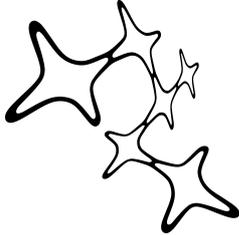


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Wayfinding

An Interdisciplinary Journey into the
Domain of Spatial Representation in
Philosophy and Psychology

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General Introduction

[G]eneral coherence of the whole is often the beginning point. Details and also foundations are constructed or perfected later, the value of the theory depending upon whether or not it is in fact possible to accomplish it.

(Ruth Garrett Millikan)

Let me begin this introduction with a comment on this book's title: »Wayfinding« was intentionally chosen to capture the fact, that this work is about way-finding in a double sense. On the one hand, its content revolves around spatial representation and *inter alia* about how to find one's way. On the other hand, it reflects the way I had to find after deciding to work within an interdisciplinary setting. This brings us to another comment worth making, pertaining to the dictum opening this chapter.

The dictum characterizes very well how different the focus of work done in interdisciplinary contexts has to be in order to be successful, as compared to investigations belonging to one discipline alone; one has to test out whether cooperation is possible before meaningful research can take off: coherency first, details later, one might say. Moreover, tackling too many details before a common channel of communication has been established can bring projects down, if only because it renders interdisciplinary crosstalk impossible due to increase in technical jargon. Interdisciplinary work, truly, is a challenging endeavor.

In order to mitigate any worries and to enable a broad readership, much work has been invested to make the reading experience worthwhile. This pertains as much to typography as to style and content. This book is wholeheartedly interdisciplinary in spirit and in order to allow readers from different disciplines to understand the topic, the attempt has been to present matters in a style as unpretentious and accessible as possible. In accord with the saying attributed to Albert Einstein to make all things as easy as possible, but not easier.

The opening chapter consists of two parts. First we will outline the plot and state our epistemic aim. Subsequently, we present a short introduction to classical philosophy of mind. This is advantageous because it will (a) generate some common intellectual ground and (b) because it allows us to appreciate the extent to which this book transcends classical philosophy of mind. Its interdisciplinary nature reveals itself in the leitmotif that can be traced through each and every chapter: the importance of movement in concord with the role of the body schema.

By the end of this book it will have become clear *that* and *the extent to which* domain specific cooperation between philosophy and psychology is possible and,

moreover, that there exists an interface between traditional philosophical questions and sensorimotor research that reveals itself in *the framework role of spatial content*.

1.1 The Plot

In this section I want to give a concise and lucid outline of this book's plot in order to enable the reader to trace the leitmotif through each and every chapter. For people fond of details, a fine grained summary is provided in appendix section 2.

The aim of this book is twofold: on the one hand, (1) it aims at testing whether cooperation between psychology and philosophy is possible (on the distinction between these two terms consider section 2.1). On the other hand, (2) it aims at actually engaging in interdisciplinary research on the subject matter of spatial representation. Both strands intermingle: it is our aim to show *that* and *how* cooperation is possible within one specific domain of research. Within the domain of spatial representation the epistemic aim concerns what was recently called »the thorniest [issue] in neuroscience, psychology and philosophy« (Grush, 2000, p. 78), namely, the question of how a representation of space might come about that is suitable for enabling higher-level cognition, yet, stands in continuity to sensorimotor research.

We start with pointing out what classical philosophy of mind is usually occupied with by giving a short historic/systematic account (1.2, 1.2.1). In that context we spotlight the key terms »mind« and »content« (1.2.2) and their relation to what is commonly understood by the term »mental representation« (1.2.3). Yet, we do not want to follow the well tread path and stick with classical philosophy of mind. Instead, we aim at interdisciplinary discourse. And we start our departure by dropping the so-called »conceptual constraint« and opting for the existence of nonconceptual content (1.2.4) that, in turn, allows us to conduct analyses at the subpersonal level of description.

Chapter 2 is immediately connected to the topics mentioned in the introduction. Because we are leaving the well tread path of classical philosophy of mind, we have to take a stand on some meta-scientific issues and embrace what one might call »cooperative methodological naturalism«, i. e., that philosophy and psychology mutually inform *and* constrain each other in cooperative attempts to explain their explanandum. We will state that it is advantageous to admit a plurality of descriptions when it comes to explaining many a cognitive phenomenon, and that fundamentalism or unqualified philosophical naturalism should be resisted. Moreover, the terminological distinction between philosophy and psychology is commented on, as well as what embracing cooperative methodological naturalism amounts to. Actually, embracing it goes hand in hand with shifting the emphasis *away* from metaphysical questions that usually dominate philosophy of mind to

assumptions laying on the methodological or epistemological side (2.1). We will follow the late Susan L. Hurley in calling this shift in emphasis »the ninety-degree shift« (1998*b*) and spend some time discussing it (2.2). There we will comment on the importance of different levels of description, mirroring the distinction between conceptual and nonconceptual content derived earlier. Moreover, we will also bring out why the philosophically naïve picture of perception as input and action as output (»Sandwich View«) should be resisted (2.2.2) and, by way of example (2.2.1), make clear that this dismissal goes hand in hand with appreciating the role that movement, bodily setup, and expectations play when it comes to the explanation of organism's capacities.

Because movement and the role of bodily setup turned out to be important, we want to figure out in how far bodily aspects in general might influence cognition. Therefore, we discuss what embodiment might be (2.3) settling for adopting a modest version of embodiment, barring the radical claims often made by young researchers trying to raise their profile (2.4). In that context we will see that (a) it is necessary to broaden the scope of research while at the same time (b) be careful not to overintellectualize the system one wants to explain. Discourse revolving around embodiment obeys at least three aspects and we comment on three strands that when woven together, characterize the debate: an ontological, a methodological, and a phenomenological strand, respectively (2.3.1–2.3.4). These three strands can be pulled together by embracing Metzinger's (2007*b*) distinction of three levels of embodiment (2.3.4) which forms an important insight in itself, as this move allows us to link our research about spatial representation to Gallagher's (2006) investigation of the role of the body schema. By the end of chapter 2 we have derived the leitmotif accompanying us through the following chapters. Formulated as a set of five conjectures (BSPOR, cf. p. 76) it is accompanied by two further positive theses (EC and COI, cf. pp. 75f.) to be further pursued.

Chapter 3 is devoted to an elucidation of the body schema. This is important because, according to BSPOR, it is supposed to play a huge explanatory role. We will follow Gallagher (2006) in his exposition of what role the schema might play and the extent to which it is to be distinguished from the body image (3.1). His distinction, we will see, abides the distinction of levels derived in chapter 2.

Even though Gallagher's exposition is the best currently available, it leaves us wanting for more because it leaves the nature of the body schema vastly underspecified. This is especially true concerning the question of whether the schema can be understood as an inner model of the body as argued for by Metzinger when opting for second level embodiment. In order to resolve this issue we argue for an account of representation that is compatible with philosophy done after resolving the ninety-degree shift (3.2). After giving an exposition of the traditional account of representation and five associated conditions (3.2.1), we will augment it by watering down the fifth criterion (3.2.2). This enables us to embrace a naturalistic

account of representation that allows us to show that the body schema might be understood as a representational entity (3.2.3) and, moreover, why it can, indeed, be understood as a inner model of the body (3.3, 3.4). The remainder of the chapter is devoted to a discussion of the schema's representational status and the benefits of understanding it that way (3.5). This discussion is connected to EC and COI as well as to the connection between the notion of emulation and the schema's workings (3.6) which will enhance our understanding and mitigate the shortcomings of Gallagher's exposition.

Chapter 4 shifts the emphasis to providing a nonstandard interpretation of Strawson's *Individuals* which allows us to point out that there is, indeed, a close connection between empirical insights and traditional philosophy, at least within the domain of spatial representation. The discussion of Strawson's philosophy allows us to derive pre-theoretical desiderata to be used later when evaluating empirical work.

Strawson belabors the well known Kantian intuition that space forms a necessary condition for the possibility of self-ascription of experience (4.1), i. e., the ability to identify or reidentify particulars (4.1.1) and its connection to a framework of particulars is argued for (4.1.2). Our nonstandard interpretation pertains to reevaluating the Kantian theme and shift the emphasis to the discovery of subpersonal mechanisms underlying this ability in the area of identifying places. The possibility of unearthing a role for movement in Strawson's argument (4.1.3) allows us to connect his work to navigational studies in psychology. It turns out that the framework he argues for is akin to the notion of reference frames that is ubiquitous in empirical work on spatial representation.

Strawson's account of place identification (4.1.4) is criticized against the background of developmental studies in psychology (4.2). We charge him of being guilty of overintellectualization and of violating COI (4.2.1), especially in the context of place identification (4.2.2). Still, his apparatus allows us to conceptually constrain empirical research (4.2.3), while at the same time refining philosophical discourse (4.2.4). Of special importance is the distinction between psychological and physical space (4.1.3, 4.2.3) that is a consequence of representational analysis and that will accompany us in the chapters to come.

The remainder of chapter 4 is devoted to a critical review of empirical literature revolving around the issue of spatial representation. The notion of a reference frame is elucidated (4.3, 4.3.1) and connected to Strawson's framework. However, because this notion is not without problems, we have to spend some space on critically discussing it (4.3.2). This yields the observation that the brain has to account for coordinate transformation in order to enable action and perception (4.3.3) and that this ability is connected to the workings of the body schema (4.4), which allows us to revisit the discussion undergone in chapter 3 and to providing for a firmer grip on BSPOR's tenets two and five. The chapter is closed

by mentioning what can be called an »anti-pragmatist conviction« pertaining to the nature of spatial representation that forms the background for the discussion in chapter 5.

Chapter 5 is devoted to the question as to how a representation of space might come about that meets the anti-pragmatist conviction, yet, stands in continuity to sensorimotor research. It turns out that there is an intimate connection between the behavior of the organism and the nature of the spatial representations it entertains (5.1). This connection will be elaborated on during the discussion of a travel-based space that allows us to further connect our discussion to psychological research.

Because our discussion is closely connected to Strawson's take on the subjective/objective divide, we spend some time discussing it (5.1.1). In that context we will resort to capacity-talk and spell out three capacities an organism has to have in order to reach an adequate representation of space. It turns out that the notion of a behavioral space is tightly connected to the notion of perspective. And because behavioral space is a product of the body schema, we have to take a stand on what perspective might be when doing subpersonal analysis. Minimally, perspective can be understood as having a point of view and this latter notion boils down to having a facing and having a position. Because we are conducting subpersonal level analysis this purported point of view has to be a nonconceptual one (5.1.2).

Subsequently, the notion of a travel-based space is elucidated (5.1.3). It is clarified that, again, movement plays an important role in accounting for a representation of space as extended and connected. As it stands, all three capacities spelled out in the beginning of chapter 5 are fulfilled when our theoretical sketch of travel-based space is accepted; moreover, this theory is closely connected to emulation (5.1.4).

The second part of chapter 5 is devoted to a review of the psychological literature revolving around navigational capacities and spatial representation (5.2). The discussion of three different types of cells can be mapped on the capacities derived earlier, with place cells realizing actual position (5.2.1), head-direction cells realizing facing (5.2.2), and grid cells providing for an underlying metric and the connectedness of space (5.2.3). A synthesis reveals that emulation allows the connection of these insights to philosophical discourse, and moreover that the body schema might provide answers to questions that are deemed pressing by the neuroscientific community (5.3).

So much to the outline of the plot, now let our story begin.