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*Thomas W. Schubert,  
Anne Maass (Eds.)*

# SPATIAL DIMENSIONS OF SOCIAL THOUGHT

APPLICATIONS OF  
COGNITIVE LINGUISTICS

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# Spatial Dimensions of Social Thought

*Edited by*

Thomas W. Schubert

Anne Maass

De Gruyter Mouton

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## Spatial Dimensions of Social Thought

# Applications of Cognitive Linguistics

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## Introduction:

# The interrelation of spatial and social cognition

*Thomas W. Schubert and Anne Maass*

Even though our modern life conditions may sometimes obscure it, it is a simple truth that humans live in real three-dimensional environments in which they move in order to fulfill all their needs. It is not surprising, then, that our nonverbal behavior in this space serves as the medium in which we regulate our social relations. This is the environment for which evolution equipped us, to which all our development is geared. Social relations *take place* in positions and movements, postures and gestures, lines of sight, speed, and other aspects of our movement. Horizontal distance, its change in approach or avoidance, vertical difference and associated looking up or down, being in front vs. being behind while watching or moving, being left or being right – all these topographic aspects can and do mean something in many circumstances. Space is the medium of social interaction – the stage of our social life.

The investigation of the social meaning of space has been in the focus of the social sciences for at least one century. At the dawn of social anthropology, Robert Hertz, a student of Durkheim, published in 1909 an essay on “The preeminence of the right hand” (Hertz, 1909, 1973). It demonstrated the ubiquity of associating *left* and *right* with polarizations of categories essential to social relations. *Good* and *bad*, *moral* and *amoral*, *male* and *female*, *weak* and *strong*, Hertz observed, are associated in many cultures with *right* and *left* in thought, language, and behavior. Hertz already speculated about the origin of these associations, arguing for a complex interaction of biological factors (initial slight physical advantage of the right hand due to brain asymmetry) and cultural processes that are informed by these initial bodily asymmetries, and then interpret and reinforce them. Throughout the twentieth century, eminent scholars, especially cultural anthropologists, have followed up on Hertz’ seminal ideas (Evans-Pritchard, 1956; Durkheim, 1912; Needham, 1973; Schwartz, 1981). In modern Western societies, the linguistic association of right and left with good and bad persists, but it has little inferential power (Casasanto, 2009).

In social psychology, lines of inquiry with similarly long traditions on similar topics can be identified. Spatial aspects of social interactions are features of the grand topic of social psychology: how the “imagined, real or implied presence of others” influences thought, feeling and behavior (Allport,

1954). Real presence by definition happens in a spatial context. Imagined presence may often include elaborate spatial images. And even implied presence may have clear spatial aspects. Social psychology has produced a huge body of work investigating such spatial aspects of human interactions, both regarding their production and their impact.

For instance, distance to others has long been recognized as a central feature of social interactions. In 1958, Harlow surprised behaviorists with the finding that infant monkey wanted to be close to a clothed surrogate mother instead of being close to a surrogate that gave milk, but was made from wire. Later, researchers like Hall (1966) and Mehrabian (1972, 1981) developed elaborate analyses of spatial behavior. They, for instance, identified the importance of the personal space around our bodies, roughly the size of our arm reach. Subsequently, social psychologists have used spatial behavior as a proxy for attitudes; for instance, Macrae, Bodenhausen, Milne, and Jetten (1994) assessed seating distance from a chair ostensibly reserved for a skinhead as an index of negative evaluation.

In these cases, the function of spatial distance as a stage for interpersonal interaction is nicely illustrated. However, consider a recent finding from Williams and Bargh (2008). They first asked participants to plot a set of points in a Cartesian coordinate plane. For some participants, the points were far apart, for others, they were close together. Those who had to plot points far apart subsequently judged their emotional attachment to their family as lower! The coordinate plane was neither diagnostic of attachment, nor was it a medium to convey attachment, but still it affected the participants' social thoughts.

Findings like these (and this volume reports many more, see the examples below) raise intriguing new questions: How do spatial aspects affect our social cognitions? How do the meanings associated with spatial dimensions develop? What role do evolution, the makeup of our brain, and language play in this development? What cognitive processes mediate our imbuing of meaning on space? Only in the last few years have researchers started to investigate the role of (often unconscious) processing of spatial information in the social-cognitive domain.

The authors of the present volume all met in 2008 in Venice at an Expert Meeting generously funded by the European Science Foundation and the European Social Cognition Network to discuss their different theoretical perspectives, to compare findings from their laboratories and to discuss future developments. The present book reflects the intense and dynamic discussion between researchers who, with diverse methodologies and from diverse theoretical perspectives, approach the same basic question, namely how social and spatial cognition interact and how one supports or constrains the other.

The results converge in the insight that much of social thinking builds upon spatial cognition. This makes social cognition susceptible to influences from spatial cues, and vice versa. A number of such links have been discovered between social and spatial thinking. This book assembles some of the key findings and the theories that generated them. For instance, consider some examples from the chapters of this volume:

When asked to put stickers representing entities on a paper, most children even at just four years put the stickers on a line, but more abstract concepts were mapped to this line only at a later age: first space, then time, then quantity, then preference. The power of managers is overestimated after thinking about large differences between vertical lines. Words about likely events are understood more quickly when they are written next to arrows pointing at close locations rather than far locations. A backpack will make a hill before you appear steeper – but a sugary drink, and thinking about a close friend will both make it appear less steep.<sup>1</sup>

These findings demonstrate that space plays a role for thinking that goes far beyond it being just a medium for communication. Indeed, it seems that it can become the medium of thinking itself, with spatial and social cognition being closely and intrinsically intertwined. This is the idea behind this book. Although the authors come from a large variety of backgrounds (including art psychology, social and cognitive psychology and cognitive science), they all share the idea that spatial information not only affects what we think, but also the way we think about social reality.

One theoretical approach that is important for a number of chapters in this book is what has been called the embodied cognition approach. By this we do not mean a particular theory or even a particular hypothesis, but the assumption that perceptual and motor systems are not simply input and output modules for a central, “higher level” cognitive modul that does the actual cognition. Instead, the embodied cognition approach assumes that perceptual and motor systems – their general function and their states – shape higher level cognitive functions. In the words of Wilson (2002), it is “the idea that the mind must be understood in the context of its relationship to a physical body that interacts with the world” (p. 625).

A number of different theories are associated with this approach and the label *embodiment* (Wilson, 2002). Volumes that preceded the present one in the Mouton de Gruyter series *Applications of Cognitive Linguistics* and *Cognitive Linguistics Research* have explored this approach (e.g., Hampe

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1 These examples were taken from Tverksy, Kugelmaass, and Winter (1991), Giessner and Schubert (2007), Bar-Anan, Liberman, Trope, and Algom (2007), and Schnall, Harber, Stefanucci, and Proffitt (2008).

& Grady, 2005; Sharifian, Dirven, Yu, & Niemeier, 2008; Ziemke, Zlatev, & Frank, 2007). One prominent and early line of argument within the embodiment approach was and continues to be conceptual metaphor theory. It proposed that directly experienced structures are mapped onto concepts that are not directly experienced, and thereby imbue them with meaning and structure (Lakoff & Johnson, 1980, 1999). Many of the above mentioned findings indeed are connected to metaphors that map the relevant concepts in language: Time, quantity, and preference are mapped onto a spatial dimension; power is metaphorically described as up; unrealistic ideas are “far out”; steepness is a metaphor for required effort (see also Landau, Meier, & Keefer, *in press*).

Yet, this volume also includes a number of findings that show effects of spatial experience on social cognition that are difficult to understand by relying on conceptual metaphor theory alone. Consider these examples:

It is easier to match the sentence “Peter pushes Paul” to a picture when in this picture Peter is pushing from the left, rather than from the right. Words about the past can be categorized more quickly with the left than the right hand, but the reverse is true for words about the future. In depictions of the Addams family sampled from the Internet, there is an overwhelming tendency to represent the (more agentic) male to the left of the (less agentic) female (82% of all images), whereas this is not the case in depictions of the Simpsons and the Flintstones, where the male is not more agentic than the female. When both scientists and lay persons graph data in diagrams, powerful groups are by far more often graphed on the left, while powerless groups are graphed on the left in only a minority of cases.<sup>2</sup>

What is behind these asymmetries in the horizontal dimension? There are hardly any metaphors about the left and right related to these constructs: While we do map good and bad onto right and left, as described in the introduction, we do not refer to the past as “on the left”, and neither to the future as “on the right”. Instead, another aspect of language seems to play a major role: The direction in which it is written. Consider three final examples from the present volume:

When chimeric faces that show different emotional expressions on the left and the right side are interpreted, the left side is typically more relied upon. That left side bias disappears in people who typically read from right to left. Whether you usually read from left to right or from right to left influences where you see the midpoint of a horizontal line, but also where you think is

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2 These examples were taken from Chatterjee, Southwood, and Basilico (1999), Torralbo, Santiago, and Lupiáñez (2006), Maass, Suitner, Favaretto, and Cignacchi (2009), and Hegarty, Lemieux, and McQueen (2010).

“straight ahead” when you are blindfolded – tasks that have little to do with reading.<sup>3</sup>

Taken together, these findings suggest that several different mechanisms might be at work in parallel that associate conceptual representations of social and non-social concepts with sensorimotor representations. The chapters in this book demonstrate vividly that in order to understand the impact of space on social cognition, researchers need to combine social cognitive theories and more general theories of cognitive science. This also requires taking findings from cognitive science on non-social topics into consideration. The present volume is an effort to contribute to this endeavor, and to assemble a coherent overview of spatial embodiment effects and theories in the social realm.

### Overview of the contributions to this volume

The volume consists of two sections. The chapters in **Section A** bring together findings and theories on the spatial embodiment of concepts and their explanation. These chapters deal with many different spatial aspects and dimensions: grouping, perspective, horizontal and vertical difference, and distance, among others. **Section B** includes chapters that look in more detail at the horizontal dimension: the association of left and right with various processes and concepts, such as horizontal biases in attribution of agency and attention, the influence of brain asymmetries, writing direction, and their outcomes.

The chapters focus on social processes and concepts. However, the chapters invariably go beyond purely social aspects and pay due attention to findings and theory on non-social processes and concepts as well, and with good reason: The embodiment of social concepts, although characterized by some unique features, shares many underlying processes with the embodiment in other areas. As such, we think, it is necessary to integrate spatial aspects of non-social cognition in the study of social cognition. Indeed, the very notion of the influence of spatial cognition in social thought demonstrates the necessity and usefulness of such a broad focus. In both sections, chapters are roughly arranged so that those with a more inclusive focus on general cognitive science precede those with a more specific focus on social concepts and processes.

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3 Examples are taken from Brady, Campbell, and Flaherty (2005), Vaid and Singh (1989), and Chokron (2003).

**Section A** starts with a chapter by **Barbara Tversky**. Step by step, she reviews the processes through which we construct a coherent understanding from the raw material of sensation: Objects, categories, orderings, which come together in relations, and on which we look from a specific perspective. She then demonstrates parallel phenomena in the realm of social cognition. The correspondence of spatial and social cognition, she argues, is due the fact that the same perception-action couplings are at work in both areas.

In a comprehensive second chapter, **Julio Santiago, Antonio Román, and Marc Ouellet** take stock of what we know about the embodiment of abstract concepts. They review various versions of conceptual metaphor theory and identify the flexibility of embodiments as a crucial challenge to this family of theories. They review evidence of such flexibility regarding the embodiment of affect, power, magnitude, linear order, and pitch, and conclude that current theories have difficulty explaining, let alone predicting such findings. As a solution, they propose a new theory that emphasizes the role of working memory, and report evidence from tests of this theory.

**Nira Liberman and Jens Förster** review another general, but very different, theory on the relation between spatial distance and the (more abstract) concepts of social distance, temporal distance, and likelihood. According to Construal Level Theory (Liberman, Trope, & Stephan, 2007), spatial distance is one instance of the more general construct of psychological distance, and it is intrinsically associated with social and temporal distance and likelihood because these are also instances of psychological distance. Liberman and Förster discuss the immense amount of evidence, and, in particular, the perspective of Construal Level Theory on metaphors.

**Simone Schnall** then reviews a new line of research concerning the influence of social factors on perception of space. Thus, the causal direction between social and spatial cognition is now reversed, with social variables affecting spatial ones rather than vice versa. Feeling alone or socially connected is found to alter basic spatial perceptions, such as estimates of distances and slants. These findings challenge many classic theories, but also some recent theories of embodiment. Not surprisingly, then, the theoretical background used by Schnall is different from that of other chapters, namely Proffitt's view on the economy of action. Besides the breadth and novelty of the reported findings, perhaps the most intriguing aspect of her review is the distinction between judgments in the service of action execution and judgments in the service of action planning – only the latter being influenced by energetic and social factors. Any future comprehensive theory of embodiment has to be able to account for such differences.

The final chapter in Section A by **Thomas Schubert, Sven Waldzus and Beate Seibt** takes a closer look at a specific concept: the embodiment



of power. The authors proceed from the assumption that the metaphoric understanding of power as elevation and size in space results from schematization of concrete experiences with larger and powerful others. Based on this assumption, they review evidence from the concrete, nonverbal communication of power to effects of abstracted, schematized, and de-contextualized spatial cues on power judgments. They then review three families of theories that can be drawn upon to explain these findings: Semantic network models, simulation theories, and conceptual metaphor theory. In addition, they discuss the possibility that evolutionarily prepared mechanisms facilitate the learning of essential concepts like power.

The authors of the chapters in **Section B** comprehensively review what is known about horizontal asymmetries in human cognitive processes. **Anjan Chatterjee** provides an overview of his own seminal and recent work on left-right asymmetries in the attribution of agency during our conceptualization of actions and events. From his review of the recent evidence, he concludes that reading and writing habits contribute more to this effect than hemispheric asymmetries. He hypothesizes the existence of a pervasive horizontal schema that, similar to other spatial schemas in the sense of Talmy's (1996), serves to increase efficiency when processing events. He then discusses how such schemas are mentally represented, what their neural underpinnings are, and how they influence the construction of mental models.

**Nuala Brady's** contribution turns to face perception. She reviews evidence of the curious emphasis on the left half of the face in person perception. In order to understand the causes of this phenomenon, she compares it with horizontal asymmetries in word recognition, and concludes that the two different asymmetries may in fact both be rooted in differential specializations of the brain hemispheres on different scales of spatial details to be considered.

**Jyotsna Vaid** reviews evidence on horizontal asymmetries in representational drawing, object recognition, and aesthetic preference. She discusses two possible explanations of these differences: differences between the brain's hemispheres, and motor processes due to biomechanical and/or cultural factors. She then reviews to what extent handedness and script direction influence the horizontal asymmetries, and concludes that motor processes may offer the more parsimonious explanation for the available data than brain asymmetries.

**Sylvie Chokron, Seta Kazandjian, and Maria De Agostini** focus on simple visuospatial tasks such as line bisection, aesthetic preference, and straight-ahead pointing. As the authors of the previous chapters, they point out that horizontal asymmetries – in their case a leftward bias – have generally been attributed to hemispheric differences; however, more recent evi-



dence reported in this chapter shows that reading and writing direction may contribute to these effects, by influencing scanning and salience of stimulus.

**Caterina Suitner** and **Chris McManus** review a topic that has a long-standing tradition in investigating horizontal biases and their social associations: The use and meaning of left and right spatial positions in paintings. Horizontal biases in different art genres are reported, including portraits, self-portraits, and religious paintings. In their comprehensive chapter, they show that the association of rightward orientation with greater agency probably provides the best explanation for a number of asymmetries identified by art historians and in experimental studies of aesthetic preferences.

In the following chapter, **Caterina Suitner** and **Anne Maass** develop the argument of differential associations of left and right with agency further. In particular, they investigate the cognitive processes underlying this bias and discuss its impact in the area of gender stereotyping. They also relate these findings to the impact of writing direction already discussed in the previous chapters, and conclude that this form of cultural bias may be the major source of the spatial agency bias. They close the chapter with a discussion of the possible causes of the existence of different writing directions, relating them to different types of alphabets which, presumably, put different strains on the two brain hemispheres.

In the final chapter, **Peter Hegarty** and **Anthony Lemieux** apply many of the aforementioned findings to the study of graphs and diagrams. With both archival and experimental data, they show a pervasive and subtle bias to embody the agency of certain (in)groups by placing them on the left side in graphs. This surfaces especially in graphs of gender differences. Their chapter demonstrates the importance of studying spatial embodiments of social concepts not only for an enhanced understanding of social cognition, but also for our understanding of the creation and perpetuation of social inequalities.

Despite the breadth of this volume, important aspects had to remain unexplored. One aspect emphasized in **Section B**, but certainly worthy of further exploration, is the cultural embeddedness of spatial groundings of social thought. One such cultural variable is explored in the current volume: the direction of handwriting. Its influence on attention and construction of meaning even in non-linguistic tasks attests to the importance of this notion (see **Tversky's** and all chapters in **Section B** of this volume). Other culturally meaningful variables such as right vs. left side driving may also be important (Scharine & McBeath, 2002). This underscores that findings from one or a few Western, educated, industrialized, rich, and democratic samples should not be considered representative of the general human population (Henrich, Heine, & Norenzayan, 2010). Cultural influence on metaphors (and their universality) is also touched upon in **Santiago et al.'s** and