The art of representation: Support for an enactive approach

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Abstract: Grush makes an important contribution to a promising way of viewing mental representation: as a component activity in sensorimotor processes. Grush shows that there need be no entities in our heads that would count as representations, but that, nevertheless, the process of representation can be defined so as to include both natural and artificial (e.g., linguistic or pictorial) representing.

Grush helps banish the misleading practice of viewing "representations" as static entities, and of using "representation" as an object term like "picture" or "imitation," as in "That picture is not an original Rembrandt, it's an imitation." Grush's theory shows that the term refers to a process. Nothing is "a representation" except as a part of that process, and even then the usage is ambiguous. Think of representation as the process of representing, and of a particular case as an instance of representation; but never think of that instance as "a representation." I predict that if we are successful at reconceiving representation so that the latter usage becomes technically meaningless, then representation will no longer be a philosophical problem.

Humans are skilled at the art of representation, socially and aesthetically, and traditionally their products are called "representations." (Grush himself employs that usage at times.) People who are successful create an object that produces in the perceiver a state similar in desired ways to that of perceiving what the artist is representing. In itself, there is no harm in calling the products "representations"; the harm comes when the source of these objects is ignored, and one looks for some feature of the objects *themselves* that makes them representations. Physical resemblance is one obvious candidate. The most dangerous view, for purposes of philosophical clarity, is holding that a natural mapping from the "representations" to the worldly objects they represent exists through causal relations between representations and objects. In natural language, words "represent" objects through the relation between the objects and the learning of the words. Language has become the paradigm for representation for many philosophers, to the extent that many theorists derive the nature of mental representations from that of natural language. There are well-known problems with this approach to representation and no generally accepted solution; this path leads to a dead end.

But representation is a real phenomenon. If it is a process, then we should seek the paradigm in human activity. I (Newton 1996), along with many others (Grush mentions some, e.g., Johnson-Laird 1983; Lakoff 1987), hold that representation is based in human behavior and perception. The general theory is simple to state in terms of motor control systems. An alternative to pure feed-forward or feedback systems is one in which the final goal state is *emulated* by a mechanism allowing the system to perform its goal-directed actions in a type of *rehearsal* of the decisive final actions, for fine-tuning, without commitment to a final outcome. Grush's proposal is that a mechanism for signal processing, the Kalman filter, performs this function. We can say that in using the Kalman filter the motor system is representing its goal.

Note that it is not obvious what would constitute "a representation" in this proposal. The Kalman filter is not a representation but a mechanism that allows representational activity by providing, among other things, appropriate isomorphism with the goal state. We could say that the Kalman filter, together with the motor-control system that employs it, constitutes a representation of the action in the static sense, but that would be inaccurate because the combined system as a whole is related to the goal action only when employed in the *process* of preparing for the final action. If we want to call that system a representation, then representations are much more ephemeral things than the language paradigm would suggest, and the philosophical interest in representations *as entities* would lose its motivation. It is much more useful to take the motor-control system as a whole as a basic example of representational *activity,* because that will allow us to define "representation" in a firm, noncircular manner:

> Representation is the process of performing goal-directed activity in a manner that allows the activity to be rehearsed and optimized in advance of the realization of the goal. This realization (whether planned or simply hypothesized) is what is represented by the activity.

Note that this definition includes the representational activity involved in perception, as Grush intends. He argues that perception involves anticipation of sensory input (sect. 5.3). With perception, the goal is the interpretation of sensory input, and the emulation system functions for that purpose as it does in the case of purely motor activity. This approach, holding that imagery constitutes anticipation of actual perception, has been proposed by Ellis (1995). Here again, Grush's detailed account of the mechanism of the Kalman filter provides both support and testability.

The discussion of mental imagery is important because mental images have borne much of the weight of the representation-as-entity approach. Grush shows how mental imagery can be seen as a truncated or constrained version of representational activity, in which (using the Kalman filter) environmental sensory input is discounted and the representing process is "an off-line operation of an emulator" (sects. 4.4 and 4.5). Sensory input is replaced by internally generated input, and the initiating motivation is not actual perception but what Ryle (1949) would call "pretending" to perceive objects, knowing that one is not really perceiving them.

Conclusion. Of course the brain mechanisms for representation do not constitute art; they are natural and probably unconscious. But it is useful to see that artistic activity – creating representational objects for the purpose of inducing desired states in observers – can be understood as constituting the same functional activity as the motor paradigm. The artist, instead of presenting the viewer with a vase of flowers, allows the viewer to "rehearse" the activity of looking at a vase of flowers with a particular focus and affective response. Thus, the artist and the viewer are both engaged in representational activity. To say that the painting *itself* represents a vase of flowers can be a shorthand way of referring to the process, but unless this process is understood, in the way Grush has offered or in some similar way, as representation in the active sense, we will continue to wonder how one physical object can bear such a profound relationship to another physical object, with no visible connections and all by itself.

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Emulation theory offers conceptual gains but needs filters

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Abstract: Much can be gained by specifying the operation of the emulation process. A brief review of studies from diverse domains, including complex motor-skill representation, emotion perception, and face memory, highlights that emulation theory offers precise explanations of results and novel predictions. However, the neural instantiation of the emulation process requires development to move the theory from armchair to laboratory.

There is currently much interest, within psychology and cognitive science, to develop theoretical frameworks that integrate percep-

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