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… the ball seemed to keep rolling …

Linking up Cognitive Systems in Language: Attention and Force Dynamics

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PART I: THEORETICAL FOUNDATIONS

Chapter 2
Language as an Entrée to the Mind: From Cognition to Language

To contextualize the objective of this study, the present chapter will introduce and briefly outline its conceptual reference system, Leonard TALMY's Overlapping Systems Model of Cognitive Organization, which dates back, as a large-scale research trajectory, at least to the early 90s[1] and has been developing ever since and offers an encompassive coherent "single theoretical framework," including a "uniform terminology" (TALMY 2000, 1:7)[2]. It has been devised to reconstruct the specific cognitive architecture of the human mind and integrating more specialized cognitive systems like vision or language largely on the basis of cross-systems compatibility in their (evolutionary) organizational design features. System-internally, however, language itself is conceived as comprising several extensive organizing systems, assembling, top-down, successively more specific conceptual categories, which, at lower levels, incorporate individualized concepts representing relevant conceptual content of a language. As an overall projection, this hierarchical model constitutes the principal aegis of Cognitive Semantics -- an approach to language that "is concerned with the patterns in which and the processes by which conceptual content is organized in language" (TALMY 2006a:543).

Given a principled 'communication' across cognitive systems, the Overlapping Systems Model pursues a balanced view vis-à-vis modular and non-modular stances in linguistics, delineating a hierarchically structured framework in which, at the most general level, "different cognitive systems can be compared with each other as to similarities and differences in their organizational properties" (TALMY 2007b:51); that is, apart from pervasive commonalities, also

1 This model was first introduced in a keynote lecture during the 4th ICLA conference 1995 in Albuquerque, NM; see TALMY (1995).

2 Cf. also TALMY (2007b:51ff) on the Overlapping Systems Model, especially with reference to the (basic structuring) feature of digitalness across cognitive systems.

characteristic differences safeguard the functional adaptiveness of the model, in fact compatible with the current consensus view among neuroscientists as reflected in their models of the brain. More specifically, the fundamental rationale underlying the Overlapping Systems Model, then, is that each major large-scale cognitive system will be expected to have some organizing characteristics or conceptual structuring properties that are uniquely its own, some others that it shares with some cognitive systems but not with others, and there will be some general and fundamental properties that will be found across all the different cognitive systems (see TALMY 2000, 1:93; 2010:289).

Before we sketch the architecture of language as a system, the section to follow is meant to outline the basic assumptions that underlie the Overlapping Systems Model, reconstructing its general composition and delineating its meta-theoretical stance.

2.1 The Overlapping Systems Model of Cognitive Organization

It has always been TALMY's (2006b:253) vital and distinguished scientific interest to explore the architecture of human cognition[3], to find out "how the mind works, especially at what is now often called higher levels of cognition" -- and it is this basic impetus which has guided the uncompromising interdisciplinary perspective consistently informing Cognitive Semantics, even long before it became known under this designation (see, e.g., TALMY 2000, 1:93; 2006b:254). And if "[d]etermining the overall and particular character of conceptual structure" (not only of language) is the aim of this research, such an approach would, apart from uniting disciplines, as a matter of fact, critically require a serious collaboration and "cooperative venture among the cognitive disciplines" (TALMY 2000, 1:93), since this objective

> entails understanding the principles of organization that characterize [cognition] overall and that characterize its various systems. And understanding the organizing principles of any single cognitive system is not only valuable in its own right,

3 Note, however, that the principle of overlapping systems indeed extends beyond human cognition to include some systems that are apparently also approximately distinguished in animals with more complex nervous systems, while in the emergence of humans two major substantive species-specific cognitive systems have evolved -- language and culture (cf. TALMY 2007b:51).

> but can also serve as an entree to further understanding those of other systems or of the whole, whether by generalizing the similarities or by contrasting the differences. (TALMY 2006b:255)

What makes this specific view of Cognitive Semantics especially intriguing, given the current hegemonic (and indeed rarely questioned) ideology of the neurosciences' superiority when it comes to exploring the mind, is that language, as a cognitive system, offers a major and valid alternative perspective for the study of cognition in general; and, as TALMY's four decades of intensive research testify, language has indeed revealed itself to be "one system of mental functioning through which the mind could be studied more generally" (TALMY 2006b:254).

In this vein, language emerges as **one** of several major substantive cognitive systems, on a par with perception (in its various modalities: visual, auditory, kinesthetic), motor organization, culture, affect, thought (reasoning or inferencing), planning, and imagining -- all of them are found to systematically interact with operational cognitive systems like memory, perspective, attention, and consciousness; and both the substantive as well as the operational systems, in turn, function with respect to different organized cognitive domains such as the spatial, the temporal, and the causal -- themselves again conceived of as systems of cognition.

This fundamentally overlapping architecture of cognition sensibly calls for a research agenda that explores the "set of large scale, roughly distinct cognitive systems" which have been identified so far in view of "what kind of major structural properties they have in common" (TALMY 2010:289); and it is the results of such scientific enterprise that become feasible in the Overlapping Systems Model of Cognitive Organization, whose fundamental mechanisms and organizing principles governing any of its component systems -- including language -- are found to be neither system-specific only, nor are they all determined by the same general cognitive features alone. In contradistinction to the classical modularist view of the mind, it turns out that "very little in cognition, indeed, is independent"; quite on the contrary, there appears to be "a large amount of interaction and overlap" across both the various component categories and the concepts that constitute it (TALMY 2010:289). Against this background, the overall rationale of the Overlapping Systems Model, which has over the years been elaborated in a wide range of individual observations and systematic analyses, pertains to the balanced view that language (and the other cognitive systems) are neither encapsulated, autonomous modules nor are their

basic architectonic and principal design features merely epiphenomena of general cognition conceived of as a general-purpose processor. Instead -- and this is the prime motivation for the model's very name -- the relation between language and other cognitive systems is, as intimated above, characterized by varying and specific degrees of (non-)overlap. In light of this initial premise, TALMY's (2003:193) overall persuasion is explicitly at odds, first, with the competing view of modularist cognitive approaches to language, like the FODOR-CHOMSKY model, which "[i]n its strong reading [presupposes] a complete inviolate language module in the brain, one that performs all and only the functions of language without influence from outside itself" -- in fact, "the evidence assembled [in TALMY's publications] challenges such a model" in which language is conceived as "a specifically linguistic 'organ'." Likewise, the Overlapping Systems Model differs from conceptions advocated within cognitive linguistics that straightforwardly equate language with general cognition (e.g., LANGACKER 1999:20); against these (skewed) theoretical stances, TALMY's pronouncedly differentiated approach appears attractive even to linguists from the 'rival' cognitivist camp, like Barbara PARTEE (2005)[4], Ray JACKENDOFF (1990), and Steven PINKER (1997).

And, as another asset in terms of a cross-disciplinary perspective, its distinctly hierarchical character renders TALMY's model compatible with recent insights in neuroscience, namely the observation

> that relatively smaller neural assemblies link up in larger combinations in the subservience of any particular cognitive function. In turn, the proposed core language system might itself be found to consist of an association and interaction of still smaller units of neuronal organization, many of which in turn participate in subserving more than just language functions. (TALMY 2003:194)

Exploring and determining the specific forms and degrees of overlap among the systems cannot, however, be determined beforehand but is part of an empirical research project. And, consequently, it becomes a default expectation that any conclusions should invariably be evaluated with respect to and ideally based on converging evidence provided by different methodologies and emerging from different disciplines like cognitive psychology, the cognitive neurosciences, evolutionary biology, and cultural studies.

Ultimately, such perspective has decisive consequences for a theory of language as it entails a "new neural model" that is to consist of a core language

4 Cf. PARTEE (2005:28) at http://people.umass.edu/partee/docs/BHP_Essay_Feb05.pdf.

system responsible for the functions shared across the different language modalities (spoken, written, signed), plus further connections with brain systems 'outside' this core safeguarding their "full functioning" (TALMY 2003:170). And among the outside brain systems overlapping with the core language system it is primarily the visual system, the motor system, and the attention system that prove relevant.

As the most impressive example of extensive overlap between the language system and other cognitive systems, we refer, following TALMY (2000, 1:91), to the significant and characteristic parallels between language and vision: Far-reaching commonalities become conspicuously manifest when three out of five large conceptual structuring systems of language, Configurational Structure, Perspective Point, and Distribution of Attention "seem to correspond, as whole systems, to counterparts in visual perception" (see Chapter 2.2). One reason for such considerable overlap between language and vision may well rest upon an 'evolutionary' argument, that is,

> the language-related faculty of the brain evolved to its present character in the presence of other already existing cognitive domains, including that of vision, and no doubt developed in interaction with their mechanisms of functioning, perhaps incorporating some of these. (TALMY 2000, 1:96)

The precise details, however, of (non-)overlap between language and vision prove especially intricate and appear far from known or understood in all their ramifications; but its most comprehensive account is probably still found in TALMY (1995). Just for cursory exemplification we may single out some aspects: The principle of multiple hierarchical embedding of structure is common in both vision and in language; the topological character of structuring in language **and** vision largely relies on magnitude- and shape-neutral abstractive processes; deployment of perspective and distribution of attention are available to both language and vision. By contrast, relevant concepts of structuring in vision that are seen to yield minimal representations in language will include rotation, dilation (expansion and contraction), and color, while categories of language manifestly absent from vision are relative temporal location as grammaticalized in the tense and aspect systems of human languages or status of knowledge, status of reality, and comparison of alternatives -- which are of immediate relevance to and in the center of our study.

And that this intriguing and ambitious perspective on the architecture of cognition is anything but mere unfounded introspective speculation may be

corroborated by quoting a prominent voice from (visual) neuroscience, alluding to -- at the very least -- pervasive conceptual correspondences between language and vision, which, quite 'naturally,' have their immediate reflexes in the respective scientific models suggested:

> Psychophysical and neurophysiological evidence suggests that the visual system identifies objects by decomposing them into components, by extracting certain sets of features, and by analyzing the relations among the respective components and features. This is an efficient strategy for two reasons. First, it permits unambiguous descriptions of a virtually unlimited number of different objects with a limited set of descriptors for components, features, and relations. Second, it can be scaled and applied also for the description of entire visual scenes, that is, for the infinite variety of configurations in which visual objects can occur. **Linguistic descriptions follow the same principle**. By recombining in ever-changing configurations a rather limited set of descriptors for objects, components, properties, and relations, a virtually inexhaustible repertoire of descriptions can be composed, both of familiar and novel, concrete and abstract constellations. (SINGER 2004:296, emphasis added M.G.L.)

From the linguist's vantage point, such potential overlaps between language and (visual) perception would first of all imply that, again, the notion of general-purpose cognition would have to be abandoned and both commonalities across different systems and differences giving rise to system-specific manifestations have to be reckoned with and accounted for in a valid model -- as when a greater magnitude along an attentional parameter unconditionally attracts greater attention to the entity that manifests it; or when an increase along a parameter features as greater stress on a linguistic constituent and in visual perception translates into larger size and brighter color (cf. TALMY 2007c:266). At the discriminating end, system-specific differences emerge, such as the considerable number, in language, of entities devoted to directing attention to a neighboring constituent or component (in case one morpheme activates a particular sense in a collocate), while it is a common feature in perception that abruptness of change in an attentional parameter attracts attention to the entity manifesting it -- a feature available in linguistic attention only sparsely, for instance in sudden rises in loudness. In light of this necessarily brief and highly selective sketch, the argumentation has come full circle: Degrees of overlap would not only emerge as a fundamental design feature of cognition but also distinctively characterize language itself.

As a consequence, the principles of the Overlapping Systems Model might thus appear to be perfectly compatible with current strands in (the cognitive)

neuroscience(s), which by now have largely given up localist and separatist stances and instead take for granted a principled and far-reaching interaction between distributed neural populations organized in (temporarily available) small-world networks (cf. SPORNS 2011, 2013), in both the spatial and temporal dimensions, to account for and model the still largely non-understood complexities that (human) brains are prepared to cope with. Yet, in accord with current skeptical voices among neuroscientists whose research has a focus on language matters, TALMY (p.c.) sees potential alignments of the putative primitives of cognition (cf. POEPPEL's 2012 *cognome*) with their corresponding neural structures (see SPORNS' 2012 *connectome*) as an open issue and, at present, would probably ~~s~~subscribe to POEPPEL's (2012:36) rather gloomy statement: "The fact of the matter is that we have very little to no idea as to how the stuff of thought relates to the stuff of brains, in the case of speech and language -- and virtually all other cases."

2.2 The Architecture of the Language System: Interacting and Integrating Systems

Moving now from the overall architecture of cognition one step 'down' to that of the language system, we realize that one of the major research targets of what has come to be known as Cognitive Semantics is "the grouping of conceptual categories into large structuring systems" (TALMY 2006a:543). At the most general level of synthesis, these constitutive systems (dubbed *schematic* on account of their abstract and idealized character) structure major sectors of conception by successively and hierarchically integrating conceptual categories, which are in turn joined together by lower-level components, to give rise to a hierarchy of nested conceptual structures within language (cf. TALMY 2011: 626f).

Taking one of its major commitments seriously, Cognitive Semantics relies on the generalization commitment to engage in and delineate a research agenda for linguistics that 'naturally' adds to fundamental categories of conceptual content, long-acknowledged in traditional strands of semantic and typological research like space, time, event, and causation, "the basic ideational and affective categories attributed to cognitive agents, such as attention and perspective, volition and intention, and expectation and affect" (TALMY 2006a: 543), which have not received the same degree of recognition in linguistics, or

even any at all, let alone systematic and in-depth study like the former. In line with our own objective, and as the title of this book makes plain, we will concentrate on the interface of two such systems in language, Attention and Force Dynamics: Given the premise of the fundamental interaction of all its component systems, Cognitive Semantics also provides the analytical background and instruments for identifying and detailing characteristic patterns as well as various degrees of link-ups and overlaps between these two systems. Accordingly, some remarks on the gross composition and the hierarchical structure of the language system are in order, before we engage in a more detailed and focused survey of the two systems under scrutiny individually in Chapters 3 and 4 respectively.

Over the years, TALMY (2000, 1:7) has introduced and detailed five higher-level schematic systems that prove to be relatively independent but, at the same time, allow for, in fact rely on, systematic link-ups as well and that together are found to "constitute the fundamental conceptual structuring system of language": Configurational Structure, Perspective (Point), (Distribution of) Attention, Force Dynamics, and Cognitive State. While Force Dynamics and Attention are of immediate concern to this study, supported by some forays into Cognitive State, we will remain with a very sketchy outline of Configurational Structure and Perspective; but see Chapter 4.1 for some moderate elaboration.

The first schematic system, Configurational Structure, "comprehends all the respects in which closed-class schemas represent structure for space or time or other conceptual domains often in virtually geometric patterns," like (spatial and temporal) prepositions, and thus "establishes the basic delineations by which a scene or event being referred to is structured" (TALMY 2011:627f). The second schematic system, (Deployment of) Perspective, specifies those schemas in a language that direct an addressee where to place their "'mental eyes' to look out at the structured scene or event" (TALMY 2011:628), constructing a vantage point from which to view the configuration of components copresent in space and time of the reference scene.

The third system, (Distribution of) Attention, directs an addressee's "attention differentially over the structured scene from the established perspective point" (TALMY 2011:630), that is, the components in their configuration in space and time viewed from a particular perspective point are selectively (non-)attended to. In its current version, Linguistic Attention proposes, identifies, and