Concepts like 'attitude' and 'belief' have also accumulated a history of different usages in analytical philosophy. Apparently, the difference between them boils down to the following. While beliefs are about truth/falsehood, attitudes can have the multiple 'values' of sincerity, suspicion, doubt, irony, etc. What is important in our context is that at some point attitudes and beliefs, too, can become conflated (or the difference between them could be 'neutralized' in the process of the mind's functioning). This is what happens in the case of the assertoric attitude where I sincerely *believe* that what I say is a truthful description of the state-of-affairs in the world. The capacity of mental states and their components to fuse is no less important a feature than their differentiation in the dynamics of consciousness.

A further problem to consider is the relationship between perceptions and beliefs, i.e., the first and the third floor of the mind's hierarchy (1. Perceptions & Feelings → 2. Thought → 3. Beliefs & Attitudes). We should be aware of this hierarchy of mental processes which has been quite widely accepted, whether explicitly or implicitly. In this hierarchy, the lowest level is ascribed to perceptions and feelings, the middle one to thoughts, and the highest to beliefs and attitudes.

Perceptions and beliefs seem difficult to associate to each other, because I do not need to believe in something I see before me right now. This is the reason why the utterance *I believe I see a chair right now before me* seems somewhat awkward, unless we imagine we are talking in a dark room. The proverbial *To see is to believe*, which equates the two, obscures an aspect of their incommensurability. If this is the case, every equation of the two is to some extent bewildering because it tends to challenge the applicability of this hierarchy.

2.4. *Towers of thought*

Rosenthal (1993:204) makes the claim that clearly distinguishing between expressing mental states and reporting them has important consequences for the

way one apprehends and models the structure of consciousness. Whenever one meaningfully and sincerely reports on being in some particular mental state, one thereby expresses one's thought that one is in that mental state. The ability to report being in particular mental states requires the ability to express higher-order thoughts that one is in those states. On the other hand, the ability to report on being in a mental state corresponds to that state's being conscious. This is presumed to be the case because if the state in question is not a conscious one, it will be unavailable to the subject as a topic of a sincere report. But the ability to report that one is in a particular mental state is the same as the ability to express one's thought of being in that mental state. So, according to the Rosenthal's argument (1993:204), a mental state's being conscious will be identical to one's ability to express one's HOT being in that mental state.

There are some troublesome aspects in the differentiations made above. First we have mental states. They can be conscious or unconscious. When they are conscious, this means the following:

(i) one is *being* conscious OF a mental state;
(ii) one is able to *report* being IN that mental state;
(iii) one is able to *express* one's thought that one is IN that mental state.

Rosenthal equates (i) with (ii), and (ii) with (iii); they mean the same although the terminology is different. The common denominator is that one is conscious of some mental state occurring in his/her mind.

The first problem with this approach is in the different way of 'spatialization' of the relationship to consciousness of the referent mental state—it is either through OF or through IN. This might look like a problem due to the verbal conventions of English. As a matter of fact, one's being conscious OF a mental state might well be a problem of being conscious IN a mental state. In other words, being conscious of some mental state is not a matter of one mental state being conscious of another discrete mental state, but of one part of the mental state being conscious of another part of this same mental state. The rules of IN-OF equation remain to be further specified.

There is a second problem which is related to the equation of the ability to report with the ability to express a thought about some mental state. If every case of expressing a thought is a case of reporting (when we are conscious what we are doing with our verbal actions), the two abilities could be faulted by circularity or misleading identification with each other in their definitions:

(a) Being *in* a particular mental state, e.g., pain, and *expressing* it either consciously or unconsciously by a grimace, an exclamation like *Ouch*, or some other directly observable bodily movement or symptom;

(b) Being conscious *of* some mental state = being capable of *reporting* about being *in* a particular mental state = being capable of *expressing* one's thought that one is *in* that mental state;
(c) *Expressing* one's thought that one is *in* that mental state = *reporting* about being *in* a particular mental state, e.g., *I am in pain*;
(d) *Reporting* one's thought that one is *in* that mental state = *expressing* one's thought *about* one's thought that one is *in* that mental state, e.g., *I think I am in pain*, etc.

The trouble seems to lie not simply in the necessity to equate expressivity recursively with reportedness in (b)-(d). At the highest level, the level of (d) above, we report from the perspective of the lower-order thought but we express our thought from the perspective of this very thought. In other words, at the highest level reporting vs. expressing depends on a change of the perspective. Accordingly, we can maintain that in (d) we have one and the same state of consciousness with a possibility for oscillating perspective, i.e., of two mental states both capable of monitoring each other.

It turns out that the highest-order thought in the current hierarchy ('tower of thought') represents itself expressively by necessity. The lowest-order thought or state also represents itself expressively while the hierarchical relationship is built up by 'reporting about'. It relates first-order states or thoughts as intentional objects of a second-order thought, and a second-order thought as an object of a third-order thought, whereas the lowest state and the highest-order thought are expressive, in this way 'encompassing' the 'reporting' tower. In other words, the relationships in this 'hierarchy' imply some circularity in connecting reporting and expressing.

It still remains to be explored why we come out with such a 'sandwich' theory of the relationships between expressing and reporting in the formation of a state of consciousness; why thoughts, as it turns out, MUST be both expressive and reporting, i.e., both expressing themselves as *mental actions* in the realization of the mind's dynamics, as well as *representing* some mental content different from what they themselves represent.

2.5. *What contributes to consciousness cathexis*

How can we conceptualize the relationship between a mental state (for itself), its expression, and the capacity to become conscious of it? Its peculiarity derives from to the experience of *intuitive immediacy* with which these three are accessible to us. This immediacy is closer to an IN-relation than to an OF-

relation. While we can only infer about the mental states of other human beings from their verbal and nonverbal behavior, we have a privileged and private access to our own experience only. This intuitive immediacy of the relation to one's own mental states is a problem because while we can report about the mental states of the others through observation of their overt behavior, we report about our own experience through the link (or cathexis) with the experience itself—be it nonverbal or verbalized. In other words, there is something quite special about the relationship of the subject to one's own mental states. William James (1890:633-634) conceptualizes this immediacy in the relationship to one's own experience under the rubric of 'sense of familiarity'. Newton (1996:70-72) provides an explanation along the lines of mapping of the perception of oneself and the proprioceptive experience of the actions of one's body in the environment. Rosenthal (1993:205), however, is of the opinion that this immediacy cannot be due to proprioceptive or visceral observation, as well as observation by way of the five exteroceptive senses. He claims that our feeling that the consciousness of mental states is somehow immediate is most vivid in exactly those cases in which the HOT is not itself conscious (Rosenthal 1993:205). The connection between a state's being conscious and our being able to report on that state reflects the fact that conscious states are accompanied by thoughts *about* those states, and we can express those thoughts (Rosenthal 1993:207). He immediately acknowledges, however, that the capacity of some state to become conscious is due to the HOT, *but not to the resulting ability to report* (*ibid.*). In other words, the capacity to become conscious is still somehow dissociable from that of being able to report on some mental state. The HOT, even if being reportable, is not in itself a reporting. We can make sense of the immediacy of experience if and only if this is done from the perspective of the primary expressive state of consciousness.

2.6. *Making thoughts to coalesce*

The importance of the remark that the HOT, even when reportable, is not by itself a reporting has rather dramatic consequences. Rosenthal (1993), *de facto*, has self-unconsciously 'opted' for some circularity (but not for identity nor for potentially endless recursivity) of the relationship between reporting and expressing. This is the case because we have the following chain of implications between them:

(a') an *expressive* mental state (here I conflate the mental state *per se* and the way of its expression);

(b') a higher order thought resulting in the ability to *report* about (a');
(c') an *expressive* higher-order thought which makes it possible to *report* on (b') and become conscious itself (as an even higher third-order expressive thought).

Note that this hierarchy (a')-(c') is an abridged version of the hierarchy (a)-(d) in section 2.4. above. If this is the case, we may provisionally accept the possibility of a circular-looking, non-hierarchic model of consciousness, a model of *dynamic oscillations system* of consciousness, which looks as if circular when we try to model it as a vertically hierarchical system or as a serially executable algorithm. The feature of becoming conscious of some mental state is a relational property, but 'relational' in the sense of *being phase-locked to another appropriate state* (cf. e.g., Hardcastle 1995:131-134 for discussion of the idea that consciousness is implemented as system-dynamic oscillations).

2.7. *On the subject of certainty: A tribute to Descartes*

One can express one's thoughts, as in *It is raining now*. One can report the content of one's thought, as in *I think it is raining now*. One can also communicate an attitude toward the content of one's thought by expressing, e.g., a suspicion *The door may well be open*. One can explicitly report this attitude by saying *I suspect that the door is open*.

When we come to thoughts proper (without considering the possible relationships to mental states such as perceptions, feelings and beliefs), things look quite like Rosenthal (1993:200) presents them. But there is something one should be aware of in this case, too. We can express thoughts, attitudes about thoughts, reports about attitudes, and reports about reports. What seems very difficult to express is a third-order thought with any attitude other than the assertoric one. Of course, one could imagine (linguists can be quite inventive in cases like these) a possible universe, where I can say something of the third-order with an ironic attitude. Please try and you will see that irony, doubt, suspicion, etc., are possible second-order thoughts but cannot be higher, third-order thoughts. Consider the following examples:

(7) **I assert that I assert that I deceive you.*
(8) **I believe that I assert that I deceive you.*
(9) **I feel that I believe that I deceive you.*
(10) **I see that I assert that I deceive you.*
(11) *I see seeing myself.*

(12) **I say that I say that I deceive you.*
(13) **I think that I think that I deceive you.*
(14) *I think that I think.*

Only (14) seems acceptable while (13) is not, i.e., the verb 'to think' in English (as well as in Bulgarian and other languages) has something special to it. Note among others that when embedded, *think* becomes an intransitive verb. The transitive use of *think* in (13) makes the sentence anomalous. (11) is an English translation of the famous verse of Paul Valéry discussed by Lacan (1977:80). Can the reader understand it without consulting Lacan?

The expression of recursively embedded attitudes and their psychologic of *congruence dynamics* can become a problem in its own right. Let us consider some further examples for the purposes of our investigation:

(15) *He lies to me.*
(16) *He may well be lying to me.*
(17) *I suspect that he lies to me.*
(18) *I suspect that he may well be lying to me.*
(19) *I assert that I suspect that he lies to me.*
(20) **I assert that I suspect that he may well be lying to me.*

In the case of (15) I make an assertion. In (16) I express a doubt. In (17) I explicitly assert (report) that I have some doubt. In (18) I once again assert my suspicion but with the difference that I am not completely sure whether it is right to be suspicious in this situation, i.e., the 'strength' of the assertion is weakened. As far as I know, this effect of weakening a HOT of reported suspicion by the expressed suspicion in the LOT has never been discussed in the literature. (19) may well be acceptable as an expression of emphatic assertion of suspicion. In (20) we have a case of 'contradiction in attitudes' because we deal here with an emphatic assertion of a weakened or uncertain suspicion.

In sum, the problem with attitudes is as follows. While LOTs can express different attitudes, the third-order thought can have only one mental attitude which corresponds to assertion. My relationship to the content I become conscious of is that of ascertaining that some mental process has taken place in my mind and I can report it. Naturally, I can also be uncertain from time to time as to what exactly happened a moment ago in my mind. But in those cases my report will be that I am not certain what happened, i.e., I will claim the certainty of being unable to fix the content of some mental state. Even in the case when the object of certainty is a state of uncertainty, one cannot escape being certain

of that on the level of the third-order thought. This is the type of certainty I will name 'Descartes' certainty'.

2.8. *Becoming conscious: Cathexis, acceptance, possession*

Rosenthal (1993) makes an attempt to explain the nature of the cathexis by way of qualifying it as a mental attitude: "Propositional states, both conscious and unconscious, intuitively seem bound to their subjects by their mental attitudes." (Rosenthal 1993:219). *The cathexis is a mental attitude relating a thinking subject to his thoughts*. The attitude seems to be that of accepting some mental contents as 'belonging to me'. The metaphor of 'accepting' is supposed to mean here that the structure of the subject and the structure of the mental content in question turn out to be commensurable, congruent (in the sense of Osgood 1980). The subject somehow appears in the situation in which s/he *has* thoughts, i.e., the thoughts not only appear but also the subject recognizes them as belonging to him/her. S/he readily acknowledges that: *I have thoughts*. It seems to me much more consistent to maintain that the unconscious thoughts are connected to an unconscious subject. It becomes more troublesome, however, to explain the immediacy of the subject's contact with the content of his/her thoughts, the content being accepted as 'one's own' and the possessive attitude toward them as 'objects' whereas the subject is not available in this immediate way as the content of the state he/she is aware of. The immediacy of the access to the content of one's thought seems noncontroversial (although it is challenged by some authors; cf. Jackendoff 1987a). It becomes a problem on a new level, however, when we try to consider the question of the immediacy of the access to the subject (not to the content of consciousness which represents objects with referents from the outside world) of the corresponding mental state or event. Consider the following example:

(21) *I had a dream last night*.

Who is the *immediate* subject of the utterance (21)? Note the immediacy of the first-person experience. In this case, we are authorized to ask further: Immediacy to whom? What is the technique for tracing back the subject's origin? Is this subject the one who actually experienced the dream? Or the one who recollected the dream after awakening, i.e., the one who is the explicit subject (the 'I') of the sentence (21)? Or the one who now pronounces (21)? Evidently, we have different possibilities for distanciation and/or dissociation of the first person from his/her immediate experience. In these circumstances, it is not entirely clear which type of cathexis with experience is the most immediate one for the

subject. We can accept as 'immediate' either the one (capable of) experiencing qualia or the 'I' who happens to be in charge at this very moment. Please note that even the last two are not necessarily coincidental: the experiencing self is a patient of the state, while the executive self is the agent in charge. And there is no easy way to choose who the 'primordial' one among them is and whether it is right to equate them as identical, irrespective of the genealogical primacy accepted.

The answer which tries to avoid the problem and claim that in all these cases we have one and the same self and because of the cathexis with this self-same self we can experience, remember and report what we dreamt last night, is not as unproblematic as the folk belief tends to make us ready to accept. The immediate subject of (21) is the one which pronounces the utterance (the 'I of enunciation' of Lacan 1977:139). The immediate subject of the dream is the subject of the dream, when the latter happened on-line. There always exists a possibility of a rupture in the continuity of self-identification and the cathexis to some coherent set of thoughts as mental content at any time.

This capacity for partially controlled or unconsciously occurring RUPTURE in the cathexis between the subject and his thoughts, attitudes, feelings and perceptions makes controversial the scenario of subjectivity and immediacy in the access to one's own conscious content, as sketched out by Rosenthal (1993:219-220). According to his theory, the hierarchy of possibilities for cathexis looks as follows:

(a) cathexis with unconscious mental states "which belong to their subjects in no more problematic way than physical objects and their properties" (Rosenthal 1993:219);

(b) cathexis with both conscious and unconscious perceptual states which are tied to their subjects "by occurring within a field of experience, which connects these mental states to others of the same and different modality" (Rosenthal 1993:219-220). I cite the passage from Rosenthal as it is, because for perceptual states, he, as a matter of fact, does not provide an explanation for the nature of the link to the subject. He speaks instead about the possibility of inclusion of a mental state into a wider 'field of experience' where two or more of them can connect to each other in some further unspecified ways;

(c) cathexis with both conscious and unconscious propositional states which are bound to their subjects by their mental attitudes, the latter being a kind of relation which connects a thinking subject to his thoughts;

(d) cathexis with conscious mental states which at the same time are tied to their subjects in some way above and beyond the bond they have in common with non-conscious states. This is due to the content of the accompa-

nying HOT. "That higher-order thought is a thought to the effect that one is, oneself, in the mental state in question. Because such higher-order thoughts are both about oneself and the mental state one is in, they carry with them the sense that the tie between one's mental state and oneself is stronger when the state is conscious than when it is not." (Rosenthal 1993:220).

Leaving aside the question which type of cathexis—the conscious or the unconscious one—is stronger, we still face a variety of problems when conceptualizing the immediacy and the subjectivity of conscious states. These problems should make us aware that the relationship of any two mental states (a HOT and a LOT) still remains controversial.

2.9. *Expressing vs. reporting what: The difficulties of representing linearly the dynamics of conscious thought development*

In the context of the HOT theory of consciousness, there are two possibilities to find *a linear causal determination* between a HOT and a LOT (or a state)—a feedforward or a feedbackward one. Either the LOT can become conscious by causing the HOT; or the HOT can cause the LOT to become conscious. It is appropriate to note that the relations between HOTs and LOTs are not symmetrically reversible. While a LOT becomes conscious within the perspective of a HOT and this is, presumably, a case of 'direct', unmediated causation, the causation by LOT of a HOT is *instrumental* to the final effect that the LOT (or the state) becomes conscious, i.e., here we have a case of 'indirect' causation, causation with some (at least partially) unspecified means.

Rosenthal (1986:339) expresses the idea that a mental state's being conscious requires not only that it be accompanied by a HOT, but also that it cause that HOT, because it is very difficult, if at all possible, to imagine other potential agencies ready to accept 'responsibility'. Rosenthal (1993:218-219), however, comes to a different conclusion. He finds the causal requirement quite troublesome to defend in the direction of the 'upward' causation—from the lower-order mental state to the HOT. If mental states cause the appearance of the accompanying HOTs, then, by definition, every mental state must be accompanied by such a thought, i.e., it must become automatically conscious. But it is clear that we can find mental states which are not conscious, or can be formed either consciously or unconsciously, depending on many different conditions.

The other direction of the possible causation—that HOT causes the formation and appearance of the lower-order mental state—also looks implau-

sible upon further investigation. It is well known from experience that we are only partly and imperfectly in control of what happens in our minds. The case for strong determination by consciousness of what is supposed to happen in the mind is not a tenable doctrine nowadays, although that does not mean that one should avoid the problem of how we succeed in guiding intentionally our mental actions within the scope of on-line conscious monitoring (which we can do, at least sometimes). In other words, even if we can 'cause' some thoughts of 'lower-order' to appear in our consciousness, their appearance does not seem to be causally determined simply and directly by the available HOT, but by a set of different conditions which directly and indirectly contribute to the formation of the state we are oriented towards. A famous example, in this respect, is the tip-of-the-tongue phenomenon where even with the best of our intentions (willful effort) we cannot get access to some name or word, i.e., we cannot 'cause' it to appear and become fully available as an 'entry' from the long-term memory (LTM).

Under these circumstances one can only claim that HOTs merely *happen*, *occur*. However, this does not sound very optimistic, since it seems that the appearance and/or disappearance of consciousness in the brain is a gambling game—it might occur but it might not; it might appear here but chances are that it will surface somewhere else, too. This picture looks more or less similar to Dennett's (1991) heterophenomenological-stories-narrating-brain. But if consciousness is such an opportunistic affair, the best we can make of it is to claim that it is epiphenomenal: Who would be ready to rely on such an 'anarchistically' disposed function in order to do some job?

Rosenthal (1993) finds a way out of the troublesome relationship between thinking and being conscious of one's own thinking in the following way. The thought is there. The difference between conscious and unconscious thoughts is that in the former case the thought is attended to by a roughly simultaneous HOT. This does not mean that the latter thought causes the LOT to emerge or arrange itself, e.g., as a well-formed sentence. The latter is already there. The difference is between attending and not attending to it. In other words, it is always potentially possible to actualize two almost parallel lines of thought. The first one goes on with or without being attended to. The second locus of thought is formed when one wants or happens to attend to the first one.

To summarize, the analysis of the HOT theory has led us to become aware that there are some problems in the relation of thoughts to other mental states (different from thoughts), as well as between two or more thoughts among themselves when they become the conscious content of one's experience:

(i) There are at least two different types of hierarchies involved in the attempts to serialize the dynamics of mind development in space and time. The first is of a 'horizontal' type. It involves the presentation of thoughts as they are made explicit in a written or spoken text—as a linear progression of coherent and congruent structures with protentive (cataphoric) and retentive (anaphoric) links with what is supposed to happen in the next thought(s) and what happened in the previous one(s). The second hierarchy is of a 'vertical' type. It involves the localization of thought processes as holding the middle position in the hierarchy of perceptions and feelings on the one hand, and attitudes and beliefs on the other hand. A state of consciousness (SoC) has the following structure (if we posit thought processes as the 'point of reference'):

(22)
$$\begin{array}{ccccc} & & \text{Attitudes, Beliefs} & & \\ & & \uparrow & & \\ \text{SoC} = \text{Subject (S)} & \leftarrow & \text{Verbal Thought (VT)} & \rightarrow & \text{Object (O)} \\ & & \downarrow & & \\ & & \text{Perceptions, Feelings} & & \end{array}$$

(ii) The 'vertical' and the 'horizontal' hierarchies of thought localization are frequently mapped onto each other. This becomes necessary in order to help serialize on-line the thought performance in the mind. Through serialization, the relationships of the 'vertical hierarchy' of mind processing (Mind = Perceptions & Feelings → Thoughts → Attitudes & Beliefs) become mapped onto the 'horizontal hierarchy' of mind processing (Mind = Subject of Thought → Thought → Object of Thought). In this way, each thought acquires a subject (cf. Langacker, this volume) which is not part of its explicit structure, as well as it aims at an 'object' which is a state-of-affairs in the world (according to the standard interpretation of the category of intentionality) or at some language-nonspecific way of representation in the mind itself (according to some theories in the psychology of language and psycholinguistics; cf. e.g., Paivio 1986);

(iii) Verbal thoughts (VTs) can 'appropriate' mental states other than thoughts (e.g., emotional states, perceptual representations of discrete objects from the objective world, etc.) by 'aiming at' (intending) or referring to them as objects (Os) of thought. For example, when I utter *I am in pain*, I am supposed to be reporting about my being in a state of pain. There is some ambiguity involved here, however. I can maintain that VT as a whole 'aims at' the O (= a state of mind), e.g., being in pain. But I can also maintain that the 'aiming at' aspect of VT is due to the referring capacity of the word *pain*, while the *I* refers to the S of the current SoC. In a sense,

VT and SoC 'mirror' each other and the latter 'aims' in two directions (cf. 22 above). If we accept this idea, we can claim that by studying the structure of VT we can make appropriate inferences about the structure of SoC in general. The 'reportability' of SoC is determined by isomorphisms in the structure of SoC and VT;

(iv) The relationship of thoughts to the nonverbalized subject is supposed to be a kind of attitude—the *possessive (assertive) attitude* of adopting a thought as belonging to oneself: S → VT. An alternative would be to identify oneself with the thought and claim that the subject is a structure derivationally dependent on the primary reality of thought: S ← VT. This seems to be basically the position of Descartes;

(v) The relationship of VT to O cannot be equated with that of VT to S. This statement starts to look more troublesome, when we reformulate it as follows: by definition the subject of thought cannot become an object of verbal thought. As soon as we make the subject of thought an object of the next thought, the latter has a subject of its own which once again is not accessible to this very thought and must be a distinct 'entity':

(22') $SoC = S^2 \leftarrow VT\ (= S^1 \leftarrow VT) \rightarrow O$;

(vi) The relationship between any two discrete successive thoughts, the second *monitoring* the first, from one point of view, looks as if comparable to the structure of a single thought with an 'object', i.e., $VT^2 \rightarrow VT^1 = VT \rightarrow O$. The analogy, however, is based on the capacity of thought to embed thoughts as its 'objects' via recursive equation of a noun phrase (NP) with a thought ($NP = VT^1$), while the establishment of a link of VT to nonverbal mental states can be mediated only through referential (and/or intentional) association which is explicated for the O and remains implicit for S of the corresponding uttered thought;

(vii) The 'rough contemporaneity' of the two distinct thoughts which purportedly form the structure of a conscious mental state raises the problem of the conditions for the formation of a single well-formed thought and the possibilities for this holistic emergent entity to relate to other entities of the same or a qualitatively different kind in the dynamics of mind development;

(viii) The relationship of 'supervision' or 'monitoring' of a LOT by a HOT requires further specification. In this respect, the basic problem is not just the necessity vs. contingency of the relationship but also its specificity, since the HOT cannot be a linearly successive—preceding or consequent—thought of the same order as any LOT but somehow is neither exactly contemporaneous (synchronous), nor strictly preceding or consequent.

3. Aspects of the specificity of sentence-immanent structure

In order to understand properly the nature of verbal thought, we must orient ourselves into the units of its implementation in mind, as well as to inquire into the sources of the functional autonomy of thought structure, e.g., to find out what the conditions for the formation of a single well-defined holistic thought are. We should take care also to identify the mechanisms which can determine the formation of a chain of two or more autonomous and well-defined verbal thoughts. In the course of our discussion we will see that the relationships between simplicity/complexity, minimality/maximality, optimality, prototypicality, fusion vs. dissociation of different structures at different levels and the related issue of automaticity vs. variability on-line in execution routines, and ontogenetic primacy in the way of conceptualization of sentence syntactic and semantic structure are quite controversial and far from having being systematically and explicitly analyzed in mutual juxtaposition in current linguistic theory, as much as one might consider them among the most self-evident 'fundamentals' of thinking about language.

3.1. *The structure of language and the structure of verbal consciousness*

In linguistics there have been different proposals as to what the basic patterns of verbally expressible states and events are which can form a single mental representation. At first approximation, one can make an attempt to posit as units capable of autonomous functioning verbal structures of different complexity:

(23a) **apple*
(23b) *the apple*
(23c) *the ripe apple*
(23d) *The apple is ripe.*

(23a) cannot implement a discrete thought in any context. (23b) seems a better candidate for expressing a single thought in appropriate circumstances. This is the case because it can refer, it can point out, toward something outside itself—an object in some possible world (not necessarily the actual world available just now to the senses, however). When can that happen? When it is used as an answer to a previous question, i.e., in the context of coherent conversation.

In the absence of any context and situation, however, we would be inclined to accept only (23d) as a well-defined language structure with a well-defined pattern of meaning associable with it. This relates to the belief that the

sentence expresses (unlike any of its components) a holistic and well-defined single (= discrete) thought. In other words, an explicit sentence structure requires minimal contextualization (compared to other potential candidates for holistic units) for making sense. From both syntactic and semantic points of view, it forms an autonomous whole. Still, this claim is not unproblematic from the perspective in which we study the problem. It appears implausible to maintain that the sentence structure plus its context-independent (so called semantic) content could exhaust ANY single discrete state of consciousness capable of being associated with it. This may seem as a contradiction to the previous claim but the minimal context or the possibility to recover maximally context and situation from the explicit content of a sentence still remains a prerequisite for a context (an implicit aspect of the mental representation). In other words, every discrete verbal thought has both explicit and implicit content and structure. At least part of the implicit structure is due to the requirement to map sentence structure onto a possible state of affairs and to verify with one's own sensori-motor system whether this envisaged state-of-affairs really is the case in the world. In other words, there is no way to block off the realization of language-nonspecific form and content during the formation of any mental representation while implementing its language-specific one. In this way language is tied to the world and to the way we act in it.

There are also some differences in the immanent structure of verbal thought in (23b)-(23d). While (23b) can just refer, (23c) expresses mental content comparable to that in (23d). In other words, (23c) and (23d) code an identical information as their semantic content. Where is the difference between them (if there is any, from a semantic point of view) and does it matter for the dynamics of consciousness and cognition? The difference is, I maintain, that while (23d) is constitutive for a discrete conscious thought, (23c) is not.

The controversy of 'word vs. word group vs. sentence as candidates for primary units of conscious mental representation' may seem outdated, i.e., long ago resolved in favor of the sentence in theoretical linguistics with the revolution in the studies of syntax in the fifties and sixties. However, Chafe (1996) points out that in actual discourse the way of parsing speech into sentence-like patterns seems inadequate, because it does not help identify the 'basic units' of discrete development of verbal consciousness. He finds appropriate, instead, to maintain the feasibility of the hierarchy of units of 'focus', 'well-formed sentence', and 'discourse topic':

> When, nevertheless, well-formed sentences *are* found in ordinary speech, they evidently function to bring together chunks of information too large to be accommodated within a single focus of conscious-

> ness, intermediate in comprehensiveness between a single focus and a discourse topic. It is interesting to find out that, whereas both intonation units and discourse topics remain relatively stable in content across different tellings of the same experience by the same individual, sentences are not. The information brought together in a sentence seems not to represent any cognitively stable unit of perception, storage, or remembering. Rather, sentence boundaries—whether syntactic, prosodic, or both—appear at points where the speaker judges a coherent center of interest to have been verbalized at that point. [...] Sentences appear to result from on-line, fleeting decisions with regard to levels of coherence that stand somewhere between foci of consciousness and discourse topics. (Chafe 1996:46)

This claim is both quite appropriate and controversial. Chafe equates the center of interest, the focus of consciousness and the intonation unit. The dynamics of discourse development in, e.g., telling several times one and the same remembered experience, results from the 'fleeting, i.e., *ad hoc*, decisions' at the interface between the foci and the discourse schemata (topics). Sentences do not represent any cognitively stable units of conception.

Chafe is right when he points out that (complex) sentences can and do occupy a middle position between single foci of consciousness and discourse topics but this is true for sentences consisting of more than one clause with some syntactically specified relationship between them (mostly that of subordination). Here, emphasizing the difference between clause and sentence (as in English) seems quite appropriate. Two foci can be integrated on a higher level with a single 'fleeting decision' but this does not mean that a single focus is fleeting-decision-free (even if the latter on some occasion is enacted automatically, it is easily deautomatizable by another fleeting decision). For the cognitive prerequisites and consequences of the developing skills for building cognitive units of higher and higher complexity cf. Zelazo & Frye (this volume). Please also note the compatibility of Chafe's idea of the 'fleeting decisions' association with on-line sentence construction-focusing with that of Zelazo & Frye about the role of control in the execution of cognitive structure.

I am of the opinion that any utterance (minimally consisting of one sentence component), if it is made *completely explicit*, i.e., after re-inserting the ellipses and deictic components either in outer or in inner speech, will MINIMALLY constitute a simple sentence. In other words, any discursive focus of consciousness MUST necessarily be sentence-specific. The sentence or its functional correlates (in language-nonspecific thought) are the minimal units of discrete holistic consciousness. There are no exceptions to this rule. The poten-

tial exceptions simply would fall out of consideration as cases of verbally-specifiable foci of consciousness. This strong claim depends, in fact, on how we define the nature of *predicativity* as a sentence-constitutive feature.

3.2. *'Deconstructing' the sentence structure: Subjects and predicates*

In traditional linguistic analysis it has been widely accepted that the most 'basic' way to split a sentence into components or parts is along the lines of 'subject' and 'predicate'. The subject is 'what is being talked about' and the predicate 'what is said about it'. In other words, with the very first move in parsing the structure of the holistic sentence, we have direct access to two different 'chunks' of information, which are, at this stage of analysis, the only 'visible' ones. The terms 'subject' and 'predicate' could, however, mean at least four different correlative pairs of concepts:

(a) According to the essentially Aristotelian *logical distinction*, in any proposition in which a particular term is combined with a general term (e.g., *Ivan is a Martian*), the particular term (*Ivan*) is the subject and the general term (*is a Martian*) is the predicate (cf. Strawson 1959);
(b) In the European linguistic tradition for centuries the subject has been identified with the expression that is employed by the speaker to identify what s/he is talking about (= topic) and the predicate is the expression that is used to say what s/he says about it (= comment) (cf. Lyons 1977:501). This would be the *topical distinction* in the imposition of a binary structure to what is said;
(c) The *grammatical distinction* is oriented primarily toward the definition of the subject. The latter is defined according to some formal criteria. In different languages different combinations of grammatical cues could serve as indication of the position of grammatical subject (cf. Palmer 1994 for further discussion);
(d) Finally, we could consider the plausibility of the *psychological distinction*. Lyons (1977) points out that one of the questions the linguists of 19th century were much concerned with was whether and to what degree,

> the order in which expressions occur in the utterance reflects the order in which their psychological correlates pass through the mind of the speaker in the cognitive process. The psychological subject was by definition the expression referring to the cognitive point of departure—the entity or topic that the speaker had in mind when he formulated the intention to produce an utterance. (Lyons 1977:507-508)

The problem of the cognitive salience and precedence in the evocation of ideas in the mind was equated either to the topic-comment distinction introduced above or to the given-new structure of information dynamics. Lyons's (1977:509) opinion is in favor of equating topicalization (he speaks about 'thematic structure' but we avoid this term) with information structure (the given-new information in the dynamics of the presentation of discourse) but this does not necessarily seem to be the case.

It is not difficult to see that the concept of subject has received much more attention in different treatments of the problem whereas the correlated concept of predicate has received less attention and vaguer definitions. At this point, we should therefore ask ourselves, what is the essence, the core of the concept of predicate in its narrow, grammatical sense, i.e., as applicable to the meanings of verbs in natural languages? Can we make the case for equating the dynamism associated with verb meaning with the motives of novelty (as contrasted to givenness), higher degree of generality (compared to the concreteness of reference-oriented common names), or some specificity associated with grammatical categories such as agreement and control (by/of the grammatical subject)? Or is Frege's (1879) intuition about the nature of this category on a better track when he points out that the meaning of the verb is a predicate that takes *n* arguments and yields a proposition? If this *access* to the arguments is simultaneous and direct, we can perhaps equate it with the unmediated (direct) access to consciousness.

3.3. *The predicate and its parts*

Chomsky (1957:26) adopted the 'traditional' way of analysis into 'subject' and 'predicate' (from a grammatical point of view) with his very first rule of constituency in *Syntactic Structures*, which splits the sentence in the following way:

(24) $S \rightarrow NP + VP$

Introducing a 'primary split' in sentence structure in this way is, however, questionable. The claim that a sentence must have a noun phrase (NP) and a verb phrase (VP) in its structure seems arbitrary as a 'first move' or *minimal parsing* because it obliterates the distinction of other basic types of relation of the verb in natural languages—those of tracing the predicative link not only to a subject, but also to a direct object, indirect object, etc. This splitting of the sentence into two minimal, first-to-be-differentiated parts is associated with an

implicit presupposition that the relationship between the subject and the verb is, somehow, more basic or fundamental than the relationships of the verb with all other arguments it could have. But is this really the case?

Palmer (1994:2) points out that an alternative view could be entertained according to which the structure of the sentence consists of a predicator and one or more arguments. Notionally, the predicator expresses the relationship. In *The boy chased the girl*, this relationship would be that of 'chasing', while the arguments of the verb will be *the boy* and *the girl*. The structure of the corresponding sentence could be represented in the following way:

(25) S → Argument + Predicator + Argument

In the terms of constituent structure, (25) could be given the following notation:

(26) S → NP + V + NP

Please note (after comparing 24 with 26) that the content of 'predicativity' is not the same in both cases. While for (24) the predicate is 'what is being talked about' (= comment)—a heterogeneous structure requiring further analysis—in (26) we achieve a clear-cut identification and fixation of (= *access to*) the verbal element (i.e., the specific predicative relation with an associated argument structure) with our very first move into the analysis of the structure of the corresponding sentence. The access to the predicator (verb) means that the associated obligatory arguments may become conscious content—simultaneously and directly.

The necessity to adopt as primary (26) but not (24) in analyzing the structure of the sentence on syntactic-semantic grounds is outlined at length by Palmer (1994) with data from typologically different languages. The notion of syntactic subject and predicate in their formulation in the Graeco-Latin grammatical tradition is, as a matter of fact, a language-and-culture specific formulation. If this is the case, we cannot claim (without introducing many further specifications and conditions) that the subject-predicate differentiation enjoys some special status in parsing sentence structure. It is a generalized idealization of some aspects of a relation between two parts of the sentence in some languages of the world. The juxtaposition of subject vs. predicate is symptomatic for differentiation on another level. This becomes evident in the proposal of Williams (1984) who introduced the term 'external argument' for the position of the subject. The idea is that the subject is easier to split apart, is further away from the 'core' of the sentence consisting of the verb with its complements. The meaning of the verb (in the case of a transitive construction, e.g., in Eng-

lish; cf. Tenny 1994) is typically more closely associated with the direct object than with the subject. In other words, the external argument is much easier to *dissociate* from the structure of the sentence compared to its ties with the direct object. But please note that here the subject is not correlated with the predicate (as a whole), but with the direct object. In other words, the concept correlative to the subject is not the predicate (as a whole) but that of the object. In a different key, the predicate or verb phrase (VP) has no referent in mind's economy.

To summarize, predicativity (as a characteristic the finite verb contributes toward the formation of a sentence pattern) has the following criterial features which distinguish it from all other grammatical relations: (i) it serves the function of focus construction for the current conscious thought; (ii) it gives direct (or immediate) access to the content of the obligatory arguments forming the current focus of consciousness; and (iii) it imposes an order of prominence in the way of presentation of the current conceptual content in the mind.

3.4. *The place of transitive construction in grammar*

In order to make clear the relationship between subject and direct object, we should discuss them in some detail. In principle, the best way to define transitivity would be through the formal structure of the transitive construction itself. Unfortunately, this seems possible only to a limited extent. Different authors via different routes have tried to define this category as a *fusion* of features of content and form.

Hopper & Thompson (1980:252) point out that the prototypical transitivity as found in typologically different languages is characterized by the following features (listed here in a modified and shortened version): an action must have two or more participants; must refer to a bounded event; is volitional; refers to a real event in the world; is highly agentive; totally affects the object of the action; the object of the action (though not necessarily the agent) is highly individuated, etc. For each of the prototypical features of transitivity, there exist languages in which clauses possessing that property display transitivity; while clauses lacking in that property do not display transitive behavior, i.e., each of the features in question could be criterial for transitivity. In other words, the availability of subject and direct object is not the only necessary and/or sufficient condition for some sentence pattern to be accepted as a transitive one.

Givón (1984:20) points out that the concept of transitivity describes the properties of prototypical events and hinges upon two strong prototypical conditions (among others): (1) the presence of a visible, volitional, controlling cause/agent; and (2) the presence of a clearly visible result-registering ef-

fect/patient. (It is appropriate to note here that Givón (1984:21) defines 'visibility' in a psychological sense, i.e., as aspects of the visualized situation or event to which one pays more or less attention.)

The 'semantic orientation' in trying to establish the nature of transitivity is even more pronounced with other authors. After saying that each transitive construction must have a syntactic subject and a syntactic direct object (in their traditional conceptualization), Wierzbicka (1988) points out that in the proto-typical case (for different languages, English among them) the semantic prototypes for the subject and direct object are as follows:

(a) The subject is an 'independent topic' (something akin to external argument), or a 'primary predicandum' (at the top of the hierarchy of focusing) due to the fulfillment of the following postulates: (i) I want to say something about *x*; and (ii) because I do not want to say something about something else;
(b) The semantic prototype of 'direct object' combines the idea of 'undergoer of an action' (patient) with the idea of 'dependent topicality'. This proposal was operationalized by Wierzbicka in line with the following conditions: (i) I want to say something about *y*; (ii) because I want to say something about person *x*; (iii) something happened to *y*; and (iv) because *x* did something to *y* (Wierzbicka 1988:17).

Tenny (1994:137) also defines transitivity according to the referential content of the verb (i.e., from a semantic point of view). A canonical transitive verb like *cut* exhibits a complex event structure with three parts:

(i) the measuring change in the internal argument (the object);
(ii) the final state which holds of the internal argument as an entity affected by the action designated by the verb; and
(iii) the external part of the event, which is an action engaged in by the external argument (the subject of the event; an event in this context may comprise more than one action) or the agent who does the cutting.

The relative *complexity* of the event structure expressed by a canonical transitive verb is due to the possibility to have actions expressed by intransitive verbs possessing as their sole arguments either the subject (so called unergative verbs), e.g., as in *I think*, or the object (so called unaccusative verbs) of the event (e.g., with experiencer verbs as in *I am frightened*; cf. also Pesetsky 1995). Complexity, however, is a theory-dependent concept (cf. the discussion of minimality below).

It becomes clear that different authors have found it most difficult to dissociate meaning from form in the case of the transitive construction. This is the reason for the proliferation of semantically motivated (explicitly or implicitly) definitions of it. The structure here seems most organically to fit the meaning it is supposed to express. The possibilities for dissociation between syntactic structure and semantic content of the expressions become more evident in cases of deviations from this construction.

3.5. *Mapping syntax onto semantics*

One way to circumscribe the possibilities for deviation and mutual dissociation of syntax and semantics is to compare the available taxonomies of syntactic relations and semantic roles. It is not my intention here to review the many proposals given for syntactically (constructively) and semantically (representationally) determined taxonomies. A good overview of this is given in Croft (1990), Palmer (1994) and Blake (1994). Here it suffices to mention that there is much more agreement in the terminology and the way of hierarchical scaling of syntactic relations:

(27) SUBJECT > DIRECT OBJECT > INDIRECT OBJECT > OBLIQUES

The subject, object and indirect object form the triumvirate of arguments which, in the great majority of cases, can become obligatory for the realization of the valence relations of some verbs, whereas the obliques are the adjuncts which can be added or omitted from the sentence structure depending on the individualized intention of the concrete communicator. (There are exceptions to the latter statement. The most frequently cited ones for English are the verbs *buy* and *sell*.)

With the semantic hierarchy, things look much more controversial and troublesome. The 'standard' list of semantic roles (or cases) after the introduction of this idea by Fillmore (1968) looks as follows:

(28) AGENT > PATIENT > RECIPIENT > BENEFICIARY > INSTRUMENT > LOCATION

More recently Fillmore (1971) introduced some modifications in his original proposal and I will cite this later version because it considerably deviates from the currently 'standardized' lists (of theta roles or conceptual arguments):

(a) *Agent*—the instigator of an event;

(b) *Counter-agent*—the force or resistance against which the action is carried out (cf. the concept of 'antagonist' of Talmy 1988);
(c) *Object*—the entity that moves or changes or whose position or existence is in consideration;
(d) *Result*—the entity that comes into existence as a result of the action;
(e) *Instrument*—the stimulus or immediate physical cause of the event;
(f) *Source*—the place from which something moves;
(g) *Goal*—the place to which something moves;
(h) *Experiencer*—the entity which receives or accepts, or experiences, or undergoes the effect of an action (Fillmore 1971:376; cf. Palmer 1994:5).

Goldberg (1995:57) cites a more syncretic roles set where, apparently, a rapprochement (mapping, fusion) between different approaches to semantic roles inventory is sought:

(29) AGENT, CAUSE > RECIPIENT, EXPERIENCER > INSTRUMENT > PATIENT, THEME > LOCATION, SOURCE, GOAL

With the proliferation of different proposals for taxonomies of semantic roles, there have been also criticisms of the plausibility of some of the roles as cognitive 'natural kinds'. Pinker (1984:400) points out that the 'thematic relation' Theme, though deducible from other semantic roles, does look more like "a disjunction of moved object or entity, subject of an attribution, and whatever is left over after the other arguments have been assigned their own thematic roles".

It is appropriate to point out that the semantic case inventory is originally posited by Fillmore (1968:33) with an orientation to represent a fixed (context-free) accessibility hierarchy in relation to subject choice. In other words, if we take as a point of reference the syntactic position of the subject, the agent will be the most accessible as a subject, the patient would be the second most accessible one, etc. The idea of an accessibility hierarchy has also been applied to direct object choice (cf. Dik 1978:74f; Givón 1984:169; Blake 1994:92). The implicit motivation in both cases is, it seems to me, that the mapping between syntactic and semantic patterns is 'computed' on-line (i.e., by the 'fleeting decisions' engine) but is not due to conventional and automatic associations of some sort.

Even if we accept the possibility of subject and/or object choice hierarchies in mapping grammatical relations to semantic roles, it is still not self-evident how that must happen, i.e., what the rules of mapping look like. This becomes especially a problem if we define predicativity in terms of the access

of the verb to *all* its obligatory arguments simultaneously and instantaneously. In other words, are there rules for mapping them in a serial order on-line during sentence production and comprehension (this seems to be the purport of Jackendoff's (1990) proposal), or do the ways of mapping themselves become conventionalized (at least partly in a language-specific way) into a set of semantic-syntactic interface constructions, as proposed recently in the most systematic way by Goldberg (1995)?

Some of the attempts to try to discover the 'universal(s)' in mapping syntax to semantics have been oriented, in one way or another, along the lines of finding the prototype of their matching with a set of features characteristic of it. The most cited attempt in this direction is due to Dowty (1991:572) who proposes at the highest level of generalization of mapping grammatical relations to semantic roles two macro-role prototypes—*proto-agent* and *proto-patient*. After the analysis of some of the aspects of the nature of the transitive relationship above we should not be astonished at this finding. The properties of the two macro-roles form sets of features of the following type:

Proto-agent:

1. Volitional involvement in the event or state;
2. Sentience (and/or perception);
3. Causing an event or change of state in another participant;
4. Movement (relative to the position of another participant);
5. Exists independently of the event named by the verb.

Proto-patient:

1. Undergoes change of state;
2. Incremental theme;
3. Causally affected by another participant;
4. Stationary relative to movement of another participant;
5. Does not exist independently of the event, or not at all.

The mapping onto the grammatical relations of subject and direct object of the proto-agent and proto-patient is according to the following principle:

> *Argument selection principle*: In predicates with grammatical subject and object, the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject; the argument for which the predicate entails the greatest number of Proto-Patient properties will be lexicalized as the direct object. (Dowty 1991:576)

We can see that linguists have tried, in one way or another, to accomplish two tasks which seem to contradict each other. The first of them is oriented toward achieving a description of language structure on formal grounds, i.e., without introduction of explicit semantic motivation, in other words, to try to dissociate form from meaning. The sets of syntactic relations do not look commensurable with those of semantic roles. The second orientation is toward trying to find out the ways and laws of mapping of syntactic structure onto semantic content. Both orientations seem legitimate. The main problem is where to look in order to find the basic motivation for both their compatibility and dissociability. Perhaps we can find further clues in first language acquisition?

3.5.1. *The prototype of transitive action in language acquisition and the problem of syntax-semantics dissociation*

In the literature on language acquisition (cf. e.g., Clark 1978; Pinker 1984; Bowerman 1989), it is quite widely accepted that children's first sentence structures are predominantly associated with the expression of transitive actions and caused motions (manipulations) of different objects, the appearance and disappearance of the latter, their acquiring and loss, etc.—either by the child or by other agents. Clark (1978), for example, points out that the agent- and/or patient-like entities are the most salient to children and are learned first:

> Most of the object categories named in children's early vocabularies are salient or attractive to them for various reasons: they move on their own, can move other objects, or can be manipulated by children. Notice that they name agents or movers—people or animals. [...] They also name a variety of smallish objects that are movable or can be manipulated. (Clark 1978:35; cf. Coldberg 1995:48)

We come once again quite close to proposing the idea of *conceptual prototypes* (or archetypes; cf. Lakoff 1987; Dowty 1991) as an alternative to the principles-and-parameters approach to the acquisition of language structure. The trouble with conceptual archetypes, however, is no less acute than with formal constraints: What is their origin and 'location' in mind? Are they a fixed set from which a hierarchy of higher and higher complexity can develop? If conceptual prototypes are imaged as a closed set, they hardly have any better chances to survive a test than any closed set of semantic roles.

Macnamara (1982:120-122) developed the thesis that the child uses actionhood as a cue that a word is a verb, and agenthood and patienthood as cues that the arguments of the transitive sentence are expressed as subject and object, respectively. In other words, in acquiring language structure the syntactic categories of subject and direct object are *semantically motivated* by being an

agent and a patient. Perhaps even more appropriate would be to say that they are, at this stage, still indistinguishable from each other, i.e., not yet dissociated from each other. At this stage of the child's development, it would be, correspondingly, out of question to talk about some 'deeply unconscious' formal constraints (of the type posited in Universal Grammar).

According to Goldberg (1995:43), children have already mastered (in a language-nonspecific way) the concepts of transfer between an agent and a willing recipient, causation of motion or change of state and they come to the task of learning language trying to learn how to encode these basic concepts (or prototypes, or archetypes). This is achieved, she suggests, through some type of 'semantic bootstrapping' (for more evidence in this respect, cf. Baron-Cohen & Swettenham 1996).

We can conclude that the point of dissociating syntax and semantics in different ways is that thus we posit (implicitly or explicitly) some architecture of actualization of sentence structure in the mind, both ontogenetically and on-line. From the former perspective, it turns out that a syntactic pattern must be represented in consciousness before it is automatized. From the latter perspective, during on-line processing we still need a mapping to happen in order for a sentence to be interpreted. If we accept the plausibility of this architecture, it remains to be seen where we must look for the language-specific implementation of 'becoming conscious'. We can get an even better orientation into the nature of the problem if we delineate the minimal/maximal scope of the verb's argument structure and the possibilities of deviation of explicit/implicit structure at the interface of syntax and semantics.

3.5.2. *The case for minimal and maximal scope of the verb's focus*

The belief both linguistics and psycholinguistics share is that the different meanings of polysemous verbs are discrete entities with a well-defined structure. The latter structure, once made accessible and having been selected for inclusion in the pattern of the sentence, must be included *as a whole*. Generally, the accepted view is that the verb's semantic structure includes up to three obligatory arguments. According to Givón (1984:116-117), however, verbs like *exchange*, *sell*, *buy*, *trade*, but also others traditionally considered as having three arguments (like *carry*, *give*, *bring*, *send*, *move*) can have four-argument structure which can be fully explicated in a single sentence, i.e., can realize more than three well-defined arguments in their semantic structure, while at the same time they, presumably, may not be explicated in the overt syntactic structure of some concrete sentence. In other words, while in the overt syntactic structure we may have two or three of the above mentioned four arguments of the verb, from a semantic point of view, nevertheless, the activated meaning is

that of four arguments. For example, when we have the overt structure *I bought a fridge*, the activated semantic content corresponds to *I bought a fridge from* x *for* y, where *x* and *y* remain unspecified but psychologically 'real', i.e., activated arguments of the schema. We can minimize to a certain extent the overtly expressed syntactic structure but on each occasion we get access to some permanent volume of semantic content. For different verbs, the minimum required explicit structure for achieving well-formedness is different. While the argument structure of *buy* could be cut down to a two-argument obligatory appearance, *exchange* seems definitely to require the explicit realization of three arguments:

(30) *Bill exchanged a chair for a table (with John).*
(31) **Bill exchanged a chair.*

There seem to be also an upper limit to the explicability of a frame or schema by a single verb. This upper limit is of four arguments. From the four, up to three can be obligatory, while up to four could be explicated with some verbs as coherent components of a single verb-affiliated (i.e., single action-specific) semantic structure:

(32) *Mary moved the textbook from the desk to the shelf.*

The situation becomes, however, more troublesome when we consider alternative opinions about the structure and meaning of verbs like *sell* and *buy*. According to Jackendoff (1990:59), in sentences with transaction verbs like *buy*, *sell*, *exchange*, and *trade*, there are not one but *two actions* going on at once. For instance, *buy* involves at least the component actions of (a) and (b) below:

(33) X buy Y from Z
  (a) Y changes possession from Z to X
  (b) money changes possession from X to Z

Thus it turns out that X and Z have each two semantic roles apiece (if we ascribe the semantic roles as due to the two different actions which happen to be enacted simultaneously in a parallel way). To say that the countertransfer of money does not count in the case of *buy*, because it counts more in the case of *sell*, is not convincing, because it is exactly the countertransfer part of the meaning of *buy* which distinguishes it from *obtain*.

Jackendoff points out that the difference between *buy* and *obtain* proves that in the former we have semantic structure expressing the action of counter-transfer of paying some money for receiving the goods one is trading. It is part of the meaning of the verb *buy* and for this reason it is not necessary for it to be expressed by means of an overt syntactic structure, e.g., by the explicit positioning of an indirect object. In the case of *obtain*, the addition of a component of the syntactic structure in the form of the non-obligatory indirect object, as in *John obtained a fridge for $150*, contributes more semantic structure to the obligatory arguments, because of the necessity to posit a second action—that of exchanging not only goods, but also money (in the opposite direction). While *obtain* with its obligatory arguments is not part of the market economy exchange rules, the addition of the indirect object reorients it into the orbit of the latter schema for regulation of social life world-wide.

The point Jackendoff wants to make on this occasion runs against the following belief: Any single sentence must have a single semantic interpretation. The latter means a single mapping between syntactic relations and semantic roles. In the case of *buy* (and many other verbs), however, there are two actions going on in parallel and two sets of semantic roles which fit in alternative ways the syntactic structure of the sentence. This controversial example can help us distinguish between the *schema holism* (or completeness, as a problem of conceptual structure, i.e., in LTM) and the well-formedness (or completeness, holism) in relation to the requirements for the realization of the obligatory arguments of a verb for the formation of sentential syntactic-semantic structure in working memory (WM).

If we accept this possibility of the realization of two different mental actions going on at once within a single sentence perspective, as Jackendoff posits it to be the case in his analysis, we can get into serious trouble in conceptualizing what is possible to access in consciousness as the structure of its verbal part. While it is reasonable to believe that the semantic structure required for the full conceptual explication of *buy* is coded in memory with all the transactional arguments required for the completion of the latter as a schema, this complex schema (i.e., a discourse topic) could be actualized in different ways and to different degrees according to the situation and context. In other words, the meaning of a verb can actualize its semantic potential in different ways depending on the specification of the concrete sentential and discourse context.

Jackendoff's (1990) proposal seems appropriate from the following points of view:

(a) Modifications in the syntactic structure can change the possibilities for the ascription of semantic structure to the corresponding sentence (as in the

case of *obtain* above). This seems to work as some kind of 'fusion' of the features of a syntactic ditransitive construction with the lexically-specific argument structure of the verb *obtain*;

(b) Any semantic interpretation is motivated by the necessity to include *perspectivization* in the meaning of the sentence (cf. also Langacker, this volume) in order to appropriately restrict the scope of conceptual content which can enter consciousness coherently;

(c) It is the requirement for perspectivization (as an aspect of the subjectivity of mental representation in general) which, among others, hinders the actualization of two (or more) mental actions at one and the same time in the performance of the conscious mind. This is the premise which has been accepted on intuitive grounds by the proponents of the serial symbolic computation approach to modeling the mind.

The three-obligatory-argument limit seems to be imposed by the lexically specific meaning of the verb, i.e., it is lexicon-dependent. It is due, in my opinion, to the necessity to map onto each other many different 'tiers' of mental information processing in a mutually synchronized and coherent format within a limited time-window. But how many of them must one posit?

3.5.3. *Multiple tiers in mapping semantics to semantics?*

Jackendoff (1990:126) points out that the conceptual representations can be organized into independent tiers, not unlike the way phonological information is analyzed and represented in contemporary phonological theory (cf., e.g., Goldsmith 1990 for further orientation). He identifies two tiers of conceptual roles—he names the first one, dealing with motion and location, the *thematic tier*, and the second one, dealing with agent-patient relationships, the *action tier*. Possible ways of correlating them are illustrated by Jackendoff (1987b:395) as follows:

(34) *Sue hit Fred.*

Theme	Goal	(thematic tier)
Actor	Patient	(action tier)

(35) *Pete threw the ball.*

Source	Theme	(thematic tier)
Actor	Patient	(action tier)

(36) *Bill entered the room.*

Theme	Goal	(thematic tier)
Actor	—	(action tier)

(37) *The car hit the tree.*

	Theme	Goal	(thematic tier)
	—	Patient	(action tier)
(38)	*Bill*	*received the letter.*	
	Goal	Theme	(thematic tier)
	—	—	(action tier)

Problematic for this model of mapping thematic and action tiers are examples (36) and (37). Is the action tier at all applicable in the case where there is no one-to-one mapping of roles? The problem is that the 'mapping' is sometimes of the schema-to-schema type, while in other cases some member(s) of one schema map onto member(s) of another as part to whole (in a metonymic way). The net result of 'fusion' is that the agent or patient becomes imaginable even if its correlative is not available for visualization (or possible to represent in a visible format). This dynamics of partial 'visilibility' and accessibility as qualitative content of consciousness is quite controversial and requires further specification.

These examples are very important in our context because, if we accept the logic of the arguments outlined above, it turns out that different tiers of conceptual structure tend to 'fuse' in a way not unlike that of syntax/semantics structural fusion. There are other subtleties in treating the ways of mapping and deviation from each other of syntactic and semantic structure, e.g., the possibility of multiple syntactic positions to have one and the same semantic role ascription (cf. Jackendoff 1990:60-61), but I will not deal with this very complicated and technical topic here.

Goldberg (1995:43) also finds it appropriate to posit two tiers of semantic structure. The outcome is a 'vertical' architecture of the following type:

(a) at the first level we have lexically coded frame-specific (or schema-specific) *participant roles*;
(b) at the second level we have *argument roles* which are of a higher level of generalization, e.g., agent, patient, goal, etc.;
(c) the relationship between participant roles and argument roles is that between *tokens* and *types*;
(d) the *mapping* between them seems to be that of cluster-to-cluster (but not a serial component-to-component mapping) because Goldberg (1995) explicitly insists that argument roles come in conventionalized clusters, so called constructions, e.g., the ditransitive construction, caused-motion construction, resultative construction, etc.

The relationships of these semantic levels of structure with the overt syntactic structure seem also to be quite complicated as Goldberg (1995:45) claims that different syntactic realizations of participant roles follow from differences in profiling (prominence), since profiled participant roles must be fused with the construction-specific argument roles that are realized as 'direct grammatical functions'. The latter are listed as subject, primary, and secondary object (Goldberg 1995:48).

In a comparison of the proposals of Jackendoff (1990) and Goldberg (1995), the real challenge is to try to find for these tiers mental modules capable of implementing them. Within the computational theory of mind, according to Jackendoff (1996:207), there must be one or more levels of mental representation over which processes of inference/entailment/reasoning can be defined canonically. One of these levels is semantic/conceptual structure (CS), while the other is spatial representation (SR). CS and SR share the work of thought; they are both, however, central representations and form a sort of an abstract version (or LTM-version, in my opinion; M.S.) of Paivio's (1986) dual-coding hypothesis (Jackendoff 1996:210). Just one step remains to be made in order for Jackendoff to accept *dual-coding processing in consciousness* itself—dual coding in LTM supports dual coding in WM (= the 'working space' of thought). The dual-focus processor in WM provides a home for the two tiers in question (or some comparable pair).

3.6. *The problem of minimality*

'Minimality' has been discussed in different contexts in the history of linguistic thought. Various types of motivation have been put forward in the pursuit of the basic or minimal language structures on syntactic, semantic, logical, and/or cognitive grounds.

The first one is oriented toward finding minimality of the representational content of the sentence. It is hardly a surprise that it should be associated (implicitly or explicitly) with the verb's meaning. Greenberg (1966) points out that the expressions of language differ according to the level of the inner complexity of their *semantic structure*, in the following way:

(39) STATES → CHANGES OF STATES → CAUSES OF CHANGES OF STATES

Along similar lines, Givón (1984:133) posits an ascending degree of complexity to states/events/actions which is correlated with the number of distinct aspects attributed to them.

According to Tenny (1994:137-138), the simplest representational event structure is that of change-of-state which has only internal argument (object of the action), i.e., a *minimal event structure*. For these intransitive verbs, the entire event is an event nucleus, as in *The lake froze*. In this way, a rapprochement is sought at the interface between event structure and syntactic structure—minimal overt syntactic structure corresponds to a minimal event pattern.

If we consider *explicit (or overt) syntactic (predicative) structure*, we can distinguish at least three different types:

(a) with a transitive verb, e.g., *John hits Fred*;
(b) with an intransitive verb, e.g., *The lake froze*;
(c) other cases like *to be*, *to have*, etc., expressing the static-looking relationships of identity, possession, equation, ascription, etc.

Minimality as applied to overt syntactic structure seems most straightforward, in the first approximation. Still, I can point out to controversial examples of the following type:

(40) *Vali.*
"Rains" (= "It rains")
(41) *Ivan — durak.*
"Ivan — fool" (= "Ivan is a fool")

In (40) we have only a verb in Bulgarian with some representative content associated with it which is impossible to distribute into any pattern of arguments of the type we know as semantic roles or syntactic relations. It has no arguments to be distinguished on semantic terms and the only formal tags are those related to present tense and the third person singular associated with the use of the verb in impersonal constructions in Bulgarian. In the case of (41) in Russian, we must drop the use of *est'* "is" in the sentences of categorial identification of individuals. We must put instead of the verb *lacuna*, a gap. Is this a case of ellipsis, of obligatory ellipsis? The latter sounds to me as *contradictio in adiecto* because obligatory ellipsis is not ellipsis at all. It behaves more like a null argument, from some point of view. In the sentence *Ivan est' durak*, adding the previously omitted existential verb would make it anomalous from a grammatical point of view. The explicit addition of the existential verb in constructions of this sort in Russian is possible only in the case of emphatic insistence on identification, which is quite developed and elaborated for rhetorical purposes, of a token with a type. This kind of identification is not evident to or expected by the audience.

In other words, examples of the type illustrated in (40) and (41) suggest that at the limit of discretization of lexical vs. overt syntactic structure of verbs we must choose as ultimate constituents of the sentence either the absence of a verb or the absence of any arguments whatsoever. As to which one of these structures could be considered 'more minimal', I leave this up to the reader. (Please note that the opposition (40) vs. (41) is one of zero vs. two and not of one vs. two arguments.)

The concept of 'minimality' could also be interpreted along the lines of generative grammar in terms of the difference between deep (D) and surface (S) syntactic structure and the necessity to trace the link between them through appropriate transformations. D-structure consists of phrase-structure rules and lexical insertion; S-structure is due to transformations which form derived phrase markers and operate upon D-structure (cf. Chomsky 1965). The Extended Standard Theory led to a four-level conception of Logical Form (LF), D-structure, S-structure and Phonetic Form (PF). The Principles and Parameters approach discarded transformations and introduced 'movements' instead. The latter serve the function of minimizing the derivation at the external (PF and LF) and internal (D-structure) interface levels. In the Minimalist Program, the derivations from D-structure to PF and LF are postulated to have a common part: D-structure is mapped to S-structure by some operation (Affect α), and the derivation then branches into two independent paths—PF and LF (Chomsky 1995:64). The S-structure is "the sole point of interaction among the three fundamental levels" (Chomsky 1995:132) of D-structure, LF and PF, no matter from which of them we initiate the derivation:

> The intuitive idea is that LF-operations are a kind of 'wired-in' reflex, operating mechanically beyond any directly observable effects. They are less costly than overt operations. The system tries to reach PF 'as fast as possible', *minimizing overt syntax* [emphasis added; M.S.]. (Chomsky 1995:198).

LF-operations working upon the structures of overt syntax turn out to be "deeply unconscious'. On the other hand, it is LF that is supposed to constitute the interface between syntax and the conceptual-intentional properties (semantics) of language. The solution amounts to the rather counterintuitive position that we can experience consciously only meaningless patterns while the interface with meaning is invariably 'deeply unconscious'. Some version of the outlined architecture of the language faculty, however, may very well turn out to be psychologically plausible but if and ONLY IF taken as a set of submodules supporting a language-specific focus in the double-focus system of consciousness developed below. Minimality is a teleological function which may reasonably motivate first and foremost the necessity to optimize the integration of consciousness, directly or indirectly.

As it turns out on closer inspection, the idea of 'minimality' and 'minimization' (= optimality) has been applied to conscious, unconscious, and deeply unconscious processes and representations of language production and comprehension. It remains to be seen whether it is right to apply this idea in a comparable way to these three types of mind processes. It is not my intention to analyze the problem of the relationships between explicit and implicit semantic content, overt syntactic structure of the sentence and its potential deeply unconscious syntactic correlates. The point I want to make on this occasion is that the relationships between simplicity/complexity, minimality/maximality, optimality, prototypicality and ontogenetic primacy are theory-dependent and far from being explicitly and extensively investigated in their mutual determination in linguistic theory.

Taking into consideration the high complexity and controversiality of the problems sketched out above, I still think that language itself gives us quite a simple clue to the solution of the problem whether there is a 'common denominator' to all the aspects of structure possible to implement in a single sentence. This is the *transitive construction* expressing an action with two participants:

(42) An argument structure of a sentence would be considered 'minimal' if it approximates as closely as possible *the common denominator* of trajector/landmark (primary figure/secondary figure; topic/comment), subject/direct object, agent/patient, and speaker/hearer mapping. Any demotions, deletions, additions, projections, extractions etc., to/from this prototype (motivated either syntactically or semantically) would be considered as contributing to higher complexity (on derivational and/or constituent-structure grounds).

Here minimality is, in effect, the 'common denominator' of the sum of explicit/implicit syntactic/semantic structures supporting the formation of a sentence. In other words, I interpret it as the 'common denominator' of all the patterns implementable in the mind. According to this interpretation, minimality is related to the capacity to map syntactic structure onto the structures of perception and action, onto the structure of discourse (with topic-comment dynamics) and onto the semantic structures from LTM. All alternatives to the 'common denominator' (or root prototype of interface) are considered deviations due to the different possibilities for dissociation between meaning and form (in this way contributing to the higher complexity on derivational grounds).

The basic reason for defining minimality along these lines is the following one: In this way, we take into account the net sum of all the processes

(explicitly and implicitly) contributing to the structure of verbal consciousness but not just one aspect of syntactic (deep or overt), semantic or pragmatic processes at the expense of others.

3.7. *Verbs as mental actions*

On several occasions I have distinguished the lexically-specific meaning of the verb from its argument structure. The problem is that they seem to be intricately interpenetrating each other. I will still maintain that there are different degrees (or levels) of deviation of the representational content of the verb from its argument structure. The argument structure and meaning of the corresponding verb seem to deviate minimally (if at all) in the case where we have a transitive construction mapping primary figure and secondary figure onto agent and patient. The structure and meaning of this construction, canonically, do not signify eventhood, but *action*. This idea seems to deviate from the intuition behind the folk semantic classification of English language verbs where eventhood is considered to be the most general and neutral term for almost all types of verb-specific meaning (cf. Tenny 1994). To illustrate this point, let's consider the taxonomy of verb-specific meaning proposed by Lyons (1977:483):

(a) A static situation or a *state* is one that is conceived of as existing, rather than happening, and as being homogeneous, continuous and unchanging throughout its duration;
(b) A dynamic situation that is extended in time is a *process*;
(c) A dynamic situation which is momentary is an *event*;
(d) A dynamic situation that is under the control of an agent is called an *action*;
    (i) A *process* that is under the control of an agent is called an *activity*;
    (ii) An *event* that is under the control of an agent is an *act*.

While from a representational point of view it seems quite appropriate to make the differentiations along the lines given above, from the constructive point of view, the specificity of the verb's meaning should be worked out in a different key. The specificity of every verb, from this latter point of view, I will maintain, is due to its being a kind of a constructive mental action. This is the case no less for the static-looking verbs expressing states as it is with the most dynamic-looking verbs of transitive action. The motivation for this proposal is that verbal thought has, at its core, the specificity of implementing a *construc-*

tive action of coordinating or juxtaposing in the mind's focus of two or more preactivated mental contents.

The verb's specific action is the action with which the access to the verb activates its obligatory arguments. The access to arguments triggers off a complicated coordinated pattern of activation of different aspects of functioning of different systems in the mind in WM and LTM. The net outcome of this action is a change in or a renewed (rehearsed) pattern of consciousness focus. This change can be enacted in both language-specific and language-nonspecific ways, i.e., both types of patterns result in a comparable structure. The first is coded in the verb's specific structures, the second in perceptual-motor patterns of attention deployment of high level of abstraction characteristic for willfully enacted imagery (cf. Ellis 1995; Newton 1996 for similar views). Please note that I do not equate the two systems as identical to each other, but I claim their compatibility and interdependence at some level of mental processing. Their work can become coordinated; but one can also be attenuated at the expense of the other (most probably to a different degree). In the latter case, it seems to us that we think verbally without experiencing any modality-specific imagery. To what degree the two centers can be completely dissociated from each other in conscious thinking and experience remains an open question.

The nature and the specificity of verbs as mental actions seems to me quite simple and straightforward. Unlike other types of mental connections—associations, priming, inferences, presuppositions, implications, implicatures, etc., we posit on different levels of mind performance—the constructive mental action is characterized by the feature of *predicativity* here and now. This 'trivially' looking characteristic has a radically different specification from all other types of grammatical relations in that it can be not just a binary relation as all the other ones in X-bar theory, but it can give unmediated and direct access, on the one hand, to one, two, and up to three obligatory arguments as the explicit content of verbal thought and, on the other hand, to an implicit subject. All other types of verbally expressible structures below and above the sentence level are of (or can be stated in) the binary head-complement (or topic-comment, or question-answer, etc.) type. (This is a claim opposite in effect to the one made by Jackendoff 1990:24-25.)

The point on insisting on the actionhood of predicativity (but not on the eventhood or happening side of mentation) is due to the capacity of thinking to monitor and control the execution of patterns in other modules of mind, e.g., in perception and motor behavior (cf. Zelazo & Frye, this volume, for further elaboration of this claim). It seems that this aspect of the realization of verbal thought also points toward the necessity to accept at least provisionally the idea of the centers of control of the focus of consciousness, mentioned above. Such

a system could monitor the execution of patterns controlled by each of the centers in an oscillating way. It could further provide us with the vivid illusion of the mind as a 'mirror of nature and itself'.

It is in the nature of mental action to give access to and construct a conscious mental representation. This idea was proposed in the context of the 'degree of accessibility' model of memory and consciousness by Mandler (1975, 1989). The latter is considered to be integrative in the sense that its contents are *constructed out* of available (activated) unconscious contents. The function of conscious construction (responsible, presumably, for 'focusing' in short-term memory or WM performance) is that *it brings two or more previously separate mental contents into direct juxtaposition* (Mandler 1989:88). The conscious state (i.e., being conscious of something in a focused way) occurs when a relatively slow second-order serialized representation of a small sample of mental events becomes necessary in order to access the parallel and rapid activation of unconscious processes. Among the conditions that are required by such a process are: (i) bringing two or more previously unrelated mental contents together or into juxtaposition; (ii) characterizing the most important aspects of the current state of the world; (iii) choosing among alternatives; and (iv) encoding new information (Mandler 1989:89).

This construction process produces effects both on the previous (retentive) and subsequent (protentive) mental events in the continuum of consciousness. It allows for the achievement of goals and solutions in a step-by-step fashion and serves to restrict and focus subsequent chains of actions and expected effects by selectively activating and rehearsing the result of the previous construction.

The constructive action implemented by the verb turns out to be a distinctive type of cognitive operation which brings into the *focus of consciousness* some pre-activated mental content at the expense of others. The verbal thought is also 'constructive' in the sense that in the very next moment it 'dissolves', giving the floor to the next thought. It remains to be considered, how we can maintain continuity and seriality in thought development if the verbal thought is constructed on the spot in order to give its place to another one in the very next moment through dissolution and construction anew.

3.8. *No sentence can be an island in the 'working space' of the mind: How can thoughts (still) relate to each other in the stream of consciousness?*

Descartes and Hobbes claimed that it is absurd to suppose that one thought could ever be about another (cf. Rosenthal 1993:212), i.e., each thought is 'an island of its own', is encapsulated within itself. In other words, it would be impossible to

find a *direct causal link* between any two thoughts which happen to be following each other in the stream of thought, i.e., thoughts do not determine each other serially in a chain. Verbal thought does not appear to form an autonomous 'space' which dynamically develops in time forming a 'stream' we can acknowledge as consciousness. With some exaggeration one could claim, to the opposite, that 'each thought emerges out of the blue and vanishes without a residue'.

While this quite plausibly could be maintained, if we consider straightforwardly the case for the 'direct causal link' between two successive thoughts as verbalized in two successive sentences, still the realization of any sentence in the mind presupposes and implies quite a lot of things, i.e., it definitely does not appear out of the blue and does not vanish without some consequences for further mental processing. There is a huge literature in linguistics on presuppositions and implications (or inferences), especially in linguistic pragmatics (but also in computational linguistics and AI systems modeling natural language understanding). The use of any assertoric sentence, e.g., *The earth is flat*, presupposes a question, to which it gives an answer, e.g., *What is the shape of the earth*? The concatenation of thoughts in the mind is not a lottery. The notion of *focus of the utterance* tries to capture exactly this point. Each assertion, when made in the mind, is a 'response' to some question, query, demand, plan, promise, expectation coming from within (in an internal colloquy) or from without (from an external interlocutor). For example, it is hardly possible to imagine how I could utter *ex nihilo* a sentence as simple as *I want strawberries*. The utterance of this sentence is an answer to quite a specific and focused question: *What do you like to eat?* This question could be put to me by an actual interlocutor or I can ask myself, because I feel hungry. The question or demand I am responding to forms the *focus* of my current verbalized thought (cf. the concept of 'focus' of Chafe 1996). The mutual presupposition of questions and answers is supplemented with the presupposed state-of-the-world to which their binding can apply. For example, when I ask: *Who is the man over there?* I presuppose as existent and accessible to me (in a language-specific and/or nonspecific way) quite a complicated situation with some man over there at some distance from me and my interlocutor(s) (cf. the concept of perspective discussed by Langacker, this volume).

We can and we do guide our thoughts by exploiting these 'clines' of presuppositions/focus/inferences in the stream of thought. Some of the inferences made during conversation are called by Grice (1975) conversational implicatures, others conventional implicatures, i.e., some depend on the specificity of the dialogical bond in conversation as such, while others on our general knowledge of the world and how things go on in it. When we say something, some things follow practically automatically as consequences, although they

can determine only partially what will happen in the next state of consciousness. In other words, the link between two verbalized thoughts cannot be equated with the straight deterministic line of a serial cause-effect chain in a modular and autonomously performing mechanism, but with the satisfaction of multiple conditions for an evolving dynamics of an extremely complex system (cf. Globus 1995), probably the most complex system in the universe we have access to at all—the one we name 'consciousness'. Verbal thinking is part of this dynamic and contributes to its most serially-looking aspect. The dynamics of focus, presuppositions and implications, however, is far from being serially determined in a strict linear order. If the latter were the case, discourse processing and problem solving would have been successfully modeled for the computer industry a long time ago.

3.9. *Toward a model of the 'working space' of conscious verbal thought*

After emphasizing the centrality of the transitive predicative relationship in the formation of the core structure of the discrete verbal thought, we should ascribe to it its proper domain of implementation or *habitus*. It is quite surprising to realize the divergence of opinions of different authors on this question which often look incommensurable.

Gleitman *et al*. (1996:360) maintain that *syntactic structure* determines the choice of which noun (or noun phrase) will be interpreted as figure and which as ground and, correspondingly, ascribed the position of 'higher' or 'lower' noun in a syntactic configuration. In the final resort, the formal structure of overt syntax is comparable to or mappable onto the formal structure of a perceptual figure/ground differentiation and hierarchy of establishing *prominence*. The latter is a structural specification aiming at placing into the focus of the current mental representation some mental content at the expense of other potential candidates for this status. Gleitman *et al*. have in mind structures of the type *The bicycle is near the building*, but these relationships could be extended nonproblematically to relationships of the type of $figure_1$/$figure_2$/ground, as in *John pushed Fred into the cave*, where $figure_1$ and $figure_2$ correspond to subject and direct object, respectively.

Cognitive grammar, on the other hand, maintains that it is possible to give a complete definition of the positions of subject and direct object in semantic terms. Correspondingly, syntactic structure is completely 'transparent' to *semantic motivation* (cf. Langacker 1986). Here one should point out that the mapping of the syntactic positions of subject and direct object is considered by them to be iconically motivated because it is identified with a perception-specific relationship of the type $figure_1$/$figure_2$. A similar opinion is voiced by

those who work in the context of construction grammar because they maintain that syntactic constructions are described in terms of semantic argument structure (cf. Goldberg 1995), i.e., they are intrinsically meaningful.

In the context of the functional-typological approach to language, Givón (1984:135-138) maintains that the differentiation between subject and direct object acquires its special status among all other possible syntactic relations and semantic roles because they code another functional level in language—that of *discourse pragmatics*—and more specifically the complex system which codes the clausal topic. It serves, in other words, the function of maintaining on-line topic identification and continuity in discourse processing.

In this situation, one can start to feel bewildered to whom to ascribe, in the final resort, the basicness and ubiquity of the transitive relationship in verbal thought: (i) to the structure of perception according to the dictum about the primacy of perception; (ii) to the primacy and definitiveness of human behavioral action structure and its subsequent internalization as intrinsically meaningful patterns (cf. Ellis 1995; Newton 1996); or (iii) to the specificity of human social interaction as mirrored in discourse structure.

I claim that all the authors cited above are right to make their points. This is the case because what is called a 'transitive relation' is, as a matter of fact, an interface among or a 'common denominator' (or *sensus communis*) of at least three different prototypical schemata (or mental spaces) of cognition:

(a) *figure*$_1$ and *figure*$_2$ (or trajector and landmark; source and goal) determine a relationship of movement, location and change of location of primarily physical entities which is possible to perceive (or visualize), categorize and afterwards express by means of natural language, as in *The ball is in the room* or *The ball hits the rock*. This schema is the structural *schema of motion*;

(b) *agent* and *patient* form a transitive relationship due to a pattern of action which is initiated by the agent and affecting the patient (animate or inanimate); the patient undergoes some changes due to the realization (complete or incomplete) of the action. This schema is the *schema of self-initiated action*, e.g., *Fred hits John*;

(c) The schema of *dialogical communicative interaction* with *speaker* and *hearer* or *agent* and *counter-agent* (cf. Fillmore 1971), or *agonist* and *antagonist* (cf. Talmy 1988) as basic roles, e.g., *Fred criticizes John*. This type of interaction is quite unlike the physical one (cf. (a) above) in its 'force dynamics'. The interpersonal basis of motivation and intentionality is a separate and specifically socially determined aspect of the formation of thought, language structure and consciousness (cf. the works of Grice

1957, 1975). The dynamics of conscious and unconscious intentionality and motivation in carrying out inner and outer dialogues is not a well investigated area (cf. Schrag 1986; Stamenov 1991, 1993b). The topic-comment dynamics in discourse modeling seems to point out in this direction, in the final resort too (cf. Givón 1979, 1984, Hopper & Thompson 1984; cf. also recent work in the cognitive psychology of discourse and text processing in Weaver, Mannes & Fletcher 1995; Britton & Graesser 1996).

The concept of transitive action is based on a structure *at the intersection* of at least three different schemata. Aspects of all three of them must contribute in different proportions to the current verbal thought's formation. The prototypes (a)-(c) are universal because they express the specificity of our perceptions, motor actions, and the capacity for social cognition in communicative interaction. Ontogenetically, their 'common denominator' seems to be that of the Shared Attention Mechanism (SAM) (cf. Baron-Cohen & Swettenham 1996). The important thing to realize is the possibility not only to associate but also to dissociate the concepts of agent, actor, figure, and subject, on the one hand, and of object, patient, counter-agent, and theme, on the other, in verbalizing different actions, including internal mental actions. Still closer to the reality of mind processing, it seems to me, would be to maintain that the three prototypes are not schemata (i.e., different objects in a single monolithic model space) but different 'mental spaces' whose dimensions can to a certain degree become commensurable/incommensurable with each other.

Even within the context of the transitive construction not all aspects of its structural potential can become simultaneously 'visible', i.e., different aspects of the latter's structural specification become 'visible' for semantization with the conceptualization of the transitive relationship along the lines of the schema (a), (b) or (c) above. If this is the case, it remains to be seen to what extent the currently 'invisible' aspects of the semantic structure of the transitive construction can become activated and unconsciously influence the way of conceptualization of the actual syntactic contour of a processed sentence. There are different possibilities, in this respect. The first one is related to the most formalized and rigid presentation of the mapping of meaning and syntactic structure via *linking rules* after selecting the alternative (between a, b, and c) which fits best the current case. Another possibility would be, however, that of *fusion* of all aspects of the semantic specification of the transitive relation which fit best the semantic and pragmatic requirements of the current discourse context. At the junction between explicit/implicit syntactic/semantic structure it is currently very difficult to judge how many interfaces could become possible and in what way they determine what becomes 'visible' as structured content of

the verbally specific mind, and what remains backgrounded, and/or implicit, and/or dissociated and inhibited.

4. The problem with the intentionality of thought or looking for traces of the implicit subject

It is frequently pointed out that by intentionality is meant the ability of something like thought, to mean or refer to another thing, *to be about something other than itself* (cf. Newton 1996:2). This 'aboutness' or orientation toward an 'object' different from itself is something to be further specified. There are several different senses possible to attribute to it:

(a) the first one is the 'standard' one in analytical philosophy since Brentano. Here the thought 'aims at' some object in the objective world (cf. Butchvarov, this volume, for further orientation). While thoughts are accepted as intentional (as well as beliefs and desires), there are mental states, e.g., of pain, which can be nonintentional;

(b) the second one is associated with the capacity of names to point to referents with which they are not identical. The latter referents could 'exist' either in the objective reality or in the mental reality of the representation of the corresponding situations (in a medium different from that of the verbal thought itself). According to this interpretation, thoughts become intentional to the degree that they contain names which *refer* to 'objects' from the objective or mental reality;

(c) the third one is related to the capacity of the verbal structure of thought as a whole *to have meaning* which is associated in a regular way with it and which is different from thought itself (cf. Newton 1996). I think that the most consistent way of supporting this thesis would be along the line of the proposal of Paivio (1986) that the mind processes and codes mental information in the regime of dual-coding;

(d) the fourth one is related to the capacity of thought as a whole (= form + meaning) *to be oriented toward* something outside itself, i.e., to be teleologically oriented. This type of aiming could be either for the sake of thought self-transformation, or toward fruition into something different from itself. In other words, the thought (at least sometimes) may aim at getting access to and enacting another thought. If we adopt the latter thesis, we are already not far away from accepting the possibility of strict thought-

by-thought determinism, i.e., to trace a causal-like connection between them.

In recent years the 'standard' treatment of intentionality (as aiming directly to objects in the world) has been attacked for different reasons (cf. Newton 1996; Jackendoff 1996:207). The difference between *referring*, *being meaningful* (for a thought as something not intrinsic to it) and *intending* remains to be reformulated in a way more friendly to the concerns of cognitive psychology.

I think that the most consistent way to define intentionality as reducible neither to reference nor to meaningfulness would be to accept that, in intending, the verbal thought should be instrumental to the achievement of something of a different order. It aims at the *evocation of meaning* and (in this way) at the 'manipulation' of another interlocutor but not enactment of a self-initiated action as a performative (intrinsically meaningful) one (cf. Newton 1996). The main problem with the intentionality of verbal thought, in other words, is not related with its 'aiming at an object different from itself'. This would be too neutral and nonspecific a way of qualification. The hearer, in order to understand the intention of the speaker, must answer the question: "What does the speaker aim at in talking to me?". In order to understand the intentions of the speaker, the hearer must become for a moment an 'other' to him/herself, to identify him/herself with the orientation of the speaker. This return to the 'common sense' interpretation of intentionality seems to me quite appropriate.

4.1. *Looking for the subject/agent of an intention*

The proper treatment of intentionality must take into consideration the fact that thoughts are always related to an intending subject but not only to their object (= the 'other'). The basic problem, in this respect, seems to boil down to the specificity of the relationship of relating to oneself as an 'other' unlike any 'other': While all other names could be considered as referring to something other than themselves, e.g., to an apple in the case of *I want the apple*, this is, apparently, more difficult to maintain consistently about the subject. When I say

(43) *I think, therefore I exist.*
(44) *Cogito, ergo sum.*

the two explicit 'I's in (43) look as if they refer to one and the same entity or subject who is the unique individual bearing the name of René Descartes (and

all other individuals after him who utter self-consciously this sentence). When I pronounce (43) from my own perspective but not citing Descartes in English (or in Latin, as in 44), I identify myself with the referent of the two 'I's in question. In other words—to introduce an example with a simpler structure—when I utter

(45) *I think.*

I refer to myself in the way of self-referring because there seems to be no other 'I' but the subject of this very utterance. In uttering (45) I *constitute* myself as the true and unique subject of this very utterance. But to whom actually is this 'I' referring and, in this sense, uniquely attributing the intention to (continue to) think? One may claim that 'I' behaves like a personal name and refers to 'me', e.g., my body schema. It is also possible to maintain that 'I' is a pronoun like any other pronoun (according to the standard grammatical classification). It 'refers' anaphorically to a previous usage of 'I' in the discourse. Its function is simply to maintain the coherence and continuity in one's own discourse. 'I', however, exchanges its allocation with the next turn of the conversation when a hearer becomes the speaker, i.e., it is generalizable as a prop (tag) for the speaker who now pronounces his/her utterance. In other words, the 'I' possesses some features of a pronoun, of a personal name, and of a common name.

The capacity for anaphoric reference of 'I' to a previous use in discourse is illustrated in (43) above. The second 'I' (from left to right in the explicit sentence) refers back to the one which appeared earlier in the utterance (or in a longer stretch of discourse). Unlike all other types of anaphora resolution, however, there is no problem in linking the subject to a previous explicit use of 'I' in a monologue of indefinite length.

There have been different attempts at the attribution of unique reference to 'I' (like that of personal names of the type *Sir John Falstaff*). The problem with the latter claim is that the self must be represented in some way different from that of the sign 'I' in order to fit as a 'mental referent'. A 'standard' way to deal with this problem would be to claim that it refers to (aspects of) the body schema of the individual. This would be in line with proposals of authors as different as Gibson (1979) or Lakoff (1987). The problem with this account would be that the body schema is very general in structure, i.e., can serve as a 'prop' for common name reference as well, because every speaker has a body schema (esp. the aspects of it related to the execution of verbal behavior).

A different and sober enough attempt to identify the unique referent of 'I' here and now was made by William James (1890) when he pointed out:

> [...] the 'Self of selves', when carefully examined, is found to consist mainly of the collection of those peculiar motions [described before this passage as different movements of, e.g., jaw-muscles, brow, glottis, etc.; addition mine: M.S.] in the head or between the head and the throat. (James 1890:288)

James quite evidently equated the 'I' with the subvocal motor activity of the articulatory organs while performing inner speech! The tag for the sense of subjecthood was identified by him with the motor aspects of inner vocalization, while for Jackendoff (1987a) the vocalizations themselves form the only mental content directly accessible to consciousness (i.e., the object of consciousness; cf. also Macnamara 1982:209). According to James (if I understand his intention correctly), it turns out that in vocalizations (say, *bla-bla-bla-bla* or *ouch*) the mapping between what is normally *not directly accessible* to consciousness (the motorics of articulatory movements) and their vocal representations (in external or internal speech) forms the loop of 'subject' and 'object' of the current state of consciousness. The 'tag' for subjecthood, from this point of view, is an aspect of the current mental structure which MUST NOT *be* DIRECTLY *accessible as content of the phenomenal representation*.

If we compare the three approaches to 'I', we can draw the following conclusions. If we provisionally accept the possibility for backward anaphoric referral of 'I' to previous uses (the discourse approach to the self), we still face the problem of the potential language-nonspecific referent of the latter. We simply move it back in time. On the other hand, the possibility of 'I' to change its referent at each conversational turn suggests that it must refer here and now in order to manage to become alienable in such an easy way from any interlocutor. In order to meet these requirements, we can introduce the distinction between implicit and explicit subject. Each of us *feels like* being a subject (without trying to analyze and specify the components of this feeling—be they general, unique, or a combination of both). When the floor is given to him/her, s/he simply explicates his subjecthood with the means given by language. The most direct and explicit means for subjecthood expression is the personal pronoun 'I' (among others).

4.2. *The difference between expressing and reporting in allocating the explicit/implicit subject of an utterance*

There is a well-known logical paradox about the Cretan who once said,

(46) *All Cretans are liars.*

If he had been saying the truth, then he was lying; if he had been lying, then he was saying the truth. In each case we end up with a contradictory interpretation of the statement in (46).

The way to escape the paradox in question has been pointed out by Lacan (1977) in the following way. It is based on distinguishing 'the I of enunciation' (= the implicit expressive subject) from 'the I of statement' (= the explicit reported subject) (Lacan 1977:139). To simplify the discussion, he considers the status of the utterance:

(47) *I am lying.*

Despite its seeming paradoxicality, this is a perfectly valid statement because the I of enunciation (I^2) is not the same as the I of statement (the explicit I, the I^1). One can distinguish among them in the following way. The I of the HOT (I^2) is not the same as the I of the LOT (I^1). Please note that we take normally for granted both the idea of the self-identity of the subject as well as the possibility to distance oneself and look at oneself as-if from outside (i.e., to become an 'other' to oneself for the time being). These two alternative possibilities become explicitly juxtaposed in (47). Its HOT form would be:

(48) [I^2 assert that] I^1 *am lying.*

When a speaker confesses a current intention to commit an act of lying, we have a clear-cut example of self-distancing. The intention to lie can only be a sincere intention (cf. the discussion in section 2.7. above). If we accept that $I^1 \equiv I^2$, it becomes impossible to avoid the paradox of the *self-referring subject*. If we accept, however, that I^2 is an 'other' for I^1, there is no problem at all.

One can point out that normally we do not use utterances like (47). If we make explicit the partially implicit structure of the latter utterance, it would be in the following format:

(49) *I am lying that p.*
p = the Earth is round

Here the emphasis moves automatically from the dissociable identity of the subject to the truth-value of the object statement in *p*. The attitude of lying or deceiving becomes troublesome only when we use *lie* as a reflexive verb, as in (50) or when the object of the verb recursively equates the latter's reference with that of the subject in (51):

(50) *I always lie.*
(51) *All Cretans* [me included] *are liars.*

Self-referring stumbles over the problem of self-identity only if the connection is presumed to be invariably unique and self-same. It is exactly consciousness which gives us the possibility to become an 'other' to oneself, to dissociate from oneself and look from aside. (51) is nonproblematically accepted in everyday usage because it is part of our commonsense theory of consciousness that I can speak about myself 'taking up the position of another party'—that of a potential hearer of my own speech.

The explicit I and the implicit I do not necessarily coincide. This is the case because in order to refer to oneself as the subject of an intention, one must become an 'other' to oneself. This applies at least to the intentions one can become aware of. If this is the case, we must accept the necessarily 'intersubjective' (in a specific sense) nature of consciousness.

4.3. *Coordinating the intentions of the subject and the other in the perspective of sentence (utterance) interpretation*

In 1957 H. Paul Grice published a widely cited article in which *speaker meaning* was defined as a meaning intended to be recognized in a particular way by at least one recipient, i.e., in the minimal circle of the dialogical "I-thou" interaction. The primacy of the interpersonal bond was rendered opaque by Grice when he asserted the following formula "'A meant-*nn* something by *x*' is (roughly) equivalent to 'A intended the utterance of *x* to produce some effect in an audience by means of the recognition of this intention'" (Grice 1957:58). He spoke about the anonymous 'audience' but not about the always concrete 'thou' in interpersonal comprehension.

In 1964 Peter Strawson posited the necessity to distinguish between not two (as was the case with Grice) but three hierarchically nested intentions in interpreting an utterance:

> (a) S's utterance of *x* to produce a certain response *r*
> in a certain audience A;
> (b) A to recognize S's intention (a);
> (c) A's recognition of S's intention (a) to function as
> at least part of A's reason for A's response *r*. (Strawson 1964:155)

The same differentiation and hierarchy of 'knowing' independently was posited by Schutz (1964) along the following lines:

In order to reach agreement what they mean people must:
(a) know$_1$ the potential range of meanings their partners can express;
(b) know$_2$ their partners know$_1$ this; and
(c) know$_3$ their partners know$_2$ they know$_1$ this. (cf. Arndt & Janney 1987:127)

The careful reader will note some differences in the requirements of Strawson (1964) and Schutz (1964). While Grice (1957) and Strawson (1964) after him speak about a 'particular intention' or a 'certain response', Schutz (1964) takes into account 'the potential range of meanings' which the speaker and hearer share as the arsenal of intentions which are possible to actualize in the current situation and from which the hearer could select the most plausible alternative.

I will not deal here with the question how the intentions of interlocutors must become dynamically coordinated in order to achieve mutual understanding. The *principle of cooperation* proposed by Grice (1975) does not suffice as a fundamental presupposition, in my opinion. It must be complemented by the *principle of struggle* (cf. Lecercle 1987; Stamenov 1991, 1997). A more detailed account of the interaction of conscious/unconscious intentionality and motivation in (external or internal) dialogue would require a separate and rather sophisticated treatment. In order to avoid from the outset any possibility of misunderstanding, I would like to point out here that there is an important difference between a dialogue with another interlocutor and an internal colloquy with oneself. In the latter case the 'first interlocutor' is represented in the medium of language while the 'second one' asymmetrically expresses him/herself predominantly with the repertoire of nonverbal, and in many cases, unconscious or semi-conscious emotive-affective and/or bodily reactions.

5. Toward finding the place of language structure in becoming conscious of experience

We saw with numerous examples in the present article that the structure of consciousness IS 'mirrored' in multiple ways in language structure as a 'product' accessible to conscious experience. In on-line mental performance syntax seems to represent as its 'direct referent' basic aspects of the structure of consciousness but not some 'deeply unconscious' formal constraints. If I am right in the arguments I provide above, there is no way to deal realistically with the syntax/semantics interface unless one faces explicitly the problem of language and consciousness.

The 'traces of the trajectory' of consciousness form their basic clusters around the number symbolism of two vs. three in the analyses and descriptions of structures in different modules of mental functioning. The explicated ('visible', 'mirrored') dual structure forms the prototype for a dissociable mapping in the conceptual dynamics of $figure_1$/$figure_2$, subject/object, agent/patient, and speaker/hearer juxtaposition. With the number 'three' symbolism the situation looks more complicated because we find a mapping in the way we conceptualize, among others:

(i) the three-level 'vertical' hierarchy of mental processes;
(ii) the three-component 'horizontal' hierarchy of SoC;
(iii) the maximum three-obligatory-argument thesis of the verb's structure;
(iv) the ternary loop of the subject's explication;
(v) the ternary loop of interpersonal understanding;
(vi) the differentiation between a focus, a well-formed sentence and a discourse topic in discourse production and comprehension (cf. Chafe 1996).

The mutually mirrored dual and ternary relationships may leave us hesitating as to what agency we should eventually trace their origin to. In order to identify the latter we must add a consideration of the *dynamics* of consciousness. In the first approximation, the specificity of this dynamics is indicated in the capacity to affiliate, juxtapose or equate two (and more) different objects of thought in some respects, to the exclusion of others, as a current focus of thought. This capacity seems to constitute the core of the constructive nature of verbal consciousness. It is something which is enacted on-line, something which cannot be strictly equated to the activation of any previously remembered pattern. Specific to the *constructive character* of emerging meaningful experience is its on-line alignment of several objects of experience into a single and coherent prominence (accessibility) hierarchy. Still, if we compare the structure of VT and SoC (cf. pp. 294-295), we can confirm that there are two different types of structures supporting the construction of the current VT (as part of some SoC). In other words, the dynamics of verbal consciousness is due to two basic ways of binding. The latter idea is one of the main reasons to maintain that consciousness must have two different foci (cf. pp. 313, 318-319) and not one focus with 'variable geometry' (or, say, three different foci working on the 'winner take all' principle):

(a) The first way of binding is responsible for the formation of the *internal structure* of both foci (modules) of consciousness:
  (i) due to the predicative link which forms the core of the language-specificity of the internal structure of VT, i.e., the core of the generative capacity of language;

(ii) due to the predicative-like (in its prominence, i.e., accessibility) hierarchy of patterns of voluntarily guided attention in a language-nonspecific (spatial) format;

(b) The second way of binding forms the *external* link among the two (language-specific and language-nonspecific) foci of attention which fuses them together and contributes to their outlook of 'as if' a single system. This link is nonpredicative-like and approximates a possessive, appropriating, attitude-like, phase-locking (cf. Singer 1994) affiliation. It forms the *outer implicit part of the structure* of a HOT (= possessor) linked to an explicit LOT (= possessed).

Please note that in the above taxonomy the metaphoric relationships between two structures, i.e., a *mapping*, is possible between patterns from (i) to (ii) and *vice versa*. The *metaphor* maps a whole pattern to a whole pattern and can serve as a mechanism for the projection of predicative(-like) structures of differing types in both directions. This on-line 'translation' process amounts to what we experience as 'comprehension' of syntactic/semantic patterns of language as patterns of imagery and action.

In (b) we have a different type of dynamics which we analyzed in discussing the HOT theory of consciousness. Here one thought appropriates, dominates another one, includes it as part of its own structure. This is a *metonymic* (part-whole, head-complement) relationship *par excellence*. Please note that according to this treatment of the relationships of metaphor/metonymy (whole-whole vs. part-whole) it is exactly the constructive nature of predication which differentiates thought from the other potential components of SoC. The point I make here is that consciousness fuses on-line the characteristic features of both metaphor (symmetric structure-to-structure mapping) and metonymy (asymmetric inclusion, appropriation). While the symmetric metaphoric relationship seems to be the case at the level of thought-to-thought mapping (either synchronously in a single SoC or in consequent SoCs), the metonymic asymmetric appropriation is responsible for structure formation both 'below' (in the NPs) and 'above' thought (in SoC as a whole).

It is important to acknowledge that the two foci's relationship is an *ambivalent* one. They, on the one hand, are oriented toward optimization of their performance through 'coordination' aiming at a higher degree of mappability, translatability of their structure. On the other hand, they are in constant *competition* (according to the *principle of struggle*) for attaining the status of a 'head' in charge of coordination. They, in other words, 'fight' on-line to command the stage of consciousness. This struggle for dominance is the top-level vehicle for implementing the consciousness-specific dynamics. Competition,

however, can result not only in a head-complement (nonpredicative) relation of a controlling HOT to a controlled LOT, but it can also lead to a dissociated performance when we practically have two parallel streams of mental processing while conscious attention oscillates between them idiosyncratically or intentionally. It seems to me that the mechanisms of coordination and competition in the dual-focus system of consciousness serve as the system's 'support' for the implementation of the pragmatic *principles of cooperation and struggle* (cf. Grice 1975; Lecercle 1987; Stamenov 1991).

A further consequence of the necessity to posit two different— metaphoric (translation-like) vs. metonymic (reporting-like)—ways of linking the components of the focus of consciousness is the following one: The structure of the focus of verbal consciousness is *nonuniform*. The nonuniformity in question originates in the specific features which make metaphoric/metonymic, part/whole, explicit/implicit (internal/external to VT), and predicative/associative structures incommensurable. At the highest level of generalization, there are two main sources of *implicit structure* pertaining to the focus of consciousness:

(i) the metaphoric mapping ('translation') of structure from one module to another. The metaphoric transfer binds together patterns of tenor and vehicle which have not only similarities but also incommensurabilities. The latter are backgrounded, become 'invisible', part of the structure of the focus which is not directly and immediately accessible;
(ii) the metonymic (asymmetric) inclusion of 'reporting'. The capacity to report is due to a nonpredicative-like relationship primarily associated with the subjectivity of the mental representation, i.e., it is due to the necessity to maintain a link to an implicit subject.

The thesis about the nonuniformity of the focus of consciousness has the following consequences, among others:

(a) there are always some components of the focus of verbal consciousness which remain *implicit*. This is the case for the implicit subject of every possible speech act. We also saw that some aspects of the verbal meaning can become represented only by means of another structure whose components it is easier to visualize, e.g., the variable mapping of $figure_1$/$figure_2$, agent/patient and speaker/hearer in the analysis of the semantics of the transitive construction;
(b) the *complexity* of the corresponding SoC is constituted from the sum of explicit and implicit structure in both language-specific and language-

nonspecific ways of mental representation. Consciousness aims at optimizing (minimizing) the relationships of implicit and explicit patterns in its current structure toward greater 'visibility';

(c) 'deviations' or 'dissociations' from the 'minimal' (most compact and 'visible') transitive structure are the source for the widely ranging dissociation of syntactic relations from semantic roles. These additions, deletions, demotions, etc., from the transitive construction become possible because of the dissociation and module-specific extraction and storage of information at the interface between each of the two foci and their WM- and LTM-specific support systems. It seems that the differentiation between obligatory vs. optional arguments of the verb's semantic structure, as well as the further differentiation between the verb's arguments vs. adjuncts in the sentence critically depend on limitations in the capacity of the two foci to 'orchestrate' their coordinated performance with that of the support they themselves need from other modules in the mind for their own proper functioning.

The aspect of consciousness which enables it to follow its own steps was discussed above under the rubric of *reporting* on mental states. Reporting is a phenomenon which is possible to trace (is mirrored) in:

(i) the internal structure of VT as is the case in languages which have a grammatical category for reporting (or evidentiality);
(ii) relating the internal (or explicit) structure of VT to the external (or implicit) structure of one and the same SoC. The latter type of structure can become explicated in the structure of the next thought;
(iii) (possibly) relating a previous SoC (as a lower-order conscious state) to a subsequent SoC (higher-order conscious state).

In the HOT theory of consciousness, 'reporting' is conceptualized as a phenomenon at the intersection of (ii) and (iii) above. The important thing to realize in approaching the structure of conscious thought in this way is that it gives us an opportunity to display the impossibility for a LOT to have the same type of structure as a HOT. Reporting can become possible only when the language-specific module (focus) of consciousness is functioning on-line. It remains unclear to me at present to what degree it would be possible for language-nonspecific perceptual and/or cognitive SoCs, as in (iii) above, to form a 'reporting tower' similar to the 'towers of thought' discussed above. The capacity to report about some SoC seems to depend on the capacity to 'translate' the mental content of this SoC into a language-specific format. In other words,

language (or its functional correlates like the sign language of the deaf) gives specific advantages in building complex patterns of embedded SoCs. These complex SoCs would be impossible to realize without language.

It remains for future studies to consider in more detail what types of restrictions can apply to the possibilities for reporting, i.e., for *recursive embedding* of SoC and VT, as each of them can be taken as O (= LOT) of a successive HOT. I think that the upper limit of reportability is given in the following formula:

(22") $SoC = S^1 \rightarrow (S^2 + Verb + (S^3 + Verb + O^3)) \rightarrow O$

Please note the necessity to maintain the 'backtracking' (reporting) link to three successive Ss. This specifically anthropomorphic feature of consciousness—*subjectivity*—seems to boil down to the capacity of the subject to maintain continuity *and/or* dissociability in the relationship to itself. This anaphoric binding and dissociation becomes possible only with language in the differentiation of 'I' as a sign and its 'referent' in the (relevant aspects of the) body schema. Language achieves that through forming a separate attention-controlling module in the mind/brain. In this way, the circle of consciousness closes upon itself.

In the context of the dual-focus system's functioning it is easier to conceptualize why verbal consciousness cannot be simply a matter of *access* to and/or *selection* (cf. Hillert, this volume, for discussion) of appropriate lexical, syntactic and/or semantic patterns, i.e., why activation and access to the argument structure of a verb is a necessary but not a sufficient condition for one's becoming conscious of some mental content. The answer is that it would be very dangerous for a human being to function that way because every verbal thought would *automatically* usurp the stage of consciousness (the person would be permanently under the spell of his/her own inner speech). In reality, the sentence structure, once generated, becomes conscious by default because it is identical to (i.e., implements) a pattern of attention. One can still think unconsciously or semiconsciously (i.e., think while focusing one's attention on some other mental activity) because there are two different attention-controlling systems in the brain/mind which could perform in a dissociable way. Thus we arrive at the 'paradox' that every VT aims at dominating the 'stage of consciousness', and each one can potentially remain outside of its current focus.

The points made in this article could be illustrated by means of the metaphors of the 'Ping-Pong game', the 'tip of the iceberg' and the 'eye of the hurricane'. Verbal consciousness consists of some kind of a Ping-Pong game

between two foci of mental activity. Each of the two can 'appropriate' the 'ball' of thought in its turn and this 'appropriation' is equitable with cathexis of some mental content (a LOT) to a HOT. Each of them has a peculiar way of functioning. During processing they are informationally encapsulated while they can share input and output in an at least partially commensurable format. The modularity aspect achieves its optimum in their way of performance when they function with minimal interference from the input they provide for each other. In this case, the two foci can be imaged figuratively as the 'eye of the hurricane' and the 'tip of the iceberg' systems. The main ways of coordination between the two foci (depending on the direction of dominance between them) could be envisaged as head-complement (part-whole, possessor-possessed) composita resulting in what we experience as the performance of a single system—either the 'eye of the iceberg' or the 'tip of the hurricane'.

Aside from metaphors, we must provide arguments why a dual-focus system fits better what we know about the 'working space' of verbal consciousness compared to a single 'central processor mechanism'. Several reasons for the split-focus hypothesis emerge from the analysis presented above:

(a) It can give us an account of the 'rough contemporaneity' aspect of the phase-locked conscious thought which is neither strictly *serial*, nor strictly *parallel* to itself in becoming conscious of experience;
(b) It can serve as the vehicle for the *figure/ground reversals* in the O (object of thought) as documented in the literature on cognition and language, e.g., for direct/indirect object or subject/object reversals in natural language syntactic structures;
(c) It can quite naturally implement the differentiation between *explicit vs. implicit mental content*. The important thing to realize is that the focus itself has aspects of its structure which remain implicit, i.e., not part of the current phenomenally accessible representation;
(d) It can nonproblematically perform as a vehicle of the various patterns of the mind's capacity for asymmetric *monitoring and control* of its own functions. This is achieved when one of the foci 'follows' the steps and interrupts the execution of patterns in the other one;
(e) It can implement the phase-locked reversible explicit/implicit association of sign vs. embodied (body schema) referent in the case of 'I' as a subject. Because of this capacity, it can serve as a point of departure for the formation of two autobiographic LTM systems which 'trace back' the origin of two ontogenetically and on-line dissociable selves—the executive, always ready for action here-and-now, immediate, implicit bodily self and the reported, explicit (alienated), 'who am I' self;

(f) Because of the capacity to dissociate from the embodied self due to anchoring to a linguistic sign, the dual-focus system can easily enact perspective switching in assuming the position of another interlocutor in discourse comprehension and talking to oneself.

The main features of the dual-focus system of consciousness can be summarized as follows:

(i) It is *constructive* (in the double sense of *predicative* and *head-complement* relations within and between the two foci), i.e., it is generated and dissolves on-line. In other words, it can be dependent on but cannot be identical to the performance of any single and informationally encapsulated system of memory and cognition;
(ii) It has a *nonuniform* (i.e., nonhomogeneous) structure;
(iii) It is oriented (aims at) *protentively* (forward) and traces *retentively* (backward) the development of what we experience as the 'stream of consciousness'. It is, however, neither a strictly *intentional* (aiming at achieving some specific aim or object in mental processing) nor a strictly *causal* system. It is an *interactional* (DIALOGICAL) one performing under multiple constraints. It may still be maintained that it is 'implicitly intentional', if we claim that this system can optimize its performance in the case of absence of external disturbance towards the *minimality* of highly concentrated SoCs with precisely and explicitly targeted (included within their scope) short-term objectives. In other words, minimality optimizes the 'translation' (symmetry) aspect of consciousness structure (cf. Globus 1995; Mac Cormac & Stamenov 1996b);
(iv) It is capable of *recursive embedding* of previously generated structures in both modules of which it consists, i.e., of 'reporting' about itself. The latter requires the performance of two distinct operations (in the case of reporting about qualia); (a) 'translation' (mapping) of the language-nonspecific pattern into a language-specific one; and (b) 'reporting' (embedding) the 'translated' structure into a higher-order one;
(v) It is *subjective* (embodied), i.e., includes an immediate sense of self. The self (in the case of VT) is an implicit structure which serves as a tag for perspectivization and subjectivity ascription;
(vi) Its two modules can perform both *monitoring and control* over the execution of mental patterns, carrying out in this way a 'DIALOGUE' with different possible outcomes:

(a) through *coordinating* the functioning of the two foci via *competition* and *domination* of the performance of one by the other;
(b) through *dissociating* in their functioning via *competition* of two incompatible and impossible to coordinate structures, e.g., when one is aware of thinking about some personal problem while driving a car;
(c) through *intermittent (oscillating) and reversible domination and dissociation* in the functioning of the two modules. The latter is the way this system performs in the long run, e.g., when one engages in discourse with another interlocutor or with oneself.

A *model of consciousness with dual-focus* is proposed here explicitly for the first time. It is equitable neither to the dual-coding approach to mental information processing (Paivio 1986), for example, nor to the model of WM of Baddeley (1989), for example, because they, to start with, do not claim to model consciousness. The only model I am aware of with a comparable claim is Posner & Dehaene's (1994) where support for a dual-locus (anterior and posterior) attention system in brain functioning is given from the perspective of cognitive neuroscience.

6. Conclusion

In this article I have tried to demonstrate that a linguistically better informed analysis of a proposal about the relations between experience, language structure and consciousness—the HOT theory—can significantly change, to the best of my judgment, the way of conceptualization and the research potential of this topic for linguists, psychologists and philosophers alike. The presentation of the linguistic aspects of the problem given above should be accepted as a prolegomenon to more systematic and thorough research and discussion by linguists, psycholinguists and neurolinguists.

References

Arndt, Horst & Richard Janney. 1987. *InterGrammar: Toward an integrative model of verbal, prosodic and kinesic choices in speech*. Berlin: Mouton de Gruyter.

Baars, Bernard. 1988. *A Cognitive Theory of Consciousness*. New York: Cambridge University Press.

Baddeley, Alan. 1989. "The Uses of Working Memory". In Solomon *et al*. 1989:107-123.

Baron-Cohen, Simon & John Swettenham. 1996. "The Relationship between SAM and ToMM: Two hypotheses". In P. Carruthers & P.K. Smith (eds), *Theories of Theories of Mind*. Cambridge: Cambridge University Press, 158-168.

Blake, Barry J. 1994. *Case*. Cambridge: Cambridge University Press.

Bowerman, Melissa. 1989. "Learning a Semantic System: What role do cognitive predispositions play?". In M.I. Rice & R.L. Schiefelbusch (eds), *The Teachability of Language*. Baltimore: P.H. Brookes, 133-169.

Britton, Bruce K. & Arthur C. Graesser (eds). 1996. *Models of Understanding Text*. Mahwah, NJ: Erlbaum.

Chafe, Wallace. 1996. "How Consciousness Shapes Language". *Pragmatics & Cognition* 4:35-54.

Chafe, Wallace & Johanna Nichols (eds). 1986. *Evidentiality: The linguistic coding of epistemology*. Norwood: Ablex.

Chomsky, Noam. 1957. *Syntactic Structures*. The Hague: Mouton.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge, Mass.: MIT Press.

Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, Mass.: MIT Press.

Clark, Eve V. 1978. "Discovering What Words Can Do". *Papers from the Paracession on the Lexicon. Papers from 14th Annual Regional Meeting of Chicago Linguistic Society*. Chicago: University of Chicago Press, 14:34-57.

Croft, William. 1990. *Typology and Universals*. Cambridge: Cambridge University Press.

Dennett, Daniel C. 1991. *Consciousness Explained*. Boston: Little, Brown & Co.

Dik, Simon. 1978. *Functional Grammar*. Amsterdam: North Holland.

Dowty, David. 1991. "Thematic Proto-Roles and Argument Selection". *Language* 67:547-619.

Ellis, Ralph D. 1995. *Questioning Consciousness: The interplay of imagery, cognition, and emotion in the human brain* (Advances in Consciousness Research, 2). Amsterdam & Philadelphia: John Benjamins.

Fillmore, Charles J. 1968. "The Case for Case". In Emmon Bach & Robert T. Harms (eds), *Universals in Linguistic Theory*. New York: Holt, Rinehart & Winston, 1-88.

Fillmore, Charles J. 1971. "Types of Lexical Information". In Danny D. Steinberg & Leon A. Jakobovits (eds), *Semantics*. Cambridge: Cambridge University Press, 370-392.

Frege, Gottlob. 1879. "Begriffsschrift, a formula language, modeled upon that of arithmetic, for pure thought". In J. van Heijenoort (ed.), *Frege and Gödel: Two fundamental texts in mathematical logic*. Cambridge, Mass.: Harvard University Press, 1970.

Gennaro, Rocco J. 1996. *Consciousness and Self-Consciousness: A defense of the higher-order thought theory of consciousness* (Advances in Consciousness Research, 6). Amsterdam & Philadelphia: John Benjamins.

Gibson, James J. 1979. *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.
Givón, Talmy. 1979. *On Understanding Grammar*. New York: Academic Press.
Givón, Talmy. 1984. *Syntax: A functional-typological introduction*. Vol. I. Amsterdam & Philadelphia: John Benjamins.
Gleitman, Lila R., Henry Gleitman, Carol Miller & Ruth Ostrin. 1996. "Similar, and Similar Concepts". *Cognition* 58:321-376.
Globus, Gordon G. 1995. *The Postmodern Brain* (Advances in Consciousness Research, 1). Amsterdam & Philadelphia: John Benjamins.
Goldberg, Adele. 1995. *Constructions: A construction grammar approach to argument structure* (Cognitive Theory of Language and Culture Series). Chicago: University of Chicago Press.
Goldsmith, John A. 1990. *Autosegmental and Metrical Phonology*. Oxford: Basil Blackwell.
Greenberg, Joseph. 1966. *Universals of Language*. The Hague: Mouton.
Grice, H. Paul. 1957. "Meaning". *Philosophical Review* 67:377-388.
Grice, H. Paul. 1975. "Logic and Conversation". In Peter Cole & Jerry Morgan (eds), *Syntax and Semantics*. Vol. 3: *Speech Acts*. New York: Academic Press, 41-58.
Hardcastle, Valerie. 1995. *Locating Consciousness* (Advances in Consciousness Research, 4). Amsterdam & Philadelphia: John Benjamins.
Hopper, Paul J. & Sandra A. Thompson. 1980. "Transitivity in Grammar and Discourse". *Language* 56:251-299.
Hopper, Paul J. & Sandra A. Thompson. 1984. "The Discourse Basis for Lexical Categories in Universal Grammar". *Language* 60:703-752.
Jackendoff, Ray. 1983. *Semantics and Cognition*. Cambridge, Mass.: MIT Press.
Jackendoff, Ray. 1987a. *Consciousness and the Computational Mind* (Explorations in Cognitive Science, 3). Cambridge, Mass.: MIT Press.
Jackendoff, Ray. 1987b. "The Status of Thematic Relations in Linguistic Theory". *Linguistic Inquiry* 18:369-411.
Jackendoff, Ray. 1990. *Semantic Structures*. Cambridge, Mass.: MIT Press.
Jackendoff, Ray. 1996. "Preliminaries to Discussing How Language Helps Us Think". *Pragmatics & Cognition* 4:197-213.
James, William. 1890. *Principles of Psychology*. Vols. 1-2. New York: William Holt.
Lacan, Jacques. 1977. *The Four Fundamental Concepts of Psycho-analysis* (The Seminar of Jacques Lacan. Book XI, 1964). Harmondsworth: Penguin.
Lakoff, George. 1987. *Women, Fire, and Dangerous Things*. Chicago: University of Chicago Press.
Langacker, Ronald. 1986. "An Introduction to Cognitive Grammar". *Cognitive Science* 10:1-40.
Lashley, Karl. 1956. "Cerebral Organization and Behavior". In H. Solomon, S. Cobb & W. Penfield (eds), *The Brain and Human Behavior*. Baltimore: Williams & Wilkins, 1-18.

Lecercle, J.J. 1987. "The Misprision of Pragmatics: Conceptions of language in contemporary French philosophy". In A.P. Griffiths (ed.), *Contemporary French Philosophy* (Supplement to *Philosophy*, 21) . Cambridge: Cambridge University Press, 21-40.

Lyons, John. 1977. *Semantics*. Vol. 2. Cambridge: Cambridge University Press.

Mac Cormac, Earl R. & Maxim I. Stamenov. 1996a. "Introduction". In Mac Cormac & Stamenov, 1996b:1-29.

Mac Cormac, Earl R. & Maxim I. Stamenov (eds). 1996b. *Fractals of Brain, Fractals of Mind: In search of a symmetry bond* (Advances in Consciousness Research, 7). Amsterdam & Philadelphia: John Benjamins.

Macnamara, John. 1982. *Names for Things*. Cambridge, Mass.: MIT Press.

Mandler, George. 1975. *Mind and Emotion*. New York: Wiley.

Mandler, George. 1989. "Memory: Conscious and unconscious". In Solomon *et al.* 1989:84-106.

Miller, George A. 1956. "The Magic Number 7 Plus Minus Two: Some limits on our capacity for processing information". *Psychological Review* 50:135-147.

Moss, Edward. 1993. *The Grammar of Consciousness*. London: Macmillan Press.

Newton, Natika. 1996. *Foundations of Understanding* (Advances in Consciousness Research, 10). Amsterdam & Philadelphia: John Benjamins.

Osgood, Charles. 1980. *Lectures on Language Performance*. Berlin: Springer-Verlag.

Paivio, Alan. 1986. *Mental Representations: A dual coding approach*. New York: Oxford University Press.

Palmer, Frank R. 1994. *Grammatical Roles and Relations*. Cambridge: Cambridge University Press.

Pesetsky, David M. 1995. *Zero Syntax: Experiencers and cascades* (Current Studies in Linguistics, 27). Cambridge, Mass.: MIT Press.

Pinker, Steven. 1984. *Language Learnability and Language Development*. Cambridge, Mass.: Harvard University Press.

Posner, Michael & Stanislas Dehaene. 1994. "Attentional Networks". *Trends in Neurosciences* 17(2):75-79.

Rosenthal, David M. 1986. "Two Concepts of Consciousness". *Philosophical Studies* 49:329-359.

Rosenthal, David M. 1990. "Why Are Verbally Expressed Thoughts Conscious?". Report No. 32, Center for Interdisciplinary Research (ZiF), Research Group on Mind and Brain, University of Bielefeld.

Rosenthal, David M. 1993. "Thinking that One Thinks". In Martin Davies & Glyn W. Humphreys (eds), *Consciousness: Psychological and philosophical essays* . Oxford: Blackwell, 197-223.

Schrag, Calvin O. 1986. *Communicative Praxis and the Space of Subjectivity*. Bloomington: Indiana University Press.

Schutz, Alfred . 1964. *Collected Papers*. Vol. 2. The Hague: Martinus Nijhoff.

Singer, Wolf. 1994. "Time as Coding Space in Neocortical Processing: A hypothesis". In Georgy Buzsaki *et al.* (eds), *Temporal Coding in the Brain*. Berlin: Springer-Verlag, 51-79.

Solomon, Paul R. *et al.* (eds). 1989. *Memory: Interdisciplinary approaches*. New York: Springer-Verlag.

Stamenov, Maxim. 1991. "Agonistic vs. Irenic View about the Dialogue: Is there any possibility for reconciliation?". In Sorin Stati, Edda Weigand & Franz Hundsnurscher (Hrsg.) *Dialoganalyse III. Referate der 3. Arbeitstagung Bologna 1990*. Tübingen: Niemeyer, 245-253.

Stamenov, Maxim. 1994. "Are There Restrictions on the Depth of Dialogue Processing?". *Cahiers du Centre Interdisciplinaire des Sciences du Langage* (Actes du colloquy "Le Dialogue en Question", Lagrasse, France, 5-8 October, 1993), Numero special 10:81-91.

Stamenov, Maxim. 1996. "The Fractal-Like Roots of Mind: A tutorial in direct access". In Mac Cormac & Stamenov 1996b:273-322.

Stamenov, Maxim. 1997. "Going Beyond the Sentence or What Does It Take to (Re)Construct the Subject?". In Edda Weigand (ed.), *Dialogue Analysis: Units, relations and strategies beyond the sentence*. Tübingen: Niemeyer, 223-231.

Strawson, Peter. 1959. *Individuals*. London: Methuen.

Strawson, Peter. 1964. "Intention and Convention in Speech Acts". *Philosophical Review* 73:439-460.

Stubenberg, Leopold. 1997. *Consciousness and Qualia* (Advances in Consciousness Research, 5). Amsterdam & Philadelphia: John Benjamins (n.y.p.).

Talmy, Leonard. 1988. "Force Dynamics in Language and Cognition". *Cognitive Science* 12:49-100.

Tenny, Carol L. 1994. *Aspectual Roles and the Syntax-Semantics Interface* (Studies in Linguistics and Philosophy, 52). Dordrecht: Kluwer.

Vygotsky, Lev. 1962. *Thought and Language*. Trans. from Russian. Cambridge, Mass.: MIT Press.

Weaver, Charles A., Suzanne Mannes & Charles R. Fletcher (eds). 1995. *Discourse Comprehension: Essays in honor of Walter Kintsch*. Hillsdale, NJ: Erlbaum.

Wierzbicka, Anna. 1988. *The Semantics of Grammar*. Amsterdam & Philadelphia: John Benjamins.

Williams, Edwin. 1984. "Grammatical Relations". *Linguistic Inquiry* 15:639-674.

Wittgenstein, Ludwig. 1953. *Philosophical Investigations*. Oxford: Basil Blackwell.

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