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Motivated empathy: a social neuroscience perspective

Erika Weisz and Jamil Zaki

Empathy supports adaptive social behaviors such as cooperation and helping. It is also fragile, and commonly unravels in contexts such as intergroup conflict. Insights from neuroscience support the idea that empathy is context sensitive, but recent findings suggest that empathy (and its fragility) reflect individuals' *motives* in a given context rather than context alone. Here we explore motivated empathy from the perspective of social neuroscience, examining how motives shape empathy-related brain activity. We also describe recent motive-based empathy interventions, their biological underpinnings, and their behavioral consequences. Finally, we propose novel applications of recent neuroimaging techniques to promote empathy, emotional wellbeing, and social adjustment.

Address
Department of Psychology, Stanford University, USA

Corresponding author: Weisz, Erika (eweisz@stanford.edu)

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Minutes into the 2017 NBA season opener, Gordon Hayward — a recent and promising acquisition for the Boston Celtics — fell to the floor with a gruesome ankle fracture. A hush fell over the Cleveland stadium as Hayward was evaluated, while players from both teams stood by his side offering support. As Hayward was carried off the court, Cleveland Cavaliers fans gave him a standing ovation, and Cavaliers players reportedly visited him in the locker room to show their concern. The outpouring of kindness toward Hayward is evidence of the power of *empathy* — the ability to share and understand others' emotions — which often impels us to help those in need [1].

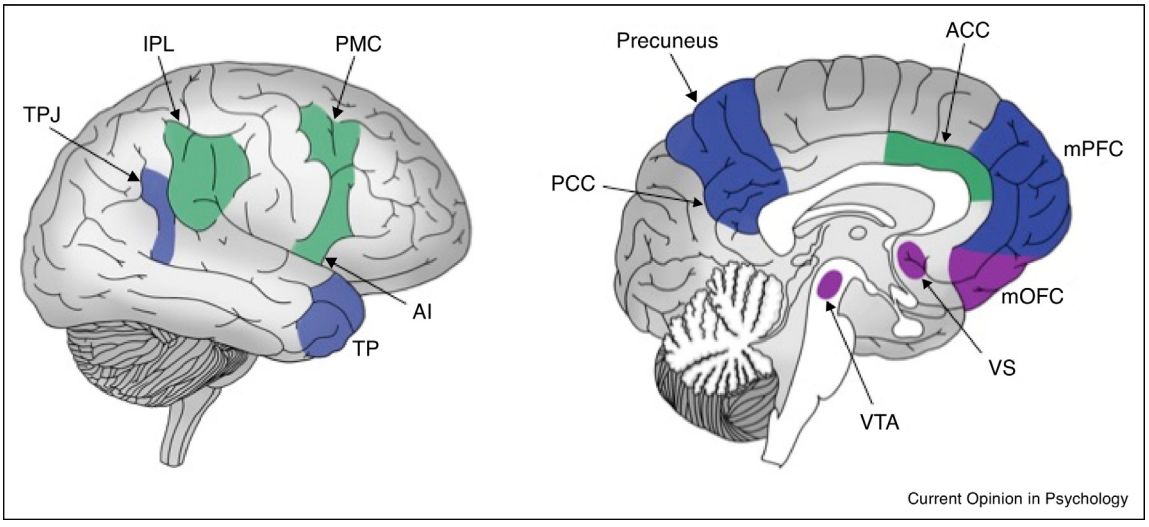
Over the past 20 years, neuroscientists have mapped brain processes that characterize empathy. Insights from this work suggest that empathy is a multicomponent phenomenon comprised of related but distinct sub-processes. These sub-processes include *experience sharing* (or vicariously feeling others' emotions), *mentalizing* (explicitly considering others' thoughts and internal states), and *empathic concern* (positive feelings of compassion and care for others' welfare) [2]. Though these sub-processes often track together, they are dissociable and are supported by different neural systems (see Figure 1). Experience sharing engages neural substrates associated with coordinating movement and feeling pain, including the anterior cingulate cortex (ACC), anterior insula (AI), and premotor cortex (PMC) [3–5]. Conversely, mentalizing recruits brain regions activated during mental projection [6], like the medial prefrontal cortex (mPFC), temporoparietal junction (TPJ), temporal pole (TP), and precuneus [7–9]. Finally, empathic concern is supported by brain regions associated with reward processing and positive affect, including the ventral striatum (VS), nucleus accumbens (NAcc), ventral tegmental area (VTA), and medial orbitofrontal cortex (mOFC) [10].

These systems are differentially activated when people perform various empathy-related tasks, like witnessing others in pain, helping others in need, or drawing inferences about people's mental states [11,12]. But empathy is not an automatic response to others' suffering. Instead, it is context dependent, shifting depending on the environment in which it unfolds. One key feature of empathic context is the group membership of targets with whom someone could empathize. For example, people readily empathize with fellow *in-group members* (those who share identification with a particular social group), but fail to empathize with *out-group members* (those who identify with different social groups), especially during competition [13,14].

Importantly, context does not influence empathy directly. According to a motivated framework of empathy [15], context indirectly shapes empathy by affecting a person's motives. *Empathic motives* are goal-directed, internal forces that drive people toward and away from social connection. At least two types of motives interact with context to facilitate or inhibit empathy. *Avoidance motives* drive people to feel *less* empathy. For instance, people are motivated to avoid empathy if it will lead to costly helping [16], if it will be exhausting [17], if it interferes with obtaining a desired outcome, like during zero-sum competition [18]. Conversely, *approach motives* encourage people to feel *more* empathy. People are often motivated to empathize more when they want to share others' positive states [19], when empathy is socially desirable [20], or when empathy strengthens their social ties [21].

A motivated framework of empathy can help psychologists make sense of anomalous events like the 2017 NBA

Figure 1



Brain areas asssociated with experience sharing (green), mentalizing (blue), and empathic concern (purple). *Abbreviations*: TPJ, temporoparietal junction; IPL, inferior parietal lobule; PMC, premotor cortex; TP, temporal pole; AI, anterior insula; PMC, premotor cortex; PPC, posterior cingulate cortex; ACC, anterior cingulate cortex; MPFC, medial prefrontal cortex; mOFC, medial orbitofrontal cortex; VS, ventral striatum; VTA, ventral tegmental area.

season opener, a competitive intergroup setting where empathy prevailed. In the following sections, we will review how motives affect empathy at the behavioral and neural level, and examine how motives can be shaped to promote empathy and improve social and emotional wellbeing.

Empathic motives at the neural level

Several studies have documented the context-dependency of empathy-related brain activity. For instance, activity in the AI and ACC — brain regions that support experience sharing — is reduced when viewing a suffering out-group member compared to a suffering in-group member [22,23]. Intriguingly, recent evidence suggests that group-based empathy biases depend on the motivational relevance of group membership. Hackel and colleagues [24••] scanned participants while they watched in-group and out-group members receive monetary rewards. Those highly invested in their group showed more robust responses in the VS to in-group members' rewards than out-group members' rewards. The authors suggest that people highly committed to their group experience greater vicarious reward to in-group members' good fortune. Motivational investment also predicted bias in prosocial behavior: those highly committed to their group behaved more prosocially toward in-group members than out-group members.

These findings suggest that people want to empathize with those most relevant to them. This tendency goes beyond group membership; people are motivated to empathize with those who look like them [25], those who are kind to them [26], and those who are close to them [27]. In a recent fMRI study, Fareri and colleagues [28] found that experiences of vicarious reward are moderated by social proximity. Participants were scanned while playing a game in which they won money to share with a computer, with a stranger, or with a friend. Participants reported greater subjective pleasure and showed stronger VS activity when sharing a reward with a friend than with a stranger or a computer. Importantly, this effect was modulated by closeness, such that participants who felt closest to their friends showed the greatest increases in VS activity. Social proximity bolsters empathy approach motives and experience sharing, as evidenced by greater valuation of positive experiences when shared with a close friend. Proximity — and presumably the motives attached to it — also affect mentalizing. Krienen and colleagues [29] found that social closeness (as opposed to perceived similarity) drives mPFC activity. Participants showed increased mPFC activity when making judgments about oneself and a dissimilar friend than when making judgments about a similar stranger.

Though this research is still in its early stages, several studies suggest that motives modulate empathy even at the neural level. While avoidance motives like intergroup bias can reduce empathy-related brain activity, approach motives like the desire for social closeness can increase it. But importantly, empathic motives are malleable and can be changed through targeted intervention. In the following section, we will review empirical efforts to intervene over empathic motives and how these efforts affect empathy-related brain activity.

Tuning empathic experiences through intervention

Because empathy is a motivated process, people can employ different regulatory strategies to control it. For example, when people want to empathize more, they can shift their attention to focus on another person's emotions. When people want to empathize less, they can avoid interactions expected to evoke empathy [15]. Empathy regulation can also involve tuning individual subcomponents of empathy to yield different psychological experiences [30]. For instance, increasing feelings of empathic concern strengthens empathy-approach motives and creates a desire to alleviate suffering [31]. Conversely, increasing experience sharing in the absence of empathic concern can strengthen empathy-avoidance motives and create feelings of vicarious distress [32].

Recent work supports the idea that people can orient themselves toward different subjective experiences of empathy, increasing empathic concern and reducing vicarious distress. Klimecki and colleagues [33] used meditation-based interventions to adjust participants' emotional experiences in response to others' suffering. First, participants underwent an 'empathy training' course, which encouraged participants to connect with their own suffering. They were asked to recall and reflect on painful experiences to help them understand what others were going through. After this training, participants were scanned while watching videos of people describing painful life events. They reported feeling more negative affect and showed heightened activity in the AI and ACC in response to others' suffering compared to baseline measures.

Participants then underwent a subsequent 'compassion training' which cultivated positive and friendly attitudes toward themselves and others to generate prosocial feelings. They were later scanned once more while watching videos depicting people describing painful events. Following compassion training, participants showed greater activity in the mOFC, putamen, pallidum, and VTA, brain regions associated with positive affect and affiliation [34].

In more recent work, these researchers demonstrated that different meditation-based trainings even create structural changes in the brain. Socio-affective training — which encouraged prosocial motivation and care for others — increased cortical volume in brain regions associated with experience sharing, including the left/mid posterior cingulate, dorsolateral prefrontal cortex (dlPFC), and the hippocampus. Conversely, training in cognitive perspective taking increased cortical thickness in mentalizing-related systems, including the ventrolateral prefrontal cortex and the right middle temporal gyrus [35••]. These findings suggest that shaping empathic experiences through daily mental exercises creates both functional and structural changes in the brain, lending support to the idea that tuning vicarious emotions creates real and long-lasting impact on empathic motives and experiences.

Intervention strategies can also bolster empathy by decreasing avoidance motives [36]. In a recent study by Hein and colleagues [37], participants received help from an out-group member, violating expectations about how they expected out-group members to behave. This generated a learning signal in the AI, which in turn increased empathy for a *different* out-group member later in the task. These findings support the idea that brief, motive-based interventions create impactful changes in empathy, and that empathy for out-group members can be cultivated by reducing avoidance motives even when groups are in conflict.

Future directions

Though brain activity is often used as a measure of how much empathy a person feels, future studies could use it as an indicator of people's success in adjusting their empathic experiences. Recently, researchers have used functional connectivity and multivariate pattern analyses to develop biomarkers of empathy-related motives [38••] and empathy-related psychological states. These analyses have produced distinct 'neural signatures' of the experience of pain firsthand, of witnessing someone else's pain [39], of empathic concern, and of vicarious distress [40••]. Biomarkers that differentiate between empathic concern (which tracks emotional wellbeing [41] and helping behavior [42]) and vicarious distress (which is associated with negative emotionality [43], compassion fatigue, and burnout [44]) could be especially useful in shaping empathy. Researchers could use these markers during biofeedback-based interventions to help people tune empathic experiences in real time, encouraging people to up-regulate experiences of empathic concern and down-regulate experiences of vicarious distress.

In future studies, scientists could examine whether empathic motives are evident in neural signatures of empathy. One important question is whether patterns of neural activity shift when people are especially motivated to empathize (like when interacting with a close friend or loved one) or when they're highly motivated to avoid empathy (like when it will be costly or painful). Future work should examine neural signatures of empathy in other motivation-relevant cases that could disentangle empathic sub-processes. Neural activity related to experience sharing could be especially robust in vicarious fear learning paradigms, where people observe others undergoing painful shocks that they will endure themselves [45]. Similarly, activity in regions that support mentalizing could be amplified when people are incentivized for accurately inferring others' mental states [46]. In such cases, neural signatures of empathy may be easily

detectable and perhaps even quantifiable, providing a more objective measure of empathic motives.

Conclusion

Empathy is a social bridge that allows people to connect with each other, but it is not an automatic response to others' suffering. Instead, it is a motivated phenomenon, reflecting approach and avoidance motives that encourage people to engage in or avoid it. Neuroscience affords researchers a more precise understanding of the origins and consequences of these motives, and lays a foundation for psychological interventions aiming to build empathy. By leveraging these insights — including the neural signatures of different empathic motives, empathic subprocesses, empathic concern, and vicarious distress — researchers can intervene to promote empathy and the many benefits it confers.

Conflict of interest statement

Nothing declared.

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