Understanding Empathy by Modeling Rather Than Organizing Its Contents

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Abstract

Perception–action approaches are sometimes criticized because empathy takes cognitive forms and people do not overtly imitate or feel all observed states. These complaints reflect a misunderstanding of the framework, which we tried to clarify through a review that bridged social and neuroscientific views. Far from "simple fixes," these misunderstandings appear to reflect deeply rooted differences in the way that each discipline conceptualizes science and the mind. We address the important points made by the commentators and reiterate the need to incorporate rich, phenomenological descriptions into academic works so that we may prevent such conceptual cross-talk in the future. The open exchange of ideas across fields is often difficult, but essential to an integrated, scientific view of empathy.

Keywords

empathy, emotion, perception–action, embodiment

> *A purely disembodied human emotion is a nonentity*
>
> James (1884, p. 194)

We are thankful for the comments of our colleagues, and their effective use of concrete examples and metaphors. Employing Morrison's (in press) extended metaphor, much of the disagreement in the field seems to emanate from opposing views on how best to handle a messy closet. Most tidy the overstuffed empathy closet by removing all but one type of item (e.g., classifying only high-level phenomena as empathy), or by dividing the contents into a few labeled boxes (e.g., cognitive and affective empathy). We instead allow everything to remain in the closet under the broad label of perception–action processes and then examine the contents to see how they are naturally arranged, where they came from, and when we may need them.

As in life, rearranging an already tidy system can be disconcerting, but embracing and describing the messy realities of a biological system allows us to greatly improve the accuracy of our models and their predictions. Divisions like cognitive versus affective distract us from this goal by imposing a priori structure upon a highly interdependent system, which occludes important and interesting information. For example, all forms of empathy engage some cognitive and some affective processing, yet dual-system views circularly localize cognitive empathy to executive regions and affective empathy to affective regions, which does not enhance our view of either empathy or the brain. Indeed, personal, affective representations are necessary for even highly cognitive forms of empathy. This last point could not have been predicted by a bifurcating model, is poorly understood, and yet is fundamental to the neurobiology of empathy; therefore, we explain it further below.

All percepts are mediated through a conceptual decoding process that reliably activates the same neurons or patterns of neurons each time the percept is brought to bear. These "neural representations" are fundamentally *conceptual*, because they encode the state, individual, or situation along with any associated meaning. As conceptual representations, our neural self–other overlap need not exist in the same cell or voxel across

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individuals, or between observation and experience, because the representations can be encoded in a variety of ways, most of which are impossible to detect with functional neuroimaging (e.g., individual-specific codes using single "mirror neurons" or distributed multineuron networks). To satisfy Morrison's apt concern, computational modeling, animal single-cell recording, and human neuroimaging must progress in tandem.

In addition, conceptual representations of people, states, and situations are "embodied" and, thus, include associations to sensations, emotions, and motor programs, as part of their essential meaning structure (e.g., Barsalou, 1999). To illuminate, we employ another metaphor, that of perceiving a peach. Without eating a peach, most would still have enough experience-dependent knowledge with round fruits to assume it is a sweet, edible item. Indirect information from stories or the media could enhance this knowledge by conveying that peaches are distinctly juicy, fuzzy, and delicious in summer, further linking the concept to preexisting affective and somatic knowledge (e.g., with juicy oranges and fuzzy sweaters). Direct experience from eating peaches provides even more detailed, affective, sensory information, but both indirect and direct sources of knowledge constitute "experiences" because both involve the perception and processing of information that activates and modulates existing representations. In turn, these representations are activated whenever the concept of a peach is brought to bear, whether formed through indirect or direct experience, activated through perception or imagination. Regardless, the concept of the peach *always* includes somatic, affective, and motivational information (e.g., that they are sweet and delicious), because concepts of ingestible items inherently entail their sensory and metabolic consequences, much like James' emotions always include bodily sensation (1884). As such, even highly "cognitive" acts, like imagining sailing away in a giant peach, partially activate the emotional-motivational aspects of the representation, whether prominent in the observer's mind or not.

Similarly with empathy, those with only indirect earthquake experience still have embodied, affective information about earthquakes, disasters, and traumatic experiences that are activated when they perceive or imagine victims. The relevance of the observer's prior experience determines the specificity, salience, and accuracy of the activated information and, as such, actual earthquake survivors have richer episodic and somatic memories that promote understanding as well as projection, since their experience may not actually match that of the target (e.g., Hodges, Kiel, Kramer, Veach, & Villanueva, 2010). Regardless, all processing of earthquake survivors, assuming minimal knowledge of real-world situations, accesses the emotional entailments of earthquakes, which involves neural self–other overlap to the extent that the observer's representation captures the target's experience (see also Davis, Conklin, Smith, & Luce, 1996).

Through this wonderful opportunity to communicate with our colleagues, we have learned that the term "self–other overlap" means different things to different researchers, itself proving the influence of experience upon perception. While our view is often mischaracterized, we too mistakenly interpreted Batson's use of self–other overlap to include resonating affect (he restricts the term to merged personal identities). In accordance with our attempt to group phenomena that share common neural and psychological origins, we use a broad definition because neural-level self–other overlap is required for both identity merging and resonating affect, both of which are mutually reinforcing.

The nervous system is a highly complex and dynamic system that helps us to parse the world into tractable, discrete objects and concepts. However, the system itself need not be parsimonious or tractable. Thus, we dispense with some of the superficial order in the empathy closet to model rather than tidy the space, allowing us to predict the location of *any* item with great accuracy. This is a powerful approach, but one that can appear messy, particularly for those who liked the closet the way it was. Through a continued academic dialogue full of rich phenomenological examples and metaphors, we can form a truly integrated science.

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