

**What's within? Can the internal structure of perception be derived from regularities of the external world?**

Rainer Mausfeld

Institute for Psychology, University of Kiel, D-24098 Kiel, Germany.

**mausfeld@psychologie.uni-kiel.de**

**Abstract:** Shepard's approach is regarded as an attempt to rescue, within an evolutionary perspective, an empiricist theory of mind. Contrary to this, I argue that the structure of perceptual representations is essentially codetermined by internal aspects and cannot be understood if we confine our attention to the physical side of perception, however appropriately we have chosen our vocabulary for describing the external world. Furthermore, I argue that Kubovy and Epstein's "more modest interpretation" of Shepard's ideas on motion perception is based on unjustified assumptions. **[kubovy & epstein; shepard]**

Nativist-empiricist theories of mind could be conceived of as being based on the conception that the mind is endowed with a rich and innately specified internal structure, which, however, is determined entirely by experience, albeit experience as generalised within evolutionary history. On this account, **shepard** is a nativistic empiricist. In his emphasis on phylogenetic experience he follows Spencer who, in his *Principles of Psychology* (1881), postulated a "continuous adjustment of internal relations to external relations." According to Spencer, the structure of the mind is the "result from experiences continued for numberless generations," whereby the "uniform and frequent of these experiences have been successively bequeathed" in the process of evolution. James (1890) lauded this as a "brilliant and seductive statement" that "doubtless includes a good deal of truth." Its founders, however, according to James, "when the details are scrutinised, many of them will be seen to be inexplicable in this simple way."

**shepard**, in contrast to Spencer, has made very specific proposals about the kind of external regularities that, in his account, have molded the structure of internal representations. He clearly recognises the explanatory vacuum caused by the disregard for postulating, within explanatory frameworks, specific internal structures adequate to the task of explanation. (Such disregard, which is characteristic of empiricist theories of mind, still prevails, in various modern disguises, in much of current thinking about percep-

tion.) shepard rightly acknowledges that we have to assume a rich internal structure of the perceptual system in order to account for the relevant facts. He thus draws our attention to a core problem of perception theory, viz., to understand the structural form of internal representations. To this end, shepard extends the approach of ecological physics to further kinds of abstract mathematical descriptions of external regularities, which he then uses as heuristics for exploring the structure of internal representations. His grand perspective on the *Evolution of a mesh between principles of the mind and regularities of the world* (1987a) doubtless includes a good deal of truth, notwithstanding the problems that his notions of “regularity” and “internalisation” are faced with when one attempts to understand them beyond their meaning in ordinary discourse. shepard’s more extensive (non-Darwinian) claim that there is an “evolutionary trend toward increasing internalization” (1987a, p. 258) and that by internalising more and more physico-geometrical regularities the fitness of a species is increased, is not easy to assess and would hardly be maintained in other areas of biology. Fortunately, issues of evolutionary internalisation do not bear any immediate relevance with respect to perceptual theory, because here, as elsewhere in biology, a satisfactory *ahistorical* account for a functional structure does not ipso facto suffer from some kind of explanatory deficit (cf. Fodor 2000). It seems to me that the role that the concept of internalisation plays in shepard’s account resembles the role that mechanisms of association play in standard empiricist approaches to the mind, viz., it acts as a kind of general multi-purpose acquisition device for building up mental structure.

What appears to me to be more problematic than the metatheoretical discourse about internalisation is **shepard**’s extreme physicalistic stance. In shepard’s view the structure of internal representations is determined predominantly by regularities of the external world, whereas no essential explanatory importance is attached to those aspects of the internal conceptual structure of perception that do not mirror external regularities, or to internal constraints of the cognitive architecture. Shepard (1984, p. 431; 1987a, p. 269) seems to think that constraints on the principles of the mind that do not have an external origin are merely arbitrary. Naturally, they must appear arbitrary if one slices the nature of perception according to external physical regularities, thus succumbing to the *physicalistic trap* in perception theory (cf. Mausfeld, 2002). Evidently, there is sufficient overlap between regularities of the world and the structure of internal representations. However, from this global property, which pertains to the entire organism, it does not follow that the representational structure of specific subsystems is predominantly determined by specific features of the environment. With respect to internal codes, equivalent

classes of sensory inputs are held together by the conceptual structure of our perceptual system, rather than by the structure of the physical environment itself. The given conceptual structure that is part of our biological endowment is based on concepts that are not expressible as “natural kinds” or abstract regularities of the external physical world. This is evident for internal perceptual concepts such as “edible things and nutrients” or “emotional states of others.” In other cases, such as the *internal* concept “surface colour,” it may be less obvious that it defies definition in terms of a corresponding physical concept (even in the sense of the latter providing necessary and sufficient conditions for the former). Rather, it has its own peculiar and yet-to-be identified relation to the sensory input and depends intrinsically, in an idiosyncratic way that cannot be derived from considerations of external regularities, on other *internal* codes, say, for perceived depth or figural organisation. (All the same one might be able to concoct some Panglossian post hoc story in terms of external regularities for each specific case, but nothing about an external origin would be implied by this.) The structure of internal representations, as Gestalt psychology and ethology have already provided ample evidence for, is shaped not only by regularities of the external world. Rather, internal representations have to fit into the entire conceptual structure of the perceptual system, including its two fundamental interfaces, viz., the interface with the motor system and that with the higher cognitive system, where meanings are assigned in terms of “external world” properties.

**shepard** has reinvigorated psychological inquiries into the structural form of mental representations. Such inquiries inevitably lead back to the core problem of perception theory, viz., to understand the internal conceptual structure of perception. This problem, however, cannot be solved or dodged by exclusively referring to physico-geometrical or statistical regularities of the external world and by assuming that the rich structure is imprinted on the mind of the perceiver almost entirely from without.

While **shepard** seems to accept internal structure only to the extent that an external origin dignifies it with a stamp of approval, as it were, **kubovy & epstein** relapse altogether into a wariness about postulating specific internal structures. They refer to a distinction, widespread in empiricist approaches to the study of the mind, between what they call a “measurement model of perception” and assumptions of “invisible internal principles.” Because they do not want to lodge the principles that are part of a successful explanatory account in the mind of the percipient, they propose what they call a “more modest interpretation,” according to which we can, instead of talking about internal principles, only say that the visual system proceeds *as if* it obeys internal principles. Thus, they implicitly make the distinction between evidence for an explanatorily

successful theory and evidence for the “psychological reality” of the principles to which this theory refers. Even if shepard’s investigations on motion perception provided, at the level of description on which he is working, a successful explanatory account – both in range and depth – of an important class of facts, it would still lack, in kubovy & epstein’s view, “psychological reality.” This is a highly questionable and unjustified distinction, which would hardly be of interest elsewhere in the natural sciences. A similar request for a “more modest interpretation” in physiology with respect to, say, the idea that “pattern cells in area MT employ the assumption of smoothness in their computations of motion” (Hildreth & Koch 1987, p. 508) would justly be regarded as being without any theoretical interest. In perception theory, as in other fields of the natural sciences, we proceed by attributing to the system under scrutiny whatever serves our explanatory needs. Ascribing inner structure to the perceptual system is not some mysterious ontological commitment, but a case of an inference to the best explanation (subject to further inquiry and open to change). There are (aside from metaphysical issues) no ontological questions involved beyond what is stated by the best current explanatory account. The distinction that kubovy & epstein make is an instance of what Chomsky (2000) has identified as an odd dualism of explanatory principles between psychology and the rest of the natural sciences. Such a dualism, which is expressed in kubovy & epstein’s emphasis on “measurement theories of perception,” will impede asking, as shepard does, fruitful questions about the “invisible internal principles,” – a natural concern, it seems, for inquiries into the nature of the perceptual system.

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