

## Human cognition, space, and the sedimentation of meaning

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**Abstract** The goal of this paper is to explore, from a phenomenologically informed perspective, the phenomenon of the operative spatialization of human thinking, viewed in its relationship with the embodied human organism's spatial experience. Operative spatialization in this context refers to the cognitive role and functioning of spatial schematizations and differentiations in human thinking. My particular focus is the domain of conceptualization. By drawing on Husserl's discussion of the (linguistic) process of a sedimentation of meaning, I aim to show that spatialization functions in a structurally ambivalent manner. On the one hand, spatialization predisposes and thus narrows the scope of human conceptual thought. On the other hand, spatialization establishes an implicit cognitive scaffold indispensable for the development and practice of human higher-order thinking. The structure and functioning of this scaffold, I argue, is intrinsically related to the spatial structure and dynamics of human embodiment. Synthesizing insights from phenomenological studies concerning the experiential constitution of space, and classic and recent research findings from fields such as cognitive linguistics and psychology concerning the cognitive dimension of image-schemas and gestural behavior, I argue that the living human body functions centrally as the sense-constitutive 'site of conversion' (Husserl) between concrete structures of spatial experience and abstract structures of conceptual thought.

**Keywords** Embodied cognition · Cognitive spatialization · Spatial perception · Sedimentation · Metaphor · Gesture

### Introduction

Every living organism is in its active behavior distinguished by a concrete mode of spatial integration. Among non-human animals capable of movement, this

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integration is predominantly mediated by the organism body's specific sensory and motor disposition, or, more precisely, the manner in which this disposition comes to express itself in the organism's lived behavior. The result of the organism's perceptions and actions is, as ethologists have emphasized, a specifically structured behavioral environment, which in turn supports and shapes the organism's existence like a flexible web (see v. Uexküll & Kriszat, 1983, 15).

In the human organism, the picture is, to some extent, similar. On a basic level, the human organism constructs its space, as palaeoanthropologist Leroi-Gourhan observes, from "within a network of movements that originate from inside or outside its own body, and whose form is interpreted by its senses" (1993, 282, translation modified). However, at the same time, human spatial behavior bears witness to a peculiar process of "symbolic 'domestication'" (313) inasmuch as the human organism's experience of space, at least partially, can be "reflected in a network of symbols and held up for comparison with itself" (283). The peculiarly human trait of a symbolic domestication of space is made possible by the evolution of human symbolic thinking (see, on the latter, Donald, 1991, 2001; Deacon, 1997; Tomasello, 2008). This evolution comprises various stages that correspond to a structural hierarchy of layers of meaning and meaning constitution, where these layers are either directly or indirectly informed by the structure and dynamics of human embodiment (see Donald, 1991, or, for a related discussion from the perspective of cognitive semiotics, Zlatev, 2009). On the most basic level, just as in most other animal organisms, there is a layer of meaningful perceptual structures, most fundamentally, the perceptual gestalt figure-background. Building on this level of perceptual structures, there is a layer of body-based schematizations that have been referred to as image-schemas (see my discussion in "[The human body as the 'site of conversion' of space and language](#)" section). This layer, in turn, provides the meaningful basis for a layer consisting of the metaphorical extensions of image-schemas. Another layer is the domain of gestural and mimetic behavior; the latter allowing for the development of "mimetic culture" (Donald, 1991, chapter 6). A phenomenon that seems to be distinctively human is the layer where meaning is constituted and conveyed symbolically by way of language in the form of verbal speech, allowing for what Donald refers to as "mythic culture" (1991, chapter 7). Finally, there is a layer of meaning that is characterized by the cognitive incorporation of techniques of "external symbolic storage" (Donald, 1991, Chapter 8). This incorporation, which facilitates the advent of "theoretical culture" (ibid), presupposes the development of extrasomatic material media such as writing systems, diagrams and architectural monuments. This is because only these material media allow for the possibility of fixing and storing symbolically encoded information in durable form outside the confines of the individual human organism's biological memory systems, i.e., the organism's brain and body.<sup>1</sup>

As important as the process of symbolic externalization is for the evolution of human cognition, it shall not be my primary concern here. Rather, the focus in this

<sup>1</sup> For compilations of archaeologically and anthropologically informed discussions of material techniques of symbolic storage, and their implications for the evolution of human cognition, see Renfrew & Scarre (1998) and DeMarrais, Gosdon & Renfrew (2004).

paper is on exploring, from a phenomenological perspective, the constructive nature of the cognitive nexus between higher-order conceptual thinking, on the one hand, and space and embodied spatial experience on the other. In doing so, I want to draw attention to the peculiar ambivalence implicit in the operative structure of human cognition, and of human conceptual thought in particular. This ambivalence expresses itself in the fact that, with regard to human cognition and language, the order of space functions in a structurally predisposing and thus narrowing manner, while it is at the same time indispensable for the development and practice of abstract human thinking. My general point of departure will be the observation that the dimension of space, in the form of seemingly unavoidable semantic references to spatial schemata and processes, is always already implicit in the constitution and functioning of the conceptual apparatus underlying human thinking.

To shed light on the nature of this ambivalent operative spatialization of human conceptual frameworks, and to grasp its specific role in the process of human thinking, I subsequently draw on the phenomenological concept of sedimentation. I want to show that an implicit yet cognitively relevant infrastructure is constituted through spatialization. This structure directs thought down certain established paths, suggesting certain connections and progressions while making others appear errant or even devious. At the same time, it is precisely the cognitively restrictive functioning of spatialized structures that constitutes an indispensable precondition for the possibility of higher-order human conceptual thinking as such. I will illustrate this point by discussing the role of conceptually sedimented spatial metaphors. In the context of this paper, (spatial) metaphors, in accordance with the main lines of thought within cognitive linguistics (see e.g. Lakoff & Johnson, 1980), are generally understood as a concrete, conceptually constructive medium to articulate abstract cognitive matters. In this sense, metaphors are not restricted to the domain of symbolic language, but also occur in the context of the human organism's embodied behavior, as well as taking durable form in some of the human beings' material cultural constructions. I argue that in both their 'internal' and 'external' manifestations, spatial metaphors, while restrictive of the scope and possibilities of conceptual thinking, simultaneously provide a heuristic scaffold that makes abstract constructs reliably available, manageable, and understandable in cognitive praxis.

Finally, returning to the level of lived spatial integration, I discuss the significance of the many spatial metaphors conceptually employed to describe abstract processes which also refer semantically to the spatial situation as it is mediated by the perceptions and movements of the human organism's living body. In line with the shift in the cognitive sciences towards an understanding of human cognition as an intrinsically embodied, situated and dynamic process, where "cognitive structures and processes emerge from recurrent sensorimotor patterns of perceptions and actions" (Thompson, 2007, 13; see also Varela et al., 1991; Thelen & Smith, 1994; Kelso, 1995), and with particular consideration of research findings from the field of cognitive linguistics (e.g. Lakoff & Johnson, 1980; Johnson, 1987; Langacker, 1987; Hampe & Grady, 2005), this semantic reference to embodied patterns and actions is no coincidence. As I will show, these findings in their overall tendency suggest that embodied patterns of spatial movement, particularly in the form of manual gesturing, have been of intrinsic importance for the development and proper functioning of the cognitive and conceptual architecture of the human individual.

These insights into the centrality of the structure of human embodiment accord with many established phenomenological positions. Moreover, these insights can be utilized in combination with a phenomenological standpoint to situate the human organism's living body as the generative interface between the experience of space on the one hand, and the operative structure of human conceptual thought on the other. In so arguing, this paper will contribute to fostering dialogue between phenomenological theories of embodiment and embodied space on the one hand, and the field of cognitive linguistics on the other.<sup>2</sup> In addition, it will also draw attention to Husserl's conception of sedimentation as a promising yet neglected train of thought for the understanding of human cognition from the perspective of a phenomenologically informed cognitive science.

### Space as intrinsic means of conceptualization: a first approximation

The project of a symbolic domestication of space is one of the truly distinctive features of human behavior (Leroi-Gourhan, 1993, 313). Anthropologists, sociologists, and archaeologists have each noted that such a symbolic domestication of space expresses itself most tangibly in the material pattern of human settlements (see, e.g., Durkheim, 1976; Wilson, 1988; Leroi-Gourhan, 1993); and most importantly in the form of the house, which was arguably "the most powerful practical symbol until the invention of writing" (Wilson, 1988, 58). This architectural domestication of space is complemented by the development of material-symbolic practices of conceptual construction, i.e., writing and formalization, and is preceded by the development of verbal speech. Importantly, the advent of speech marks a significant cognitive emancipation of human spatial cognition from the way space is initially experienced via human embodiment, and the development of writing further intensifies this. In the place of the indeterminate, situated, and dynamic structure of embodied space, a symbolically mediated, increasingly rationalized conceptual framework is erected as a substitute. This framework allows for both the cognitive and communicative abstraction from the immediacy of embodied experience, i.e., from the concrete situation and the way the spatial environment is given therein.

Despite this increasing capacity for a symbolically mediated "displacement" (Hockett, 1960) from the directly given spatial situation, the operative domain of human conceptual thinking, even at higher levels of complexity and abstraction, continues to rely intrinsically on spatial patterns and structures. This pertains not only to the constructive functioning of spatial metaphors (the salient aspects of which I will discuss further), but also to the constructive role of spatial schematizations and differentiations in constituting conceptual frameworks. Particularly striking in this regard is the way that cognitively salient oppositions are conceptually established. In general, the construction of oppositions is indispensable not only for

<sup>2</sup> For a thorough and critical discussion of the state of dialogue between the two fields see Zlatev (2010). As Zlatev shows, in the writings of some the 'founders' and most prominent proponents of the field of cognitive linguistics, notably Mark Johnson and George Lakoff, references to phenomenology are of a rather superficial and quite often contradictory nature. At the same time, Zlatev argues, there are a range of more recent developments in the field of cognitive linguistics which signal a tendentious rapprochement of cognitive linguistics with phenomenological issues and positions.

the process of the symbolic domestication of space, but also for the establishment of complex conceptual systems. It has even been argued that thinking in terms of polar oppositions constitutes a culturally predominant way of conceptually organizing the world, whether it be because opposition expresses a “natural propensity of human thought”, or because it responds “to an intellectual necessity in coming to terms with representations” (Needham, 1987, 35; also Needham, 1979; for a classic discussion of the fundamental role of polarity in early Greek thought, see Lloyd, 1966).

Opposition, in human cultures, is commonly conceived of, and communicated, by way of spatial schemas, specifically, metaphoric oppositions with a spatial character (Gattis, 2001b, 5). Take for instance the spatial opposition of interiority and exteriority. In the domain of symbolic construction and theory building, this spatial opposition has served as a matrix for a range of the most influential conceptual distinctions—striking examples are mind versus body, essence versus appearance, and, maybe most importantly, subject versus object.<sup>3</sup> Another striking example is the spatial opposition of left and right. In a classic essay, anthropologist Robert Hertz (1973) has observed that the division of the universe into polar opposites is almost universally communicated by way of the left–right asymmetry of the human organism’s manual functions, whereby the right (hand) of the human body is almost everywhere regarded as superior to the left.<sup>4</sup> This observation indicates that the constitution of many prominent human modes of cognition and conceptual categorization, even in the case of rigid and exclusive models, are in their intrinsic spatialization developmentally connected to the dynamics and structure of human embodiment.<sup>5</sup>

<sup>3</sup> With regard to the latter pair, an etymological perspective proves particularly revealing. Etymologically, the word ‘object’ derives from the Latin *obiectum* (translated from the Greek ἀντικείμενον), which signifies in spatial terms that which is thrown to the opposite, exterior to and distant from the subject. The word ‘subject,’ by contrast, stems from the Latin *subiectum* (a translation of the Greek ὑποκειμενον). It literally denotes that *substratum* which underlies, and forms the basis of something else. In this form, it is also very early on associated with autonomy and interiority.

<sup>4</sup> In his discussion, Hertz focuses on the superior role of right handedness in Maori culture but also develops a general sociological discussion concerning the pre-eminence of the right in human cultures. For a discussion of the superiority attributed to the right over left in Greek philosophy, see Lloyd (1973). Recent experimental studies demonstrate, however, that the manner in which a person associates right and left with positive and negative ideas is significantly influenced by the person’s handedness: in contrast to the majority of right-handed persons, left-handers commonly tend to associate the left with positive ideas (Casasanto, 2009). For a recent, comprehensive discussion of the phenomenon of handedness in biological and cultural contexts, see McManus (2004).

<sup>5</sup> It is interesting to note that in the particular instance of the evolution of binary thinking, it has been claimed by palaeoanthropologists that bilateral bodily organization, and the increase in mobility it entails in comparison to radial bodily organization, has, in the long run, established the condition for the development of complex human symbolic and technical behavior (see Leroi-Gourhan, 1993, 27). Of particular importance in this regard is that the evolution of bilateral bodily organization entails the polarization of mouth and hands. This polarization, in turn, with the acquisition of bipedal locomotion, eventually paves the way for the differentiation of language and technics (see *ibid*, 31ff). With regard to the emergence and dominance of binary modes of human thinking, it is then crucial that the front limbs of the upright human organism, once placed laterally on the body, entail a “lateral division of functions” (Brésard, 1993, 89) inasmuch as some actions are consistently performed by the right or the left hand. This manual lateral specialization, which corresponds to the lateralization of cerebral functioning, implies a habitually perpetuated, dyadic behavioral motor structure that may inform the binary patterning characteristic for many human conceptual frameworks. See, in this regard, also the discussion by Maxine Sheets-Johnstone (1990, 84ff). Sheets-Johnstone develops the interesting hypothesis that the rhythmically alternating pattern of the human gait, stemming from the evolutionary acquisition of bipedal locomotion, may have contributed to the development of hominid binary modes of thought and even human numerical thinking.

In any case, the fact that the most prominent conceptual oppositions are established against a backdrop of spatial schematizations entails that human conceptualizations of space, if they rely on these oppositions, remain necessarily immersed in what they seek to capture. In other words, within the limitations of human conceptual frameworks, space is never merely a determinate and extrinsic *object* of study. Rather, space functions intrinsically yet implicitly as a medium through which differentiating concepts such as the ‘object’ are meaningfully established and delineated in the first place. Once a certain level of conceptual complexity has been reached, there would seem to be no escape from spatialization. All these raises the question of how to explore the constructive nature and role of spatialization that underlies, and possibly even anticipates, the cognitive structure of higher-order human thinking.

### **Phenomenology and the spatialization of human thought: sedimentation and spatial metaphors**

If one wishes to analyze the peculiarly implicit yet constructive functioning of space with regard to the domain of human conceptualization, one must move beyond a methodological approach that takes space as a ready-made, fully determined, transparent entity (i.e., as objective space). Instead the aim has to be to shed light, by descriptive means, on the constitutive process through which pre-objective spatial patterns (e.g., as directly experientially mediated by human embodiment), anticipate, shape and bestow meaning on human conceptual constructions. I will discuss some concrete examples of the constructive operative role of human embodiment from this perspective later (4). The project of exploring the dimensions of the pre-objective constitution and functioning of space, with particular attention to the role of human embodiment, can be aligned with a phenomenological investigation of the constitution of space. For phenomenology, as Merleau-Ponty says, sets as its explicit goal the grasping of “the nature of space (...) in its state of nascency, prior to all objectification” (1962, 292, translation modified).

The phenomenological inquiry into the constitution of pre-objective space, i.e., space prior to its conceptual domestication and objectification, faces a fundamental difficulty from the outset. For even when one seeks to descriptively explore the dimensions of the primordial, pre-objective constitution of space (e.g., as it becomes manifest on the level of kinesthesia and embodied experience more generally), one can do so for the most part only by way of linguistic constructions. And language, as Husserl already emphasizes, functions in the main not as a neutral and transparent medium, but instead tendentiously participates in the constitution of the sense that it seeks to express (Husserl, 1970b, 361f). This includes the dimension of “*so to speak*, mute experience” (Husserl, 1960, 38, my emphasis, translation modified), whose own sense a phenomenological philosophy strives to bring to expression. From a phenomenological perspective, one thus would be generally willing to concede that language has the potential to interfere both in the experiential sense-constitution and in the cognitive structuring of spatial orders. At the same time, however, it is notable that a range of authors influenced by phenomenology from fields such as linguistics, philosophy and psychology (e.g., Bühler, Cassirer, and Goldstein) stressed, almost



50 years prior to the founding of the field of cognitive linguistics, that the order of human language itself, both in its genesis and its cognitively salient schematizations, is always to some extent constitutively indebted to pre-linguistic spatial orderings, orderings that are intuitively grasped and mediated by the dynamic structure of human embodiment (see “[The human body as the ‘site of conversion’ of space and language](#)” section).<sup>6</sup>

The main concern for now however is to uncover how phenomenology can help to understand the cognitive role that spatialization plays in the formation of human conceptual thought, and most importantly here, higher-order conceptual thought. In his well-known essay on the *Origin of Geometry*, Husserl borrows a spatial (specifically a geological) term, namely that of *sedimentation*, to denote a peculiar characteristic of the human organism’s cognitive praxis, and of linguistically mediated conceptual thought in particular. With regard to the praxis of human cognition, sedimentation refers to a consolidating process of linguistic conceptualization, in the course of which the evident cognitive structures originally given in embodied sense-experience have certain “persisting linguistic acquisitions” superimposed on them (Husserl, 1970b, 362). In particular, through sedimentation, linguistic concepts become more and more an immediately available, unquestioned (and sometimes even unquestionable) element of the language user’s conceptual repertoire. According to Husserl, this effect is potentially magnified once these concepts become materially embodied in the form of writing. Husserl’s choice of the term ‘sedimentation’ is no coincidence. This is because the metaphor of sedimentation allows one to imaginatively connect the two dimensions of conceptual–cognitive processes that are often separated: their synchronic structure on the one hand, their diachronic dynamics on the other. Sedimentation, in spatial terms, describes a process whereby particles collect together and build vertically. This vertical process, in turn, leads to the establishment of horizontal strata that over time form a stable structural configuration. Thus, sedimentation not only combines structure and process, spatial order and becoming, but also two spatial movements that on the face of it are mutually exclusive: particles sediment in a downward movement, leading to the formation of stratified configurations that grow from the bottom upward (see Sommer, 1998, 137f).

The fact that linguistic sedimentation immediately implies stratification and increasing conceptual solidification has serious implications for the *modus operandi* of the praxis of thinking in the medium of language. First of all, the linguistic stratification and solidification of conceptual constructions implies the concealment of these constructions’ own structural genesis and history, including that of their pre-linguistic roots in human embodiment. Thus, for Husserl, sedimentation entails

<sup>6</sup> This emphasis on the fundamental cognitive role of human embodiment separates phenomenological approaches from the work of some of the pioneers of cognitive linguistics (e.g., Talmy, 1983, also to some extent Langacker, 1987, but then again see Lakoff & Johnson, 1980). More recently, Levinson (2003) has convincingly argued that the relation between the *modus operandi* of the human organism’s embodied spatial cognition and that of human modes of linguistically mediated spatial cognition is not always linear. This is because in some cultures, the cognitively dominant linguistic frames of spatial reference function without requiring explicit reference to the space of human embodiment (see also the discussion in “[The human body as the ‘site of conversion’ of space and language](#)” section). See, for a discerning discussion of the relation between embodied and linguistic spatial cognition, also Munnich and Landau (2003).

covering up the original dynamics of processes of meaning constitution within the domain of language-use (Buckley, 1992, 91), and ultimately, a reduction of critical distance to, and reflection on, the linguistic concepts employed. In overall terms, “a kind of superficial and ‘passive’ understanding is the necessary result of the increasing familiarity with spoken and written words” (Klein, 1940, 155). This facilitates a second consequence of sedimentation. The more that language is sedimented, e.g., through social convention and habituation, the more an implicitly functioning cognitive–conceptual scaffold forms that tacitly channels both what is to be newly and actively expressed, and also what is received and conceived of in conceptual form. In this sense, one can say that linguistic sedimentation tendentially entails for the individual human organism not only a relative regression of critical distance, but also a reduction of cognitive activity, contingency, and complexity.

In view of this cognitive forgetfulness and passivity that follows the “unavoidable sedimentation of spiritual [*geistigen*] products” as relatively static linguistic constructions, Husserl, somewhat drastically, considers the process of conceptual sedimentation not only as implying a “seduction of language,” but also as posing a “constant danger” to lucid, self-evident and original human thinking (Husserl, 1970b, 362). Husserl’s critical stance on sedimentation is, however, tendentially one-sided. On more careful scrutiny, there are indeed plausible ways to understand both the cognitive passivity and forgetfulness that follows from processes of sedimentation, as indispensable conditions for the development of constructive, higher-order conceptual thinking. In this regard, I think, Husserl’s notion of sedimentation can be expanded to not only apply to processes of stabilization and habitualization taking place on the level of linguistic conceptualization, but also to certain stabilizing functions implicit in pre- and non-linguistic forms of conceptualization. These may either be conceptual processes that are based on recurrent embodied processes and sensorimotor patterns of spatial schematization (see “[The human body as the ‘site of conversion’ of space and language](#)” section for more detail), or the sort of cognitive–conceptual processes that use as their formative medium (non-linguistic) material structures of the surround (see, e.g., Tilley, 1999; Hutchins, 2005).

In all these cognitive–conceptual domains, processes of sedimentation function in a way that entails the creation of stabilized, typifying structures of meaning. These structures in turn effectively constitute a readily available yet for the most part implicitly functioning memory for cognitive processes. This implicit memory, in reducing cognitive complexity, provides a cognitive scaffold that liberates the thinking of the human individual from the impossible task of thinking everything simultaneously and constantly anew. As a matter of fact, every constructive cognitive act made up of explicit and selective processes of thinking presupposes an ongoing freeing of cognitive capacities. In providing the scaffold necessary for such a cognitive liberation, sedimentation ought not to be regarded as a detrimental process, i.e., as a hollowing or emptying of thought (Merleau-Ponty, 2002a, 8), but as an essential condition of the possibility of constructive human thinking. As Merleau-Ponty puts it, sedimentation is the “realization” of thought, for thought “can exist only as sedimented” (2002b, 25). Following this logic, it can even be argued that the more that thought is sedimented, the more cognitive resources are liberated



that potentially allow for the future progression and diversification of human thinking (see Buckley, 1992, 91).

The precise way sedimentation functions cognitively can be made concrete by illuminating the implicit role that metaphoric structures, and in particular spatial metaphors, play in human thinking. A structural nexus exists between what Husserl refers to generally as the process of sedimentation and the cognitively both scaffolding and canalizing functioning of metaphoric structures in human thinking. Two aspects are of particular importance in this regard. First of all, metaphorical structures, like sedimented conceptual structures generally, exert an implicit, stabilizing influence on the dynamics of human conceptual thinking. Secondly, and related to this, the same metaphorical structures function as an implicit storage of formerly active meanings and significations.

That habitually employed, or sedimented, metaphors possess a peculiar, cognitively operative force is, from a phenomenological perspective, nothing novel. The illuminating discussions of (spatial) metaphors by Manfred Sommer (1998) provide an example. Sommer emphasizes that metaphorical constructions are characterized by an “underground efficacy” as they “can be constitutive of the order, the arrangement, the configuration of the various parts of a theory” (1998, 131).<sup>7</sup> This is not only the case if metaphors suggest certain questions and considerations, or limit the scope of these questions’ potential occurrence (see *ibid*), but also, as we shall see further below, because metaphorical constructions give abstract theoretical constructions and frameworks a more concrete, intuitively graspable form. Interestingly, this constructive functioning characteristic for metaphorical structures often expresses itself in the form of cognitive spatialization, in both a direct and indirect manner. Firstly, human languages contain an abundance of conceptual-metaphorical constructions the expressions of which are of an explicitly spatial nature. Secondly, metaphors, in their network of mutual references and possible interconnections, institute an infrastructure that implicitly supports, while also structurally restricting the scope of, human conceptual thinking.

Let me begin with the former. As pointed out, spatial metaphors feature prominently in human conceptual frameworks. As Cassirer emphasizes, this may be linked to the fact that every mental construct becomes conceptually graspable only on the basis of its spatialization, with qualitative relations and oppositions being rendered by means of spatial relations and differentiations (1985, 152). Cassirer’s observation is substantiated by more recent research findings from disciplines such as cognitive psychology and linguistics. These findings, collected in a book edited by Meredith Gattis (2001a), suggest that spatial schematization plays an intrinsic role in abstract cognitive processes, and specifically that the cognitive capacities acquired for the perception of space are fundamental to other more abstract cognitive

<sup>7</sup> Another succinct and instructive phenomenological discussion of metaphor is found in Edie (1963). A more comprehensive, programmatic outline of a phenomenologically informed theory of metaphor is that by Hans Blumenberg (1960). While not being directly aligned with the phenomenological project, the studies on the cognitive function of metaphors by cognitive linguists George Lakoff and Mark Johnson (1980, 1999) are also worth mentioning here (see also my discussion in the “*The human body as the ‘site of conversion’ of space and language*” section). These authors, as in the phenomenological tradition, emphasize the cognitive dimension of human embodiment and sensorimotor action.

tasks. For instance, spatial schematization, both in the form of imagined mental arrays and extrasomatic material structures, provides a scaffold that aids memory. In addition, spatial schemata play an important role in conveying categories and oppositions in communicative processes, since they provide order, direction, and relationality in processes of reasoning (Gattis, 2001b). On the level of conceptual thought, it appears there is a direct correlation between the degree of spatialization and the level of abstraction—the more abstract and theoretical a concept is, the more its ideal determinations are metaphorically rendered by way of spatial determinations (see Cassirer, 1985, 150). A pertinent example of a noteworthy theoretical concept which metaphorically leans against spatial directions and dispositions is the concept of ‘foundation’ (epistemological or otherwise). Somewhat less striking is the considerable number of theoretical concepts with spatial prefixes (e.g., ‘explanation’, ‘hypothesis’, ‘substance’, ‘induction’ and ‘deduction’). Finally, one should not overlook the wide range of concepts that, as previously mentioned, are meaningfully established against the backdrop of a spatial polarization.<sup>8</sup>

While spatial metaphors constitute a cognitively implicit scaffold that is crucial for the formation of complex conceptual constructions, the same metaphoric structures often tend to foreclose certain conceptual possibilities. This leads me to the infrastructure of metaphors I have already noted, the role of which is to implicitly stabilize and canalize the dynamics of human thinking. As long as language makes use of metaphors, and most of all spatial metaphors, the potential scope and actual dynamics of human higher-order conceptual thought will remain somewhat restricted. This is mainly due to two characteristics of the use of metaphor, and spatial metaphors in particular.

First of all, the individual human organism, throughout the process of enculturation, more or less habitually adopts a socially established metaphorical infrastructure and a transindividual memory. Once tapped into in cognitive and communicative praxis, this infrastructure operates as field of implicitly enactive forces that anticipates many of the avenues of thinking. Specifically, the operative logic of this field of metaphorical structures makes particular emotive connotations, certain connections, and particular orderings and exclusions seem obvious and natural, as well as fostering communicative connectivity. In view of the functioning of this pre-established metaphorical infrastructure, the practice of human thinking might seem to be more a matter of constant recognition and recollection of familiar

<sup>8</sup> Given the phenomenological orientation of my discussion, it is also worth bearing in mind here that a range of phenomenological key concepts, with respect to their own linguistic formulation, are likewise established only against the backdrop of semantic references to potentially predisposing spatial processes. The most prominent example is probably the concept of the phenomenological reduction, or *epoché*, referring to the bracketing (*einklammern*) of all preconceived opinions, theories or interests. The term ‘bracketing’ semantically implies a (quasi-spatial) process of demarcation and exclusion. Likewise, Husserl’s speaking of a “complete transformation [Umstellung],” or reorientation, of attitudes (*Einstellungen*) (Husserl, 1970a, 150) and of a “putting out of action [Außer-Spiel-setzen]” of interests (Husserl, 1959, 110, my translation) is informed by semantic references to spatial ordering processes. In view of this semantic spatialization, one may ultimately wonder whether Husserl’s assertion that the use of the *epoché* “completely shuts me off from any judgement about spatiotemporal factual being [räumzeitliches Dasein]” (Husserl, 1982, 61) should not be taken with a grain of salt; more so since this use unavoidably implies the use of the medium of language.

patterns than a discovery and new beginning, to paraphrase Nietzsche (1999, 34). In short, if formulated in the medium of language and hence implicitly deploying metaphorical structures that reflect underlying spatial structures, the human individual's own thoughts are never only its own productions.

Secondly, with particular regard to spatial metaphors, the tendency towards an implicit canalization of thinking is further reinforced by the fact that the spatializing metaphorical infrastructure over time tends to conceal its own spatial derivation. For the most part, the thinking individual is unaware of the extent to which their conceptual thinking implicitly relies on spatial metaphorical structures. In other words, while metaphors can, over time, become highly conventionalized, and are hence no longer explicitly grasped as metaphors, the cross-domain mappings that underlie the metaphors, it has been argued, tend to continue to remain cognitively operative since they implicitly exert an enduring influence on human thinking and action (Lakoff & Johnson, 1980). The spatial metaphor of 'understanding' is a case in point (its underlying structural specifics will be discussed further below in "[The human body as the 'site of conversion' of space and language](#)" section). Due to the centrality and frequency of spatial metaphors in the solidification of human conceptual constructions, and due to these metaphors' cognitive salience, it seems difficult to imagine a complex mode of conceptual thinking that would be able to entirely avoid reliance on spatial metaphorical structures. It has even been argued that any conscious attempt of the human individual to totally dissociate itself in cognitive practice from spatial metaphorical structures is bound to fail, particularly as thought becomes more complex (see Ströker, 1987, 15).

To briefly summarize the discussion in overall terms, it appears that spatial metaphors, and sedimented metaphoric infrastructures more generally, have a double cognitive function. On the one hand, they exert a stabilizing yet restrictive force as they subliminally guide human thought down well-established avenues and anticipate certain connections and associations. On the other hand, it is these same structures and the restrictions they impose that make possible the process, and progress, of human conceptual thinking, including the possibility of new bifurcations and perspectives.

### **The human body as the 'site of conversion' of space and language**

In the previous section, I argued that spatialization, particularly in the form of metaphoric structures, participates in the formation and functioning of human conceptual thinking in both a constructive and a restrictive sense. At the same time, it is striking that a wide range of metaphors combine both a spatial aspect and a reference to the structure and dynamics of human embodiment. This nexus is no coincidence, for the structure of human space, as pointed out before, is originally mediated by the structure of human embodiment, in particular, by the way the human organism's experiencing and moving body is dynamically coupled to its spatial environment. Drawing on relevant research from the cognitive sciences, my aim in this section is to specify the nature of the cognitive coupling of abstract conceptual formations with the spatial structure and dynamics of human embodiment.

Let me begin by observing that there are a wide range of abstract concepts that metaphorically refer to the situated character, the structure or the dynamics of human embodied behavior. Concepts such as ‘circumstance’ and ‘object’ (literally ‘that which is thrown against’) are metaphorical expressions and they reflect some of the typical spatial structures of human embodied experience, the upright posture of the human body, and the body’s centering function in the space of perception most notably. Likewise, in many Indo-European languages, concepts denoting cognitive processes such as comprehension or understanding are often constituted by employing the word ‘stand’ in combination with a spatial prefix. This is possibly due to the fact that in embodied experience, the place and posture of the perceiving human body structurally anticipates the human subject’s visual hold on a particular spatial object. This, in turn, may have given rise to “spatial metaphors whose idea was that standing in a certain position allows the observer to get to know the properties of the object” (Lieberman & Mitchell, 2008, 210). In addition, there is a group of concepts that directly refer to the human body’s locomotive capacities to describe more general and abstract processes, e.g., ‘progress,’ ‘regress,’ ‘process’. Finally, one may point to the wide range of metaphors for abstract cognitive attitudes and processes that directly refer back to the bodily domains of visual and tactile experience. Terms such as ‘theory’ (from the Ancient Greek word for ‘looking at’), ‘insight’ and ‘point of view’ reveal an obvious reference to visual perception. By comparison, cognition metaphors such as ‘grasping’ (‘grasping an idea’) and ‘comprehension’ have the human body’s manual, exploratory gestural activity as their metaphoric source domain.

Considered against the backdrop of phenomenological studies of the experiential constitution of space, this link between spatial metaphors and metaphors referring to human embodiment is more than just coincidence. As Husserl has shown, and as authors such as Maurice Merleau-Ponty, Erwin Straus, and Elisabeth Ströker have elaborated, it is the living Ego–body of the human organism that organizes the field of spatial experience in such a way that the spatial environment becomes perceptually accessible and distinguishable in the first place. As this is well known, I restrict myself here to highlighting the two most important aspects of this process. Of particular importance, at least for the embodied constitution of visual–perceptual space, is the body’s functioning as what Husserl has called the non-objectifiable “relational center of all spatial orientations and possible presentations” (1997, 109). At the heart of the process of the human organism’s experience of space, its own living body constitutes, in contrast to all other things, an “ever-abiding point of reference, to which all spatial relations seem to be attached” (Husserl, 1997, 66). As a result, Husserl continues, the human organism’s living body comes to determine the appearing of spatial directions such as left and right, front and back, and above and below (1997, 66). Then, there is the way the living body functions spatially as a dynamic system of kinesthetic and locomotive capacities. This dynamic functioning is central to the experiential constitution of space both on a visual and tactile level. Movement alone makes possible a change of orientation and visual perspective not only facilitating the experiential constitution of three-dimensional objects, but opening up the spatial environment to the experiencing organism. Without this primary dynamic process, a complex comprehension of space on the part of the human organism would be out of question. On a basic level anticipating all higher

level of spatial cognition, the experiential constitution of all spatiality is “essentially mediated by the movement of the lived-body” (Husserl, 1997, 148, translation modified). Thus, if one takes the actual dynamics of spatial experience as point of departure, one cannot simply insert the perceiving and moving living human body into a pre-established, static space as one object amongst other objects. As Merleau-Ponty concludes, the human living body is never merely a “fragment of space”; on the contrary, for the human self there could be no space in the first place if this self were not embodied (1962, 102).

If, as previously argued, the domain of human conceptual thought cannot ever simply set aside its own spatialization, and if the structure of space is first of all experientially given to, and mediated by, the structure and dynamics of the body, then it seems obvious to assume that thinking must, in one way or the other, be constitutively informed by (primary) embodiment.<sup>9</sup> This seems particularly true of the process of spatial differentiation and schematization that serves to conceptually establish and express highly abstract, conceptual distinctions. It is not merely that the experiential, cognitively salient differentiation of the spatial environment into distinct regions and places has as its point of departure the ‘here’ of the individual human organism’s own body. But the dimension of embodied spatial experience is also intersubjectively shared by all human subjects, to whom as a rule it is usually constantly cognitively available. In view of this, it is not surprising that, as Cassirer observes, the sensuous-material structure of the human body has commonly served as the prime matrix for the symbolic domestication of the world, with the linguistic concepts necessary for this domesticating process often being semantically based on parts and the spatial organization of the human body (1985, 159ff).<sup>10</sup> More recent cross-cultural research has in part corroborated Cassirer’s observations, with the reservation that the human organism’s body, though the privileged “source domain for the linguistic conceptualization of spatial relations,” is not unique in this function (Sinha & Jensen de López, 2000, 24). At times, and in some language groups, this conceptual function is extended to experientially salient structures of the material environment. Here, human embodiment, in its practical nexus with the environment, plays an indirect, yet ultimately indispensable role; indispensable insofar as human

<sup>9</sup> Following Sonesson’s discussion, I use the term ‘primary embodiment’ to signify the fact that the living body forms, for the individual human mind, its “condition of access to the experience of the world” (2007, 27). As a matter of fact, human thinking is also significantly informed by both ‘secondary embodiment’—the fact that other human minds encountered in the world are also embodied—and tertiary embodiment, which refers to the extrasomatic embodiment of thought in material structures of the surround (see Sonesson, 2007). In this paper, I primarily focus on the cognitive role of ‘primary embodiment’.

<sup>10</sup> Problematic in Cassirer’s developmental account is his thesis of the primacy of embodied rest (1985, 165ff). That is to say, in the evolution of symbolic expression, what is primary according to Cassirer is a static process of transference of bodily parts into linguistic expressive forms. The transference of dynamic *gestalts* of lived movement, by comparison, is only considered a secondary process. However, phenomenological findings, particularly if combined with a developmental and evolutionary perspective, rather suggest a constitutive ‘primacy of movement’ (Sheets-Johnstone, 1999). This is more so since it is only the perceptual and locomotive movements of the human body that allow for the primordial structuration of the spatial environment into a field of distinguished regions and places, thus establishing a differentiated, immediately sense-bestowed field that serves as a matrix for the establishment of cognitively salient, symbolic structures.

embodiment facilitates the cognitive coupling of human minds and environmental structures (Sinha & Jensen de López, 2000, 24).

The centrality of human embodiment to the symbolically mediated domestication of the world is also directly apparent in the use of spatial prepositions. For the most part, spatial prepositions refer back to the spatiality as it experienced by, and in its orientational structure centered in, the human organism's living body. It is impossible to meaningfully construct and comprehend oppositions such as 'inner' and 'outer', or 'above' and 'below', and spatial determinations such as 'besides,' 'next to' or 'behind', if one takes the homogeneous and isotropic extension of objective space as exclusive point of departure. At least indirectly, all these conceptual demarcations of spatial relations presuppose the reference to the spatial hereness of the individual human organism's own living body (see Waldenfels, 2000, 118f, or for a developmental-psychological perspective Piaget & Inhelder, 1956). Again, this is not to underplay the striking structural differences that exist between various cultural varieties of the cognitive-conceptual organization of spatial frames of reference. Thus, the linguist Stephen C. Levinson (2003) has convincingly demonstrated that a range of cognitive referential systems exist that are not anchored in the moving Ego-body of the perceptual subject. At the same time, Levinson also acknowledges that the human body, and its constituent parts above all, are "indeed amongst the most frequent diachronic sources for spatial expressions" (2003, 13). To give one striking example for a non-bodycentric frame of reference, some Australian aboriginal groups anchor their spatial systems of reference in arbitrarily determined yet absolute reference points, often identified with a stable material structure of the environment. In the particular case of these extrasomatically anchored spatial frames of reference, the human organism's body, while no longer serving as exclusive point of reference, nevertheless remains of vital importance. For even an absolute frame of reference only becomes practically useful for orientational, and navigational, purposes if it also always relates to place of the moving human organism's own body.<sup>11</sup>

Discussion of the intricate relations between embodiment, space, and language raises a question: how does the basic embodied organization of space become transferred to and operationally effective on the higher levels of symbolically mediated human cognition? In what follows, I will discuss three interrelated modes of embodied behavior that exemplify the way the human body makes spatialization

<sup>11</sup> With regard to the conceptual comprehension of spatial directions and distinctions, and the general cognitive functioning of spatial reference frames, one can thus distinguish at least two ways in which human embodiment contributes to the functioning of spatial cognitive processes. First of all, there are those structures of human spatial cognition which directly derive their meaning from the structure of human embodiment, specifically, from the (body-)centric structure of perceptual space. In the domain of spatial conceptualization, for instance, this pertains to spatial determinations such as 'here' and 'there'. Secondly, however, there exists a wide range of structures intrinsic to the functioning of human spatial cognition where human embodiment plays only an indirect role. There are those structures, for instance, that have as their main operative referent not the embodied subject's own body but (bodily perceived or perceivable) extrasomatic material anchors. As one referee of this journal pointed out to me, a range of more recent psychological studies even suggest that many of the spatial orientation systems to be observed among both human infants and great apes are not of an ego- (and body-)centric nature but instead are based on absolute, allocentric frames of reference (see, e.g., Haun et al., 2006; Gentner, 2007, see also Acredolo, 1978).



operative in human conceptual thinking and in cognition more generally. These modes are image-schemas, gesture, and deixis.

### Image-schemas

An important starting point for the understanding of the transposition of embodied structures of spatial experience to the level of conceptual thinking is Mark Johnson's work on cognitive semantics. In his work, *The Body in the Mind* (1987), Johnson argued that the spatial dynamics and structure of human embodiment shape the formation of cross-domain conceptual–metaphorical structures, and that these in turn anticipate the operative structure of human language and cognition up to the most abstract levels. Central in this regard is the notion of the image-schema, which denotes “a recurring, dynamic pattern of our perceptual interactions and motor programs that gives coherence and structure to our experience” (Johnson, 1987, xiv).<sup>12</sup> According to Johnson, these prelinguistic and embodied, sensorimotor patterns not only continuously structure the experience of the spatial environment of the human organism, but also, once projected into more abstract cognitive domains, congeal in the form of cognitively effective metaphorical conceptual structures. Specifically, these metaphorical structures are considered to provide an implicitly functioning scaffold for many of the human organism's abstract cognitive processes.<sup>13</sup> In his book, Johnson gives ‘containment’, ‘center–periphery’, ‘near–far’, or ‘path’ as examples of spatial image-schemas (1987, 126).

A further striking example of a spatial image-scheme is verticality, which I discuss here to illustrate the cognitive functioning of image-schemas. The image-schema of verticality derives from the experience of the human body's upright posture as it is dynamically mediated through its bipedal locomotion. It is worth noting here that, from a phenomenological perspective, the acquisition of upright posture is more than a mere physiological transformation. Rather, as Erwin Straus has observed, upright posture establishes “a definite attitude toward the world; it is a specific mode of being-in-the-world” (1952, 532). Most importantly, upright posture establishes a relative cognitive distance between the embodied human organism and the experienced environment—a distancing impetus that is the result of a spatial transformation characteristic of the development of human locomotive behavior. In quadrupedal locomotion, for example among infants, the direction of bodily motion corresponds to the axis of the body. By contrast, once upright posture and bipedal motion are accomplished, the human “moves his body in a parallel transposition, the length-axis of his body at a right angle to the direction of his motion”, thus allowing for behavior that makes use of both manual laterality and the vertical dimension

<sup>12</sup> Zlatev (2010) observes that within the field of cognitive linguistics there exists no coherent, monolithic notion of the image-schema. This is not the place to elaborate on the various meanings of the notion of image-schema within the discourse of cognitive linguistics. For practical reasons, in the discussion above I follow Grady's suggestion (2005) and use the notion of the image-schema strictly in the sense of patterns of sensorimotor experience (including their representation, broadly conceived).

<sup>13</sup> For an instructive overview of more recent empirical research and theoretical discussions concerning the functioning and role of images schemas see the various articles in the book edited by Beate Hampe and Joseph E. Grady (2005).

(Straus, 1952, 538). Now, the human organism, in its embodied behavior, finds itself “‘confronted’” by things (*ibid*); where the hands, freed from their locomotive function, and distant from the ground, become truly “‘epicritic, discriminative’” organs (Straus, 1952, 544).

In line with the transformation of the cognitive relation between organism and environment that accompanies the acquisition of upright posture, the vertically orientated body of the human organism comes to function paradigmatically as an embodied spatial matrix and experiential source for the construction of “orientational metaphors” (Lakoff & Johnson, 1980, chapter 4). Orientational metaphors demarcate a concept by relating it to a spatial orientation. As such, it is argued, they are indispensable for the establishment of both cognitively and normatively important distinctions and concepts, for a particular “metaphor can serve as a vehicle for understanding a concept only by virtue of its experiential basis” (Lakoff & Johnson, 1980, 18). For example, in most cultures, the ‘good’ and ‘superior’ is not only associated with spatial expressions such as ‘right’ but also with what is ‘higher’. Conversely, what is considered to be ‘evil’ and ‘inferior’ is usually identified with what is spatially lower.<sup>14</sup> Likewise, levels of abstraction and generality are often semantically connected with, and metaphorically expressed through, spatial differentiation of vertical levels, as are degrees of maturity and quantity.

At least in the case of conceptually fundamental spatial–orientational metaphors such as up and down, front and back, inside and outside and left and right, a constitutive reference to human embodiment is plain to see. As Lakoff and Johnson observe in a passage concordant with phenomenological insights: “These spatial orientations arise from the fact that we have bodies of the sort we have and that they function as they do in our physical environment” (1980, 14). In short, on the basis of its spatially orientating function, the human organism’s living body facilitates the construction of cognitively and conceptually operative spatial–orientational metaphoric structures. However, this is not to say that the human body constitutes the sole medium for human spatialization metaphors. With the accelerating evolution of material culture, the function of metaphoric spatialization can be externalized, and increasingly transferred to extrasomatic material structures. Consequently, these material cultural structures, if integrated into distributed cognitive processes, come to function as ‘solid metaphors’ (Tilley, 1999) and ‘material anchors of conceptual thinking’ (see Hutchins, 2005).

## Gesture

In discussing processes of spatial schematization mediated by the body, one should not forget the whole domain of the human organism’s gestural activity as a

<sup>14</sup> See for a contextualizing discussion also Jon Tolaas’ article exploring the origin of spatialization metaphors (Tolaas 1991). In his discussion, Tolaas goes through a range of implicitly or explicitly normative English expressions which metaphorically lean against the vertical axis. It is interesting that Tolaas sees a link between the genesis and structure of vertical spatialization metaphors and the ontogenetic process of the acquisition of upright posture.

cognitively potent part of the process of mobilizing space for the constitution, comprehension, and communication of abstract structures of meaning. Moreover, recent research suggests that “gestures provide easily accessible manifestations of image schemas” (Cienki, 2005, 435, see also Calbris, 2003) and add to the way in which speech, in its linearity, can mobilize image-schemas (cp. Cienki, 2005, 436). Such findings tie in with the groundbreaking research on metaphoric gesture by David McNeill that explores the relation between gesture, language and thought. What is important here is that McNeill (1992) considers gestures not merely to be “paralinguistic features or added kinesic emphasis” but as forming, together with language, one whole system that helps constitute human thought (1992, 245). This, incidentally, seems to be in line with Merleau-Ponty’s phenomenological observation that gesture, and the movement of (embodied) expression more widely, “is not an external accompaniment to intellectual processes” (1962, 193), i.e., not the external expression of a pre-established, inner thought or meaningful cognition.<sup>15</sup> Merleau-Ponty argues the opposite case: the embodied gestural expression directly realizes a generative semiotic and cognitive process, for the gesture, including the specifically “linguistic gesture,” directly and dynamically “delineates its own meaning” (1962, 186).

Based on a range of comprehensive studies and discussions, McNeill argues that metaphoric gestures play an important role in the dynamic and cognitively constructive process referred to by Merleau-Ponty. Metaphoric gestures, according to McNeill, are those pictorial gestures that use concrete space and objects as a cognitive medium (1992, 263) while enabling the constitutive presentation of abstract ideas and concepts, rather than merely referring to a concrete object (ibid, 14). A vivid example is the widespread depiction of temporal processes and concepts through spatial gestures—i.e., the gesture of pointing forward or backward, depending on semiotic conventions, to refer to a future event.<sup>16</sup> More recently, it has also been argued that metaphoric gestures do not always seek to conceptualize something abstract in terms of something concrete. According to Cienki (2008, 8f), for instance, there are metaphoric gestures with a concrete reference as well as abstract referential gestures that do not function as metaphors (e.g., the act of depicting a triangle with the fingers of one’s hands, that is, a mathematical idealization, while discussing an abstract geometrical problem).<sup>17</sup>

In any case, McNeill’s general view that gestural activity is central for the development and functioning of human conceptualization and cognition, both linguistic and non-linguistic, also accords with recent research in disciplines such as developmental and cognitive psychology, linguistics, neurophysiology and neuropsychology. For example, the relevance of gesture for the development of human language skills on the level of ontogenesis has been supported by research by

<sup>15</sup> Merleau-Ponty himself is quoting here from Kurt Goldstein’s and Adhemar Gelb’s essay on the amnesia of color names (Goldstein and Gelb 1925, 158). In his more recent book exploring the relation between gesture and thought, McNeill himself also explicitly invokes the passage by Merleau-Ponty quoted above (McNeill 2005, 91ff).

<sup>16</sup> For a recent, empirically informed discussion of the constitutive relation between gestures, speech and conceptualization of time in English language see Cooperrider & Núñez (2007).

<sup>17</sup> An excellent collection of recent research findings and theoretical perspectives concerning the cognitive nexus between metaphor and gesture is Cienki & Müller (2008).

Iversen and Goldin-Meadow (2005); in this context, one should also duly note the pioneering studies by developmental psychologists Werner and Kaplan (1963, in particular, chapter 7), which come to similar conclusions. Neurophysiological and neuropsychological findings further establish a close neuronal link between language and gesture (Iversen & Thelen, 1999, 21-27). This suggests that (manual) gesture and (verbal speech) are in truth “two related movement systems that start out coordinated with another and remain so, although the nature of the coordination changes” (Iversen & Thelen, 1999, 27). Finally, it is worth noting that the view that gesture contributes to the development of human speech, and symbolic communication more generally, has also been supported by a range of researchers investigating the evolution of language (e.g., Donald, 1991; Armstrong et al., 1995; Hewes, 1996; Tomasello, 2008).

With regard to the functioning of human cognition in a broader conception, empirical studies have further demonstrated that gestural movements have a direct, if mostly unnoticed, performance-enhancing impact on a range of cognitive processes, including the most abstract. Research findings suggest that gestural activity assists in a range of memory recall tasks, e.g., with regard to lexical retrieval and spatial working memory (Morsella & Krauss, 2004). It has further been shown that gestural activity assists human beings in remembering information while they are simultaneously engaged in another task, e.g., explaining a mathematical problem (Goldin-Meadow et al., 2001). This suggests that gesture reduces cognitive load and liberates cognitive resources that can consequently be utilized for other tasks (ibid). Other research found that gesture helps children retain acquired knowledge, thus contributing to the solidification of learning performance (Cook et al., 2008). These findings seem to confirm the general observation that the concrete embodied act of gesturing, and the concretely visible and kinesthetically experienced spatialization it implies, is beneficial for a range of learning processes, including those that involve a considerable degree of abstraction and generalization (see for a comprehensive discussion Goldin-Meadow, 2003).

## Deixis

In addition to the general cognitively scaffolding function of gestures, it is also worth drawing attention to a particular type of human gestural behavior, namely embodied deixis, that is, referential acts of pointing. My main point of reference point here will be the *Theory of Language*, put forward by Karl Bühler (1990). Originally published in German in 1934, Bühler’s work went largely unnoticed in the Anglophone world. Bühler’s approach was partially influenced by Husserlian phenomenology, and attributes a central role in the development and functioning of human linguistic praxis to deictic behavior. This pertains even to the level of fully developed verbal speech, where, Bühler argues, the dimension of deixis cannot be fully dispensed with. To understand the point, it is necessary to bear in mind that Bühler conceives of language as comprising two differently organized fields, which are structurally coupled in linguistic praxis. On the one hand, there is the primary deictic field, on the other hand, the symbolic field. The deictic field, a situationally anchored “system of subjective orientation on the point here–now–I” (Bühler, 1990,

169), is spatially structured in a manner similar to a coordinate system. Its center is a spatially privileged, if not absolute, *origo*—the speaker’s own living body—a point of orientation from which something is deictically pointed out, at and towards. The symbolic field, by comparison, comprises the functional domain of linguistic symbols and representations. It constitutes, in Bühler’s own words, “the surrounding field in which they [the linguistic symbols, P.W.] can be arranged” (1990, 171). Bühler also uses the word “*context*” to denote the functioning of the symbolic field, setting it apart from the (perceptually mediated) *situation* that is implied in the functioning of the deictic field (1990, 169). What is important now is that deictic modes of action derive their definite meaning only from the deictic field, and thus ultimately from the perceptually mediated situation of the speaking subject. This is obviously the case with the index finger, as Bühler remarks, the “natural tool of ocular demonstration” (1990, 95). However, even if words come to replace the index finger’s original deictic function, they nevertheless derive their specific meaning only from the situation of the embodied subject, i.e., the deictic field: “What ‘here’ and ‘there’ is changes with the position of the speaker just as the ‘I’ and ‘thou’ jumps from one interlocutor to the other with the exchange of role of sender and receiver” (Bühler, 1990, 94).<sup>18</sup>

What makes embodied deictic behavior, and the gesture of pointing in particular, so interesting is that, despite their crucial connection to the bodily perceived spatial situation, they already express an abstracting–symbolic relation of the human organism to its immediate spatial environment. This is particularly the case in pointing behavior that is ‘declarative’ in nature, i.e., where the gesture of pointing is used communicatively to draw attention to an object, without this object actually being requested (as it would be in ‘instrumental’ or ‘imperative’ pointing).<sup>19</sup> Support for the view that pointing represents a complex symbolic action can be found in Kurt Goldstein’s classic psychological studies of the behavioral and cognitive differences between the manual gestures of pointing and prehension (1971). On the basis of extensive empirical research evidence, Goldstein believed the act of pointing constituted a paradigmatic behavioral form of *abstract* movement, is in contrast to the act of grasping, which he classified as a *concrete* movement. According to Goldstein, the distinguishing moment in pointing is that the gestural act implies that the gesturing individual is capable to some extent of cognitively distinguishing between itself and its environment (1971, 267ff). Among other things, this requires an at least rudimentary cognitive understanding of space as exteriority (Goldstein,

<sup>18</sup> A possible objection to Bühler’s conception is that his assumption of an absolute *origo*, synonymous with the living Ego–body, implies a considerable egocentric constriction of the actual field-structure of human deictic praxis. See, for a contrasting view, Beata Stawarska (2008). Stawarska, without explicitly mentioning Bühler, argues that the phenomenon of human deixis, in its spatial and linguistic functioning, is always already a social phenomenon, and thus primarily organized in a polycentric fashion. For a comprehensive, multidisciplinary overview over recent research findings and discussions concerning the deictic gesture of pointing, see Kita (2003). For a good discussion of deixis from the viewpoint of embodied cognitive science, see the paper by Ballard et al. (1997).

<sup>19</sup> The distinction between ‘declarative’ and ‘imperative’ pointing was introduced by Elizabeth Bates, Luigia Camaioni, and Virginia Volterra on the basis of their studies on the development of pre-verbal communication in infants (Bates, Camaioni, & Volterra 1975). See, for a comprehensive, empirically informed discussion on the same topic also Carpenter, Nagell, & Tomasello (1998).

1971, 268).<sup>20</sup> The bodily gesture of pointing, one may thus say, makes manifest a cognitive capacity for the proto-symbolization of space; or, better put, it constitutes one of the basic forms of the abstracting process of a symbolic domestication of space. Specifically, the bodily gesture of pointing bears witness to a cognitive *and* concretely spatial distancing between cognizing human organism and intended thing of the environment. Importantly, this distancing is at the same time bridged by symbolic means: in pointing, the intended thing can be ‘grasped’ without requiring immediate physical contact. The concrete gesture of pointing thus to some extent already anticipates the relative displacement from the immediately accessible spatial environment characteristic of higher-order forms of human symbolic cognition and communication. In some sense, as Hans Blumenberg observes, the intrinsically abstract symbolic act of naming is constitutively built upon the development of the bodily capacity of pointing at, and towards, things (Blumenberg 2006, 598).

Much more could be said here about the cognitive role and the phenomenology of the dynamic interlacing of space and language in gestural and deictic behavior. However, for the purpose of demonstrating that human embodiment plays a central role in the mobilization of spatial schemas for cognitive purposes, the discussion above should suffice. To sum up, I have shown that the living human organism’s body functions cognitively in a manifold sense with regard to space. On a preconceptual level, the living body, because it occupies a privileged, spatially orientating place in perceptual space, because of its dynamic sensorimotor and kinesthetic capacities, and last but not least because of its constant availability, provides a cognitively salient perceptual organization of the spatial field of experience as well as making the dimension of space accessible in the first place. Moreover, the same embodied, spatializing processes are also tapped into on higher-order cognitive levels, for instance through the mediation of recurrent patterns of movement (image-schemas) and the metaphorical extensions of these, through the wide range of human gestural behavior, and as a particular case of the latter, through deixis. On the higher-order levels of human cognition, these processes prove crucial for the situating, differentiation and functioning of many symbolic and conceptual processes.

In short, the living human body, to borrow a pertinent expression from Husserl, functions as the generative site or “point of conversion” (1989, 299) between concrete structures of spatial experience and abstract structures of conceptual

<sup>20</sup> It is interesting to consider Goldstein’s insight into the difference of concrete and abstract movements in the light of the findings of a recent empirical study undertaken by Jonathan Cole, Shaun Gallagher and David McNeill (2002). The object of this study was the gestural behavior of a person who, as a consequence of an infection, lost all proprioceptive and tactile senses from the neck down, and thus also control of motor functions that involve proprioceptive feedback. Experiments showed that the test person was able to perform instrumental and spontaneous motor operations (which are roughly analogous to what Goldstein calls concrete movements) only with great difficulty. At the same time, the test person, without too much ease was capable of performing communicative and expressive gestural movements that serve to convey meaning (roughly corresponding to what Goldstein calls abstract movements). All this suggests, in line with Goldstein’s original research, that abstract gestural operations serving a communicative function, while necessarily embodied and dynamic, nevertheless constitute a different kind of action than purely instrumental, concrete bodily movements. See for another relatively recent, empirical study that confirms that Goldstein’s general distinction between abstract and concrete movements also applies on the level of human ontogenesis (in the form of the difference between the performative acts of reaching and pointing) Franco & Butterworth (1996).



thought, and more generally, between sense and sensuousness.<sup>21</sup> Human embodiment, and embodied spatial experience in particular, can thus broadly be regarded as constituting from the very beginning an essential condition for the possibility of the symbolic domestication of the world. The fact that spatialization continues to be indispensable even once the human beings' governing symbolic structures increasingly detach themselves in the course of cognitive evolution from the human organism's body only underlines the body's enduring cognitive influence.

## Summary

Let me conclude by summarizing the view arrived at in the present paper about the cognitive nexus between space, living body and conceptual thinking. The point of departure of my discussion was the observation that spatial schematizations and differentiations and spatializing metaphorical infrastructures are always already constructively implied within human conceptual thinking, including within higher-order cognitive domains involving complex forms of symbolization. Subsequently, I examined the cognitive function of implicit, pre-objective processes of spatialization in the context of Husserl's discussion of the sedimentation of structures of meaning. The process of sedimentation, I argued, entails the implicit creation of a cognitive scaffold that has ambivalent consequences for the functioning of human conceptual thinking. On the one hand, this scaffold imposes a certain structure, even a relative passivity, on the human individual's conceptual thinking, reducing cognitive complexity and contingency. On the other hand, I sought to show that the same relatively restrictive scaffold also has a liberating effect on human conceptual thought. This is because sedimented structures function as a superindividual memory that continuously frees the individual human organism's cognitive capacities and thus permits the further development of human thought. I then went on to argue that metaphorical structures, and spatial metaphors in particular, fulfill a very similar cognitive scaffolding function—both being equally constricting and liberating. Turning my attention to the level of the human organism's sensorimotor spatial behavior, I then explored some of the ways that cognitively operative structures of spatialization are interwoven with the structure of space as it is dynamically mediated by human embodiment. My particular foci here were the domain of image-schemas (and their metaphorical extensions), the human organism's gestural activity, and as a specific case of the former, deictic gestures. Drawing on findings from developmental and cognitive psychology as well as cognitive linguistics, I reached the conclusion that the human organism's living body functions as the central, continuously available cognitive medium facilitating the establishment both of constructive relations and translations between conceptual structures and spatial-experiential structures.

Viewed in this light, the actively perceiving and moving human body turns out to be not only the primary source for the cognitively indispensable spatialization of

<sup>21</sup> Specifically, in his *Ideas II* Husserl refers to the human living body as being a 'site of conversion' in a related, yet differently accentuated fashion. Here, the living body or lived-body (*Leib*) is understood as the "point of conversion from spiritual causality to natural causality" (1989, 299).

language and thought, but in the long run also a necessary precondition of the human phenomenon of a symbolic domestication of space. Ultimately, this even applies to the extreme case of the human accomplishment of arriving, by way of cognitive techniques of idealization and formalization, at a systematic conception of abstract objective space (i.e., a space that would correlate to a disembodied, spatially unsituated ‘view from nowhere’). Even here, embodied spatial praxis provides both the practical and conceptual means without which the emancipation of human spatial cognition from embodied experience, and space’s conceptual reconstruction in ideal-objective terms, would have remained unthinkable.

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