

# Empathy

*Philosophical and Psychological  
Perspectives*

EDITED BY

Amy Coplan and Peter Goldie

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## Two Routes to Empathy: Insights from Cognitive Neuroscience

*Alvin I. Goldman*

### 3.1 Definitional Overview

The concept of empathy has a considerable history in both philosophy and psychology, and may currently be enjoying an apex of attention in both. It is certainly receiving close attention in cognitive neuroscience, which brings fresh discoveries and perspectives to the subject. The term 'empathy', however, does not mean the same thing in every mouth. Nor does there seem to be a single, unified phenomenon that uniquely deserves the label. Instead, numerous empathy notions or phenomena prance about in the same corral, and part of the present task is to tease some of these notions apart. More importantly, there are fascinating new findings that should be reported, analyzed, and mutually integrated, whether one's interest in empathy is primarily driven by pure science, philosophy of mind, moral philosophy, or aesthetic theory.

As a first step in distinguishing multiple senses, grades, or varieties of empathy, consider a definition offered by Vignemont & Singer (2006):

There is empathy if: (i) one is in an affective state; (ii) this state is isomorphic to another person's affective state; (iii) this state is elicited by the observation or imagination of another person's affective state; (iv) one knows that the other person is the source of one's own affective state. (2006: 435)

Questions can be asked about this definition that might motivate alternative definitions. For example, clause (i) restricts empathic states to affective or emotional states, but this is too narrow for some purposes. Cognitive neuroscientists talk of empathy for touch (Keysers et al. (2004)) and empathy for pain (Singer et al. (2004); Jackson et al. (2004); Morrison et al. (2004)), but neither touch nor pain is usually considered an emotion (although pain has an affective dimension as well as a sensory one). Concerning clause (ii), it should be asked exactly what is meant by 'isomorphic'. If it means a state of one person that matches a state of the target, then that requirement is more restrictive than definitions offered by others. Hoffman (2000), for example,

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defines empathy as 'an affective response more appropriate to another's situation than one's own'. This doesn't imply that the receiver's affective state matches (or is isomorphic to) that of the target.

Clause (iii) might be questioned on a rather different ground. It seems right to restrict empathic states to ones acquired by observation or imagination of the target individual. But shouldn't the elicitation process be constrained even further? For example, David Hume writes:

'Tis indeed evident, that when we sympathize with the passions and sentiments of others, these movements appear at first in *our* mind as mere ideas, and are conceiv'd to belong to another person, as we conceive any other matter of fact... No passion of another discovers itself immediately to the mind. We are only sensible to its causes or effects. From *these* we infer the passion: and consequently *these* give rise to our sympathy. (1739-1740 (1978): 319, 576)

Hume (using the term 'sympathy' rather than 'empathy') apparently endorses a three-stage hypothesis: one observes another person's movements, one infers from those movements a certain passion in the person, and the inferred belief causes a matching passion in oneself. If this is right, the process satisfies the Vignemont-Singer definition because the affect is elicited—albeit indirectly—by observation. But many people conceptualize empathy as a spontaneous, non-inferential process. If they wish to define empathy in that fashion, the previous definition would have to be amended to exclude inferential steps.

Another dimension of empathy important to many theorists is 'care' or 'concern' for the target. This dimension is omitted in the Vignemont-Singer definition. Social psychologists are traditionally interested in empathy as the basis of altruistic behavior, and many would want to highlight that component of empathy. Other investigators are interested in empathy as a key to mindreading, and might even use the term 'empathy' to describe (what they take to be) the most common form of mindreading. In other words, they use the term 'empathize' as roughly equivalent to 'simulate' (in an intersubjective fashion). I myself am a partisan of this position (Goldman 2006a), but this will play only a secondary role in the present paper. The proffered definition is neutral on the question of mindreading, and that's fine for present purposes.

It is easy to conflate different features of empathy, so readers can sometimes be mystified as to how, exactly, a given writer uses the term. For example, in Baron-Cohen's (2003) account of autism, or Asperger's syndrome, the linchpin of the account is a deficiency in 'empathizing'. But in reading Baron-Cohen it is often difficult to tell which of three possible senses of 'empathizing' he primarily has in mind: (A) using simulation when engaging in mentalizing, (B) being curious about others' mental states, or (C) feeling concern about other people's feelings. Correspondingly, a deficiency in empathizing might consist in a sparse use of simulation, a dearth of curiosity about others' mental states, or a low-level of concern about other people's feelings.

These preliminary comments should alert the reader to the fact that different writers and researchers exhibit different approaches to empathy. In addition, however,

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research findings can contribute to an understanding of how empathy is produced. Is there exactly one route to empathy, that is, one cognitive system—or one *type* of cognitive system—that produces empathy, or is there more than one? How exactly does this system, or these systems, work? What different consequences might ensue as upshots of different modes of empathizing? These are the primary questions to which this paper is addressed.

### 3.2 The Mirroring Route to Empathy

In an earlier era, one might have been skeptical about the isomorphism, or matching, condition we provisionally accepted in the definition of empathy. Do empathizers really undergo states that match those of their targets? Are the feeling states of receivers exactly the same as those of their targets? Since the discovery of mirror neurons and mirroring processes, however, there is much less room for skepticism. There is little doubt about the existence of processes through which patterns of neural activation in one individual lead, via their observed manifestations (e.g. behavior or facial expressions), to matching patterns of activation in another individual. If the corresponding patterns of activation are not perfect duplicates, at least they resemble their corresponding states in the target in terms of the kinds or types of mental or brain activity involved. Some might balk at calling the resonant states 'mental' states, because the mirroring episodes commonly occur below the threshold of consciousness even when the episodes being mirrored are fully conscious. If the term 'mental' is used broadly, however, they are processes of 'mental mimicry.'

Mirror neurons and mirroring processes were first discovered in monkeys, and subsequently in humans, in connection with preparation for motor action (Rizzolatti et al. (1996); Gallese et al. (1996)). When a monkey plans a certain type of goal-related hand action, e.g. tearing, holding, or grasping, neural cells in its premotor cortex dedicated to the chosen type of action are activated. Surprisingly, when a monkey merely observes another monkey or human perform a similar hand action, the same cells coded for that type of action are also selectively activated. Thus for certain neurons there is a sort of neural mirroring; one thing that occurs in the actor's brain is (more or less) replicated in the brain of the observer. These kinds of cells were therefore dubbed 'mirror neurons.' There are many details concerning the precise activation properties of mirror neurons in an observer versus an actor (Rizzolatti et al. (2001)). But the basic finding is that there is robust, selective activation of the same cells in both execution and observation modes.

Using different techniques, an action-related mirror system has been found in humans, centered on the inferior parietal lobule and the premotor cortex, including Brodmann area 44 (see Rizzolatti & Sinigaglia (2008)). Cochin et al. (1998) showed that the same  $\mu$  rhythm that is blocked or desynchronized when a human performs a leg or finger movement is also blocked when he merely observes a similar movement by another person. Similar results were obtained from research studies using

magnetoencephalography (MEG) and transcranial magnetic stimulation (TMS). Fadiga et al. (1995) recorded the motor evoked potentials (MEPs) induced by magnetic stimulation of the left motor cortex in various muscles of the contralateral (right) hands and arms of subjects who were watching the experimenter either grasp objects with his hand or make movements unrelated to any object. In both cases a selective increase in MEPs was found in the recorded muscles. Thus, mirroring properties were detected both for the observation of goal-related actions, as in monkeys, and also for non-object-related arm movements, which is not found in monkeys.

A study by Buccino et al. (2001) showed that mirroring for action isn't restricted to actions of the hand or arm. Subjects were shown action stimuli of the following sorts: biting an apple, grasping a cup, kicking a ball, and non-object-related actions involving the mouth, hand, or foot. The results showed that observing both object-related and non-object-related actions led to the somatotopic activation of the premotor cortex, with the mouth represented laterally and the foot medially.

Which mental states are activated in the case of motor mirroring? As I have said, it is presumably plans or intentions to do specific actions. Matching motor plans are activated in the observer, but they don't normally lead to imitation. Their outputs are usually inhibited downstream. There is mental mimicry, one might say, but not behavioral mimicry.

Mimicry of action-planning states doesn't naturally invite the label of empathy. But many other mental states that partake of mirroring more naturally invite talk of empathy. Some writers might prefer other labels. One might speak of 'resonance,' for example, or 'contagion.' But I think that 'empathy' is a reasonable choice. It must be stressed, however, that in many mirroring activities the receiving end of the mirroring relationship may not be conscious. The receiver may not be aware, or not fully aware, of the mental event she is undergoing that happens to be congruent with an event in the sender. This may raise issues concerning condition (iv) of the definition discussed earlier. I think it is fair to require a receiver to have some sort of intentional attitude directed toward the target by which the resonating state is linked to him. Otherwise, it doesn't seem like a case of empathy. I suspect that condition (iv) is too strong an intentional condition of this kind, but I don't have a wholly suitable replacement for it.

Even if a suitable replacement for condition (iv) is found, 'empathy' might not be a tempting term for mental mimicry of action-planning. Let us therefore examine other categories, starting with the sensation of touch. Keysers et al. (2004) found that when a person watches another person being touched, the same brain areas are activated as those in the person being touched. More specifically, they found that touching a subject's own legs activated the primary and secondary somatosensory cortex of the subject. Large extents of the secondary somatosensory cortex also responded to the sight of someone else's legs being touched. Films used with control subjects in which the same legs were approached by an object, but never touched, produced much smaller activations. This phenomenon is naturally described as empathy for touch.