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Windows In: Empirical Evidence of Construals of Spatial Meaning

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1.1 Introduction

In the domain of interactions between language and cognition, SPACE and expressions of SPACE in languages are prominent topics of scientific inquiry. In spite of the extremely rich flora of investigation that we have seen in the recent past, the topic is far from being exhaustively researched. On the contrary, it has yet to offer many new developments and new knowledge, partly thanks to theoretical development in the area of language and cognition, and partly due to developments of new empirical techniques and computational facilities. As the title of this volume indicates the centre of gravity is at the interface between theoretical and empirical development and progress.

The research reported in this volume is all carried out within the broad framework of Cognitive Linguistics, reflecting the main ideas of the theory as well as its point of departure in *Space Grammar* (Langacker 1982). Cognitive Linguistics is not monolithic, but holds a wide variety of research topics and empirical methods. Central to the framework, however, is that our conceptual and linguistic structures are physically, socially and cognitively grounded. Geeraerts & Cuyckens (2007: 5) select three fundamental tenets: (i) the primacy of semantics in linguistic analysis, (ii) the encyclopaedic nature of linguistic meaning, and (iii) the perspectival nature of linguistic meaning. ‘Specifically, language is a way of organizing knowledge that reflects the needs, interests and experiences of individuals and cultures’ (ibid.2007: 5).

Our interest in the topic is inclusive rather than restricted in that we take linguistics to encompass both verbal and non-verbal communication systems. Knowledge is obtained in physical space and thought of as reflecting inner (mental) space. The contributions reflect the multidisciplinary character of the study of SPACE. At the heart of all of them is the relation between physical space and mental space as it is expressed in human communication. Alluding to the title of Johansson, Holsanova & Holmqvist’s contribution to this volume, we have organized the contributions on the basis of a spatial metaphor of a window through which we as analysts are able to get a glimpse of inner space. Eye movement, pointing, gesture, drawing, speech and writing are all such windows. To reflect the empirical focus of the contributions, we introduce them in order along a cline of ‘windows in’ starting with what we interpret as the most fundamental and basic means of expression, eye movement and pointing, through gesture and drawing to speech and writing (Figure 1.1).

[Fig 1.1 about here]

Not only does the figure reflect the different ‘windows in’ and the types of data used by the authors in this volume, but it also reflects the development of human communication, both ontogenetically and phylogenetically:

Specifically, pointing is based on humans’ natural tendency to follow the gaze direction of others to external targets, and pantomiming is based on humans’ natural tendency to interpret the actions of others intentionally. This naturalness makes these gestures good candidates as an intermediate step between ape communication and linguistic conventions. [...] Conventional languages (first signed and then vocal) thus arose by piggybacking on these already understood gestures, substituting for the naturalness of

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pointing and pantomiming a shared (and mutually known to be shared) social learning history.

(Tomasello 2008: 9)

Besides being a reflection of the data used and the types of windows in, Figure 1 is also a representation of the organizational structure of the book, with a starting point in the types of data investigated by its contributors in the search for a better understanding of the relationship between physical and conceptual space.

1.2 Eye movement and pointing

The volume opens with an argument in favour of eye-tracking methodology in the study of 'inner space' imagery. In *Using eye tracking methodology as a window to inner space*, Roger Johansson, Jana Holsanova and Kenneth Holmqvist offer an overview of the current mental imagery debate and an extensive account of mental imagery research. Imagery is the mental counterpart of an experience that resembles the experience of perceiving a scene or an event without direct sensory stimulation. Mental imagery is activated when people are engaged in activities such as remembering, planning and problem-solving. The authors focus on their own 'inner space' studies, where they demonstrate that there is spatial correspondence between eye movement and the perception of scenes during the visualization of pictures and spoken scene descriptions. They discuss advantages as well as disadvantages of eye-tracking methodology and relate the discussion to current theories of mental imagery, perception and mental simulation.

Peter Gärdenfors' and Massimo Warglien's contribution is concerned with the development of semantic space in childhood. Meanings of expressions reside neither solely in the world nor solely in people's minds, but develop through 'meetings of minds' in communication. In pointing, meetings of minds occur when people perceive that they align their attention in physical space, and in verbal communication, when they perceive that they are aligned in mental space. In *The development of semantic space for pointing and verbal communication*, the authors identify a developmental sequence of pointing: imperative pointing, emotional declarative pointing, goal-directed declarative pointing, pointing in combination with words and finally (detached) language. They conclude that the development from pointing to verbal communication is a transitional phase from pointing in physical space using pointing gestures to pointing in mental space using language. Thus, the child acquires ever more sophisticated skills as increasing cognitive complexity is achieved through the expansion of semantic space, generating a continuum from physical to mental spaces, which enables them to take part in more complex communication.

1.3 Gesture and drawing

A substantial amount of psycholinguistic research has demonstrated the importance of embodied simulations in the understanding of literal language about space and movement. Several recent projects have shown how embodied simulations are also relevant to understanding certain forms of metaphorical language. The study by Marcus Perlman and Raymond Gibbs, *Drawing motion which isn't there*, extends this work to show that speakers have definite, generally consistent intuitions about the spatial meanings of metaphorical motion verbs. They have investigated participants' interpretation of metaphorical (*John ran through the presentation*) and physical (*John ran through the neighbourhood*) motion expressions using the novel technique of asking people to read sentences and draw a line within a circle indicating the motion of the action depicted in each sentence. There was significant overlap in intuitions about the direction of motion for the metaphorical and physical readings of the sentences. These results are not congruent with earlier hypotheses

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that metaphorical verb meanings are highly abstract and unstructured, compared to the meanings of concrete, physical motion verbs. On the contrary, it seems that metaphorical motion verbs are interpreted in specific, embodied ways that enable people to draw motion that really does not exist.

The rest of the contributions in this section have their empirical base in the study of gesture. In *Differential use of dominant and non-dominant hands for referential and non-referential functions*, Nicola Rossini distinguishes between ‘planning’ gestures and ‘referential’ gestures in videographs of map-task activities with blocked visibility. The speakers giving route directions to listeners behind a screen use the dominant hand for referential functions, while the weak hand is used for self-regulatory and/or other psycho-pragmatic functions. Previous studies have largely focused on the communicativeness of gestures, while neglecting the self-directional role of language. Rossini’s results are consistent with the view that speech and gesture share the same cognitive, psychological, and ontogenetic origins, and that they interact in handling language functions. The map-task data indicate that gestures can serve self-regulatory and planning functions even before they become communicative and interactive.

In the next article, *Embodied interaction*, Kristiina Jokinen, Ingrid, Rummo, and Silvi Tenjes probe the extent to which gestures and body posture can replace speech in the construal of meaning. Using video data, the authors analyze how a 17-year-old girl, called L, with the mosaic variant of Patau syndrome uses hand gestures and situational information to communicate. L understands everyday questions, but her speech is disturbed due to motor dysphasia and she can produce no speech beyond the vocalization of a few concepts important to her. She extracts intricate information through gestures and body postures and is also able to impart meaning with hand gestures in communication situations. She asks questions primarily in order to move the conversation in a direction that suits her needs, and she also realizes that the others would understand her more easily if her gestures could be translated into spoken words. As one of the first studies on the communicative behaviour of people with Patau syndrome, it not only contributes to explaining the communicative capability of people with this diagnosis, but also shows how our ability to form symbolic concepts and understand meanings is reliant not so much on a spoken language as on the cognitive capacity to observe and interact with the surrounding world.

The last article in this section, *Describing adjacency along the lateral axis*, is concerned with gestures accompanying the use of the preposition *next to*, which encodes the adjacency of two objects but is neutral as far as directional information is concerned. Mark Tutton has carried out a filmed experiment in which one participant is asked to describe objects and their locations in a picture of a living-room, while the other has to identify the correct picture from a given selection. The relation between locative expressions and coverbal gestures during their question and answer sequences is the focal point of the investigation. When using *next to*, the speakers frequently use gesture to express left and right directional information which is not lexically encoded elsewhere in the utterance. Since the provision of directional information is pivotal to the successful description of object location in stimulus pictures, the author concludes that these gestures are intended to communicate directional information to addressees.

1.4 Speech and writing

We now move on from primarily non-verbal data to verbal stimuli and objects of study, beginning with a focus on SPACE through two kinds of mental spaces: first-order perceptual space and second-order conceptual space. In *Toward a Cognitive-Semiotic typology of motion verbs*, Per Durst-Andersen, Viktor Smith and Ole Nedergaard-Thomsen use evidence from Danish, English, and Russian to provide an experientially founded typology of motion verbs

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which is sensitive to subtle differences within typologically similar manner languages. The framework assumes that we experience situations primarily through mental pictures organized as figure-ground-manner-path configurations which form the basis for cognitive interpretations. The authors treat states and activities as simple situations, since they are captured in one single picture. States are stable pictures and activities unstable. Processes and events are complex situations composed of simple ones: an activity and a state are related to one another by the relational concepts *purpose* and *causation*, respectively. Thus, the proposed framework makes it possible to distinguish motion events from motion in a wider sense and shows that it is necessary to distinguish two types of figure: a primary and a secondary figure, and two types of manner: manner of existence and manner of activity. It provides a basis for describing and explaining not only already observed differences between languages, but also differences that have been left unnoticed, e.g., important differences between languages which have been classified as manner languages.

The next article continues on the theme of encoding motion. In *A basic level category for the encoding of motion*, Mila Dimitrova-Vulchanova, Liliana Martinez and Ole Edsberg contribute to the modelling of manner of biological motion in language by proposing a new and more fine-grained typology of features to account for the composition of the category of 'manner'. They propose that meanings of lexical items are organized in a prototypical fashion round the default settings of parameters for the individual types and manner of biological motion, at three levels of specificity: basic level expressions (*walk, run, crawl, climb*), superordinates (*go, come, move*) and specific manner verbs (*gallop, scurry, jog, pace, saunter*). The study reports on an exploratory elicitation experiment where native speakers of Bulgarian, English, and Norwegian are asked to describe what is going on in video clips. The experiment is designed to test the authors' assumption about speakers' preferences for the level of specificity, the prediction being that basic level expressions will be the preferred category. The outcome indicates that the participants do indeed favour basic level expressions for a wide range of biological motion. While there are strong similarities across the three languages, there are also differences relating to the boundaries between superordinate and subordinate expression types.

A third contribution on the encoding of motion focuses on adverbs. Henrik Hovmark's contribution, *Danish directional adverbs: ways of profiling a motion event*, is a corpus-based study of directional adverbs, such as *op* 'up', *ned* 'down', and *ud*, 'out'. Danish is a typical satellite-framed language according to Talmy's (2000) framework, but what makes Danish special is that it has a rich system of directional expressions, which provide the geometric information of the path in motion events. The directional adverbs are satellites which form part of a syntagm consisting of 'verb + directional adverb + prepositional phrase', e.g. *han kørte / ud / til lufthavnen* 'he went by car / out / to the airport'. The directional adverbs come in three flavours: a zero-form (*ud-Ø*), a form with a derivative *-e*-suffix (*ud-e*) and a third form with a prepositional *-ad*-suffix ('-wards'). Each of these adverbs profiles different aspects of the motion event, namely a dynamic event, a static event and a procedural event respectively. Hovmark shows how the different forms of directional adverbs in Danish are used to construe spatial meaning by coding information about the geometric properties of the path in a motion event.

In *How German and French children express voluntary motion*, Anne-Katharina Ochsenbauer and Maya Hickmann examine how children of 4, 6 and 10 years of age develop expressions for voluntary motion events involving up/down/across paths and how Manner and Path are encoded across the two typologically different languages. German is a satellite-framed language typically encoding Manner in the main verb (*klettern* 'climb') and Path in verbal satellites such as prepositions and particles (*runter* 'down'). French, on the other hand, is a verb-framed language typically encoding Path in the main verb (*descendre* 'descend') and

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Manner in more complex ways such as prepositional phrases (*à quatre patte* ‘on alla four’) or gerunds (*en glissant* ‘by sliding’). The experiments show that while, overall, both language groups showed a common progression towards including expressions of both Manner and Path in their descriptions of the motion events, the two groups differed considerably in their response patterns: German speakers of all ages frequently encoded both Manner and Path in their descriptions, while the responses by the French speakers most frequently focused on Path. On the basis of these results, the authors conclude that both general cognitive factors and language-specific properties determine how children learn to construct the semantics of space.

The next article, Marlene Johansson Falck’s *Narrow paths, difficult roads, and long ways: Travel through space and metaphorical meaning*, is concerned with the spatial concepts associated with artefacts on the ground meant to travel along, more specifically *paths, roads, and ways*. The author shows that these artefacts give rise to embodied experiences of travel through physical space, as in *the path was barely wide enough, badly kept, branches low across it*, and that they are equally embodied when extended to abstract metaphorical space, as in *the path through the undergrowth of arguments and data is not a very straight or a very clear one*. In a detailed corpus analysis, the author finds a) coherent ways in which sentences including these terms are generally structured, b) differences between *path, road, and way* sentences at a more specific level of abstraction, and c) similarities between non-metaphorical and metaphorical sentences with the same item (e.g. non-metaphorical *path* and metaphorical *path*). The image-schematic structures of these experiences create coherence in word use. Differences between paths, roads, and ways, and hence between journeys along these, lead to variation in spatial metaphorical meaning. The analysis suggests that human conceptualization processes operate in a more specific way than suggested in previous versions of conceptual metaphor theory, which does not reveal in what different ways artefacts and actions connected with different kinds of travel through space, help us to structure the language and logic of that travel.

Johan Pedersen has a different take on *way*. In *The way-construction and cross-linguistic variation in syntax. Implications for typological theory*, he presents a cross-linguistic analysis of the English *way*-construction and other complex predicate constructions. By means of a parallel corpus study of English, German, French and Spanish, Pedersen shows that there are systematic differences in the way argument structure is organized, beyond the binary distinction of verb-frame and satellite-frame. In discussing the implications of this approach for typological theory, he concludes that typological distinctions made on the basis of lexicalization patterns are superficial, and not fundamental, while distinctions made on the basis of parameter setting lack complexity and are too much focused on grammatical form. In some languages lexical constructions have a central role in the clausal organization of argument structure, while schematic constructions correspondingly play a more secondary role. Pedersen concludes that fundamental typological distinctions should be based on the relative importance of constructional and lexical constraints in the clausal organization of argument structure.

The last two papers in the volume focus on observations concerning adjectives, albeit from widely different perspectives. Elena Tribushinina’s contribution, *Spatial adjectives in Dutch child language: towards a usage-based model of adjective acquisition*, tests the predictions of three hypotheses about the acquisition of spatial adjectives such as *large, tall and long* – the semantic feature hypothesis, the haphazard example hypothesis, and the best exemplar hypothesis – against longitudinal Dutch data from the CHILDES database. Her results suggest that none of the existing hypotheses can fully handle this naturalistic longitudinal data. Tribushinina proposes an alternative usage-based approach to accommodate the shortcomings of the three existing models, which states that children store specific

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adjective-noun pairings from the input and start by reproducing these prefabs with the same communicative function as in the language they hear around them. This explains why the relative frequencies of spatial adjectives in child speech reflect child-directed speech. After having stored a critical mass of exemplars, toddlers start generalizing over the specific instances. This stage is characterized by the formation of abstract semantic categories and by overgeneralization (combinability) errors.

Finally, in *Negation and approximation of antonymic meanings as configuration construals in SPACE*, Carita Paradis and Caroline Willners investigate native speakers' interpretations of negation in combination with BOUNDED antonymic adjectival meanings, e.g. 'closed', 'true', and also in relation to their interpretations of the approximating degree modifier 'almost' in Swedish. In an online judgement experiment, participants were asked to assess test sentences such as 'The door to the kitchen was not closed', in which 'not closed' is the test item. The task of the participants was to make a judgment of the test item on a scale with the end-points 'non-existent' and 'maximal' in response to the trigger question 'How was the gap?'. The results of the investigation were then related to a similar study by the same authors (2006), which includes 'not' with UNBOUNDED SCALE meanings, e.g. 'narrow', 'long', and in relation to 'fairly'. On the basis of these behavioural data, they propose that 'not' is a degree modifier and like all other degree modifiers it operates on configurational structures. While the results for the UNBOUNDED meanings are very robust across all test items, the BOUNDED meanings are much more volatile and adaptive to alternative scalar interpretations. The implication of the results is that the negator is best seen as a pragmatically motivated configuration construal of a SPACE structure.

The exploration of language and space continues. With this volume we offer a collection of some of the latest findings gleaned through empirical research, and hope that it will provide inspiration for further investigation as ever more sophisticated tools of analysis and theoretical insights are developed.

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Figures – chapter 1

