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**Review of Thomas W. Schubert and Anne Maass (eds.). *Spatial dimensions of social thought***. Berlin: Mouton de Gruyter, 2011, 353pp., ISBN: 978-3110254303.

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If you have ever felt that a stranger was simply standing too close or have talked about how you and a former friend have 'grown apart', then you will have experienced the strong relation between concrete space and social connectedness. This interrelatedness is apparent when we talk about concepts such

as *social distance*, a term commonly used to describe affective reactions of members of one social group for members of another social group (Bogardus 1947). The seminal work of Hall (1966) on interpersonal distance has shown that space is not only used to talk about social relations, but that different social relations are actually associated with differences in the concrete spatial distance between two interaction partners. The chapters in *Spatial dimensions of social thought*, edited by Thomas W. Schubert and Anne Maass, discuss empirical and theoretical work that goes beyond these earlier findings by revealing that even thinking about social concepts is fundamentally related to thoughts about space. The volume, which appears in the Applications of Cognitive Linguistics series, aims to highlight how bodily experiences related to space play a role in shaping and constraining thoughts about our social world.

In recent years, there has been an increasing interest in theoretical views that propose that meaning emerges dynamically in the interaction between individuals, their bodies, and their environments (Barsalou 2008; Clark and Chalmers 1998; Varela et al. 1991), and these theories echo throughout this volume. In relation to previous books on how space can structure conceptual thought (e.g. Gattis 2001), the current volume sets itself apart in its focus on the interaction between concrete space and our social world, which makes it a timely contribution to the literature on how (social) cognition incorporates bodily experiences. *Spatial dimensions of social thought* reveals the many surprising ways in which space influences thoughts about other people and social concepts, and how other people and social concepts can influence our thoughts about space. The many empirical findings discussed in this volume clearly demonstrate the main message of the book: spatial and social thought are inherently intertwined.

The book is organized in two sections. Section A focuses on the overlap between spatial cognition and representations of social concepts such as affect, social distance, and power. Section B considers how cultural, biological, and hemispheric phenomena contribute to the relationship between the horizontal dimension and the representation of action and agency.

The first chapter by Barbara Tversky sets the stage by examining the parallels between spatial thought and social thought. She reviews how space is used to group and organize objects in relation to our own bodies, and discusses how abstractions of the relational structures provided by spatial schemas can be used to think about non-spatial domains (see also Kirsch 1995; Woelert 2011). An increasing body of work has emerged over the last years that reveals how space can not only be used to structure non-social concepts such as time (e.g. Boroditsky 2000; Lakens et al. 2011), but also thoughts about social concepts such as affect, power, and agency.

The second chapter by Julio Santiago, Antonio Román, and Marc Ouellet presents a novel theoretical model to explain how such social concepts are

structured in space. Instead of assuming that associations between social concepts and spatial dimensions consist of stable relations that have emerged through experiential co-occurrences (e.g. looking down when feeling down) (Lakoff and Johnson 1980), they argue for the importance of attention to both the spatial as the social dimensions to explain how flexible mappings between these dimensions can be created in working memory. As an example, they examine the association between valence and verticality, and show that previously reported faster evaluations for valenced words presented on their metaphorically congruent location (UP for positive words, DOWN for negative words) compared to valence words presented on their metaphorically incongruent location (DOWN for positive words, UP for negative words) do not emerge as automatically as previously assumed (Meier and Robinson 2004). Instead, spatial information only influences evaluations (or vice versa) if these dimensions are salient (see also Santiago et al. in press).

The third chapter by Nira Liberman and Jens Förster provides a review of recent findings that reveal how spatial distance affects and is affected by less concrete distances, such as temporal distance, or social distance. Based on Construal Level Theory, the authors reason that greater distance on any of these dimensions moves events further away from direct experience, and this increase in psychological distance has similar psychological consequences. For example, language directed at a person further away is more polite (reflecting greater social distance) than language directed at a person nearby. This chapter provides a range of examples that reveal strong commonalities between the effects of spatial and social distance on affect and behavior.

In the fourth chapter, Simone Schnall shows how spatial perception can be influenced by social information. She presents research on perception, developed from an ecological viewpoint, that reveals how slant, distance and depth perception depend on both bodily and affective cues. For example, the presence of a friend can lower judgments about the steepness of a hill, compared to when friends are absent. In this chapter, space is not used to structure more abstract information, but the reversed relationship is detailed, and thereby provides an interesting overview of how perceived space, often regarded as a concrete source that scaffolds abstract thought, can itself be influenced by non-sensory information.

Section A concludes with a chapter by Thomas Schubert, Sven Waldzus and Beate Seibt, who look more closely at the spatial representation of power. Power relations can be structured spatially, such as when leaders are in front of or above their followers. After reviewing the literature, the chapter addresses the question as to how such spatial cues are linked to the representation of power. They relate published empirical findings to three theoretical perspectives: semantic network theories, conceptual metaphor theory (Lakoff and Johnson 1980), and perceptual symbols systems (Barsalou 2008). Based on

the lack of a-priori predictions from semantic network theories, and the bi-directionality of the space-power link, they conclude that simulation theories seem to offer the best explanation for the results observed so far.

Section B starts with a review, by Anjan Chatterjee, of the multiple ways in which horizontal spatial asymmetries influence mental representations. Chatterjee discusses empirical, cultural, and neurological support for the assumption that spatial asymmetries exist that determine how action is represented. From the spatial asymmetries inside our brain between our left and right hemispheres, through the spatial asymmetries in our body due to left or right handedness, to spatial asymmetries in attention due to cultural differences in writing, Chatterjee explains how all these factors contribute to mental models we use to think about people and situations.

In chapter seven, Nuala Brady focuses on how spatial asymmetries bias face perception and memory. She examines the left-side bias in face perception (the finding that the left half of a face looks more like the whole face than the right half of the face) and discusses several possible underlying mechanisms.

Jyotsna Vaid turns to spatial asymmetries in drawing directionality, and compares a laterality account with a motoric account. She concludes that a motoric account, influenced by biomechanical and cultural variables such as writing direction, provides the best explanation for the tendency of people to draw animals, objects, and scenes more often in a rightward (rather than leftward) direction.

Sylvie Chokron, Seta Kazandjian and Maria de Agostini similarly focus on the interaction between lateral asymmetries and cultural factors to explain observed spatial asymmetries in line-bisection tasks, straight-ahead pointing, and aesthetic preference judgments. Although these tasks clearly require different cognitive skills, the observed spatial asymmetries were all attributed to hemispheric specialization. After a detailed examination of the literature, the authors convincingly argue in favor of an interaction between hemispheric specialization and cultural factors such as reading direction, with the relative contribution of both these mechanisms depending on the task and task characteristics.

Moving to spatial asymmetries in abstract concepts, Caterina Suitner and Chris McManus investigate spatial asymmetries in art. Starting from earlier observations regarding the preference of artists to paint portraits that show their left cheek (and are thus turned to their right) rather than the other cheek, they relate this observation to the Spatial Agency Bias, which describes the tendency to associate agency to targets on the left moving to the right.

In Chapter 11, Caterina Suitner and Anne Maass review the literature on spatial biases in the representation of agency, with a focus on gender stereotyping. Due to the dominant stereotype that males are more agentic than females, men and women are associated with different horizontal spatial positions, as well as different spatial orientations in portraits.

In Chapter 12, Peter Hegarty and Anthony F. Lemieux extend insights on the spatial representation of concepts to graphs, and discuss research that shows stable biases in the order in which social groups are depicted in graphs. For example, men are depicted first in graphs and tables that present gender differences. Furthermore, they show that manipulating social thought influences these biases, and conclude that social psychological processes give meaning to the spatial order of concepts depicted in graphs.

Although the authors who have contributed to the book have different roots (spatial cognition, cognitive psychology, perception, social cognition, social psychology, cognitive neuroscience), the chapters offer strikingly converging conclusions about the ways in which spatial dimensions and social thought are related: The relation between spatial dimensions and social thought is functional, flexible, and bidirectional.

Practically all chapters highlight the functional nature of using space as a scaffold for social thought. Barbara Tversky argues for the primacy of spatial knowledge to provide structure to other types of concrete or abstract knowledge. Spatial schemas include objects and the relations between them, orderings, directions, and frames of references, and all these aspects of space can be (and as she argues, often are) used to structure social thoughts. The functionality of the interaction between space and thought is also exemplified in the ecological approach to perception reviewed by Simone Schnall. The perception of distances, heights, and slants is not a purely objective process. How far, high, or steep we perceive stimuli in our environment depends on how much weight we carry, how positive or negative we feel at that moment, and whether social support is present or not. Two chapters (Suitner and Maass; Hegarty and Lemieux) also discuss how structuring social concepts in space might be functional, but can at the same time introduce unwanted biases, for example in the spatial positioning of men and woman, and in the visual representation of powerful and less powerful categories in graphs in scientific publications.

To be truly functional, spatial schemas that underlie social thought must be flexible. Several authors build on this idea. Anjan Chatterjee reviews neurological and cognitive findings that reveal how people use spatial schemas to think about relations and situations, but also concludes that “the specific direction used in the schema may be arbitrary and modifiable by experience, but that a direction be chosen seems necessary for processing efficiency” (p. 204). Santiago, Román and Ouellet make the flexibility of the spatial structuring of thought a central tenet in their flexible foundations view on metaphoric reasoning. People can use spatial dimensions to structure concepts such as time and valence, but whether they do so depends on the degree to which the spatial dimension and the abstract concepts receive attention. Furthermore, creating such a mental model takes some effort, because the different structural and content units activated in working memory need to be integrated into a coher-

ent mental model. This flexibility is also evident in the way motoric constraints influence drawing directionality (Jyotsma Vaid), and in how cultural differences in writing direction influence both aesthetic judgments and straight-ahead pointing (Chokron, Kazandjian and De Agostini).

Finally, space does not only influence social thought, but social factors also influence the perception of space. Liberman and Förster discuss the interrelations between spatial distance, temporal distance, social distance, and hypotheticality, and review a range of findings where one of these four dimensions is manipulated, which affects judgments on the other dimensions. These findings suggest that at a certain level of mental representation commonalities exist between these different ‘psychological’ distances. Schubert, Waldzus and Seibt focus on more concrete experiential correlations between the concept of power and spatial cues such as vertical spatial relations and size differences, and review studies that reveal the bi-directional link between space and power. Santiago and colleagues similarly argue for a theoretical model in which concrete space and social concepts can influence each other as a function of the salience of either the concrete or the abstract dimension, and discuss empirical support for their theoretical model. The bi-directionality of the relation between spatial thought and social thought is a departure from earlier theoretical work on conceptual metaphors (e.g. Lakoff and Johnson 1980), and is also observed in studies investigating the relationship between concrete experiences and non-social abstract concepts (e.g. Schneider et al. 2011).

The editors have not attempted to provide a single unified framework that predicts how spatial dimensions and social thought interact, but have collected chapters that represent the breadth and diversity of the interdependency between space and social cognition. The authors of the different chapters take stock of the current understanding of the neural basis underlying directional selectivity, how brain asymmetries drive spatial attention, how such spatial asymmetries are expressed in art, the correspondences between spatial thought and social thought, how abstract concepts are structures in concrete space, and how social information can influence spatial perception. Together, these chapters provide a comprehensive overview of the playing field for researchers interested in the spatial dimensions of social thought.

The spatial dimensions discussed in the book all consider our body as a stationary zero-point. There is a strong focus on horizontal and vertical space, while the sagittal plane (front-to-back) receives relatively little attention. Our tendencies to approach or avoid others (e.g. Cacioppo et al. 1993), the ways in which we regulate our interpersonal distance in social interaction (e.g. Hall 1966), and how movement through space influences our thoughts (e.g. Boroditsky 2000), would have deserved attention in a dedicated chapter. In this respect, the horizontal dimension is overrepresented in the current volume, with some overlap between the chapters in Section B. Naturally, choices need

to be made when collecting chapters on such a broad topic, and the detailed discussion of the different processes underlying spatial asymmetries in the horizontal dimension in Section B will probably be seen as the most interesting aspect of the book by researchers who already have a basic knowledge of the relation between space and social thought.

An important strength of the volume is that the authors of the chapters provide more than a review of their respective fields of expertise. They raise important questions for future research, and propose first steps towards the development of theoretical frameworks to address these questions. For experts, the book serves as a reminder, for novices, as an eye-opener, of the simple truth that space is the most inescapable property of human life. It should not be surprising that spatial dimensions permeate our social thoughts, and at the same time, it is difficult not to be amazed by the overview *Spatial dimensions of social thought* provides of the often subtle, but always pervasive, interrelatedness of social thought and space.

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