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The Discrimination of Self From Other as a Component of Empathy

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Despite the centrality of empathy in human social life, there is no widely agreed definition or characterization of the concept of empathy. A common thread in many of the proposed definitions, however, is that empathy presupposes the discrimination of self and other on the grounds that, to empathize with another individual, the mental state of the target individual must first be distinguished from the empathizer's own mental state. The purpose of this study is to investigate this proposal empirically. We employed a paradigm in which participants rated the emotional valence and degree of arousal of 93 facial expressions of mental states. We asked participants to infer the mental state represented by each facial expression (the Other condition) as well as to describe the effect of the expression on their own mental state (the Self condition). An absolute difference score between the Other and the Self conditions was used as an index of a capacity for self–other discrimination. Empathy was measured using the Interpersonal Reactivity Index. Results show that individuals high in trait empathy discriminate between self and other to a significantly greater degree when judging mental states than individuals low in trait empathy. This suggests that the capacity for self–other discrimination may be a component of the capacity for empathy and that future investigations of the concept of empathy ought to retain it.

Keywords: empathy, self–other discrimination, emotional valence, emotional arousal

Empathy is a fundamental component of human social interaction and the subject of copious investigations over the last 100 years (for recent review see Håkansson Eklund & Summer Meranius, 2021). Nevertheless, empathy research has not converged on a definition or characterization of empathy that is widely accepted. As Cuff et al. (2016) put it, there are "perhaps as many definitions [of empathy] as there are authors in the field" (p. 3).

Many early definitions of empathy took empathy to be either an affective or a cognitive state, where affective empathy is construed as a bottom-up process of "catching" another person's emotional state, and cognitive empathy is thought to be a top-down inference or simulation of the state (Preston & de Waal, 2002). For example, Hoffman (1981) defines empathy as primarily affective and characterizes it as a largely involuntary and automatic response to emotional cues from another individual. In contrast, Wispé (1986, p. 318) describes empathy as "the attempt of one self-aware self to understand the subjective experiences of another" and Hogan (1969) describes empathy as the process of "constructing for oneself another person's mental state." Recent proposals (Coplan, 2011; Cuff et al., 2016) tend to advocate the inclusion of

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Charlotte Little served as lead for investigation, project administration, writing—original draft, and writing—review and editing. Elizaveta Solomonova served in a supporting role for methodology, supervision, and writing—review and editing. Maiya Jordan served in a supporting role for investigation, project administration, and writing—original draft. Natalie Klein served in a supporting role for investigation, project administration, and writing—original draft. Ben Jennings served in a supporting role for formal analysis and writing—original draft. Gunnar Schmidtmann served in a supporting role for writing—original draft and writing—review and editing. Héctor Leos contributed equally to software and served in a supporting role for data curation, project administration, and visualization. Ian Gold served as lead for funding acquisition, supervision, and served in a supporting role for conceptualization, investigation, resources, writing—original draft, and writing—review and editing. Charlotte Little, Elizaveta Solomonova, and Maiya Jordan contributed to conceptualization equally. Charlotte Little and Elizaveta Solomonova contributed to formal analysis equally. Ben Jennings and Gunnar Schmidtmann contributed to methodology equally.

On behalf of all authors, the corresponding author states that there is no conflict of interest.

All data have been made publicly available at the Open Science Framework and can be accessed at https://osf.io/29d6e. This study was not preregistered.

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both affective and cognitive processes as necessary components of empathy.

Definitions of empathy also differ with regard to whether empathy is a unitary capacity (Batson, 2011; Coplan, 2011; Eisenberg et al., 1991; Hein & Singer, 2008) or a family of related processes (Batson et al., 1987; Preston & de Waal, 2002). While there is no consensus on this question, even those who define empathy as a single phenomenon acknowledge that it may share common low-level processes with other forms of social cognition.

Despite these theoretical controversies, there is some consensus with respect to the concept of empathy. In their recent review of the empathy literature, Håkansson Eklund and Summer Meranius (2021) identify four primary themes that appear in virtually all of the studies of empathy surveyed: understanding, feeling, sharing, and self–other differentiation. Their research suggests that consensus around the definition of empathy might be achievable by positing these themes as fundamental components of the concept of empathy that can be explored individually. The present study adopts this strategy by investigating the hypothesis that the capacity to discriminate between the emotional state of the self and the target other is a measurable component of empathy.

The theoretical motivation for taking self–other discrimination to be a component of empathy is that to exhibit empathy, one must be able to represent the mental state of the target other as distinct from one's own mental state (Cuff et al., 2016; Håkansson Eklund & Summer Meranius, 2021). For example, in their definitions of empathy, Cuff and colleagues highlight the importance of "recognition that the source of the emotion is not one's own" (2016, p. 17), and Decety and Lamm (2006, p. 1146) claim that empathy is "the ability to experience and understand what others feel without confusion between oneself and others." This would be the case even with theories of empathy that maintain the necessity of "emotional congruency" or the "sharing" of the emotional state of the empathizer and the target individual (Bernhardt & Singer, 2012; Chismar, 1988; Cuff et al., 2014; Håkansson Eklund & Summer Meranius, 2021; Hein & Singer, 2008). Indeed, without the capacity to distinguish one's own mental state from that inferred to be present in another person, empathy is impossible. Even if one takes empathy to be little more than emotional contagion or affective mimicry, the person who empathizes must understand that their own emotional state is a downstream effect of the presence of the same state in another person. Distinguishing between one's own state and the state of another individual thus appears to be conceptually required if empathy is understood to be distinct from emotional contagion.

Aside from this conceptual link, the capacity to distinguish self from other may play a variety of cognitive roles in the phenomenon of empathy. Separating self and other has been shown to reduce personal distress in interactions with other peoples' distress (Decety & Lamm, 2009) and to prevent an egocentricity bias in the interpretations of the mental states of other individuals (Lamm et al., 2011; Silani et al., 2013). An egocentricity bias usually occurs when an individual fails to move sufficiently beyond their own mental state while interpreting that of another individual (Decety & Hodges, 2007; Royzman et al., 2003). The capacity for self–other discrimination may therefore be integral to increasing the accuracy of empathic judgments.

The capacity for self–other discrimination in mental state attribution is further supported by physiological evidence demonstrating that the same brain areas that are employed in mental state attribution—the right temporoparietal junction (rTPJ) and the right supramarginal gyrus (rSMG; Brass et al., 2009; Decety & Lamm, 2007; Santiesteban et al., 2012; Silani et al., 2013)—appear to be involved in signaling whether it is the self or another individual performing an observed action. For example, Silani et al. (2013) used transcranial magnetic stimulation (TMS) to disrupt the function of the rSMG in a visuo-tactile judgment paradigm to explore empathic judgments. They found that in this condition the capacity for self–other discrimination was disrupted, resulting in egocentrically biased judgments.

The importance of self–other discrimination was recognized by some of the earliest theoretical accounts of empathy (Barrett-Lennard, 1962; Batson et al., 1987; Hoffman, 1981; Rogers, 1975; Stein, 1989). The distinction between self and other is, to some extent, at odds with the common view that empathy is a sharing of the emotional state of the other (sometimes called "affective empathy"). Many investigators, however, regard emotional congruence as a function of a more basic or immature form of empathy (Shamay-Tsoory et al., 2009), a view to which we subscribe. The aim of this study, therefore, was to test whether individuals with a greater capacity for empathy are also better able to differentiate between emotional states experienced by themselves and those experienced by others. To do so, we hypothesized that, compared to less empathetic individuals, more empathetic individuals would exhibit greater differences between judgments of their own emotional states and the emotional states of another person. We measured this difference in an emotion recognition task.

Material and Method

Participants

Of the participants, 142 were tested (mean age = 22.52 years, $SD = 4.76$ years, range = 18–39 years of age). The first cohort of participants was tested in-person at McGill University's Neurophilosophy Lab between October 2018 and March 2019. The second cohort was tested remotely during the Spring of 2022. To determine sample size, we relied on the sample size used within Schmidtmann et al.'s (2020) study which made use of the same emotion recognition paradigm. We later extended the study to increase the sample size and the power of our results. Gender was self-reported by the participants. A total of five participants were excluded from the study due to technical issues (three from the first cohort; two from the second cohort). The criteria for participation were normal or corrected-to-normal vision, advanced understanding of the English language, no previous diagnosis of a psychiatric disorder, and that the participant resides on the island of Montreal. Participants were provided with a small monetary compensation for their time. For gender and age of participants, see Table 1.

Table 1
Gender and Age Demographics of Participants

	Gender	*n*	*M*	*SD*	Range
Age (in years)	All	142	22.52	4.76	18–39
	Female	108	22.38	3.67	18–39
	Male	32	23.09	4.13	18–38
	Non-Binary	1	n/a	n/a	n/a
	Prefer not to say	1	n/a	n/a	n/a

All testing was approved by the McGill University Research Ethics Board (Committee 2/3) and was carried out in accordance with the ethical standards established by the 1964 Declaration of Helsinki and its later amendments. All persons gave explicit written informed consent before their inclusion in the study.

Interpersonal Reactivity Index

Participants completed lDavis' (1980, 1983) Interpersonal Reactivity Index (IRI), a widely used multidimensional measure of individual differences in empathy. The IRI comprises 28 items divided into four seven-item subscales—perspective taking (PT), fantasy (FS), empathic concern (EC), and personal distress (PD). Participants are asked to rank on a 5-point scale how well each item, or statement, describes them, with the scalar range extending from *Does not describe me well* to *Describes me very well*. The subscales have an internal reliability ranging from .71 to .77, and test–retest reliability ranging from .62 to .71.

As a result of an oversight in the experimental procedure, 23 participants completed the IRI on a 7-point scale. The scores of these participants were converted to a 5-point scale ad hoc using the method outlined in Lewis and Sauro (2020). None of the primary findings were altered when these participants were excluded from the analysis.

High Versus Low Empathy Groups

A median split was performed on the total IRI score. Participants who scored at or below the median score of 79.5 were considered "low empathy" and those above the median "high empathy." Of the participants, 71 were identified as being in the high empathy group and 71 as in the low empathy group.

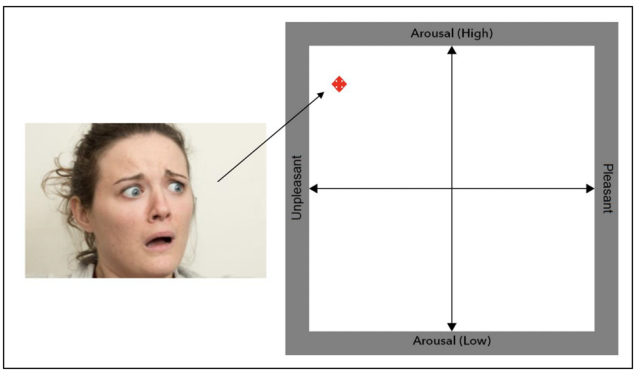
Emotional Valence and Arousal Classification Testing

In each testing condition, participants were shown front view facial images from the McGill Face Database (Schmidtmann et al., 2020), a validated collection of facial expressions depicting 93 mental state terms drawn from Baron-Cohen et al.'s (2001) "Reading the Mind in the Eyes task" (Baron-Cohen et al., 2001; Schmidtmann et al., 2020). Each mental state is depicted twice, once by a male actor and once by a female actor, for a total of 186 faces.

Participants were asked to classify the 186 presented faces on a two-dimensional emotion space defined by emotional valence and arousal following the method outlined in Jennings et al. (2017), and using a version of the affect grid originated by Russell (1980). The space was represented on screen as a 600 × 600 pixel clickable square for the in-person cohort, and a 300 × 300 pixel clickable square for the remote cohort. Every face was presented to participants twice—once under each of two testing conditions. Faces were presented to participants in random order. On each trial, a face was presented on screen for 1 s. Participants were then required to classify the face by making a mouse click at the location within the emotion space best representing the arousal (y-axis) and valence (x-axis) levels of the facial expression in the current trial (see Figure 1). For the in-person cohort, the arousal axis ranged from 0 (relaxed) to 600 (excited), and the valence axis ranged from −300 (unpleasant) to 300 (pleasant). For the online cohort, the arousal axis ranged from 0 (relaxed) to 300 (excited), and the valence axis ranged from −150 (unpleasant) to 150 (pleasant). The center of the space corresponded to a neutral expression. The two-dimensional coordinates of each trial were saved and subsequently used in data analysis.

Figure 1

An Example of the Placement of the Facial Expression "Terrified" on the Emotion Space



Note. The face image is taken from the McGill Face Database ("The McGill Face Database: Validation and insights into the recognition of facial expressions of complex mental states," by G. Schmidtmann, B. J. Jennings, D. A. Sandra, , J. Pollock, and I. Gold, 2020, *Perception*, 49(3), pp. 310–329 (https://doi.org/10.1177/0301006620901671). Copyright 2020 by Sage.).

Participants underwent practice trials before beginning each testing block. They had the option to repeat the practice trials until they were satisfied with their understanding of the task. They were then tasked with classifying all 186 faces in two ways (tested in two separate testing blocks):

1. Classify the mental state of the actor (the OTHER condition), and
2. Classify your (i.e., the participant's) mental state upon seeing the image of the actor (the SELF condition).

These conditions were described to the participants as (a) "how they feel" versus (b) "how do they make you feel," that is, the faces based on the emotion the participant perceived the face to be displaying as opposed to the emotion elicited in themselves in response to viewing the face. Approximately half of the participants were tested first with OTHER ($n = 70$), and approximately half were tested first with SELF ($n = 72$). Participants were given the option to take up to a 5-min break between each testing block.

Data Analysis

The face stimuli shown to participants were divided a priori into three valence categories: positive ($n = 22$), neutral ($n = 30$), and negative ($n = 40$). For the categorization of face stimuli, see Table 2.

Self–other discrimination was measured as the absolute difference between ratings in the SELF condition and in the OTHER condition. MANOVAs were performed to compare average self–other scores in high and low empathy groups for emotional valence and emotional arousal. Bonferroni corrections were performed on the p values for the 12 stimuli groups tested in each condition ($\alpha < .004$).

Independent samples t-tests were performed comparing ratings of emotional valence and emotional arousal between high and low empathy groups in the SELF and OTHER conditions. Effect size

Table 2
The Three Categories of Mental State Terms Depicted by the Face Stimuli

Valence group	Facial images
Positive ($n = 23$)	Affectionate, amused, anticipating, comforting, confident, contented, curious, desire, eager, earnest, encouraging, entertained, enthused, flirtatious, friendly, grateful, hopeful, interested, joking, playful, reassuring, satisfied, sympathetic
Neutral ($n = 30$)	Apologetic, assertive, baffled, bewildered, cautious, confused, contemplative, convinced, deciding, decisive, dominant, fantasizing, fascinated, flustered, imploring, incredulous, indecisive, indifferent, insisting, intrigued, pensive, perplexed, preoccupied, puzzled, reflective, relaxed, relieved, serious, tentative, thoughtful
Negative ($n = 40$)	Accusing, aghast, alarmed, annoyed, anxious, arrogant, ashamed, concerned, defiant, depressed, despondent, disappointed, dispirited, distrustful, doubtful, dubious, embarrassed, fearful, guilty, hateful, horrified, hostile, impatient, insulting, irritated, jealous, nervous, offended, panicked, regretful, resentful, sarcastic, skeptical, stern, suspicious, terrified, threatening, uneasy, upset, worried

was calculated using Cohen's *d*, where 0.2 is a small effect, 0.5 is a medium effect, and 0.8 is a large effect (Cohen, 2013). Bonferroni corrections were performed on the *p* values for the 12 stimulus groups tested in each condition ($\alpha < .004$).

Transparency and Openness

In compliance with the Transparency and Openness Promotion (TOP) Guidelines endorsed by the American Psychological Association (APA), we report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study, and we follow JARS (Kazak, 2018; Nosek et al., 2015). All data has been made publicly available at the Open Science Framework repository and can be accessed at https://osf.io/29d6e. This study's design and analysis were not preregistered.

Results

Participants

A χ^2 test of independence was performed on the group split to examine the relation between the gender of the participant and their inclusion in either the high or low empathy group. Female participants ($n = 108$) were significantly more likely to be part of the high empathy group, X^2 (2, $N = 142$) = 19.606, $p < .001$.

Self–Other Discrimination for Emotional Valence and Emotional Arousal

MANOVAs were performed to determine whether there was a statistically significant association between membership in high and low empathy groups and average self–other discrimination in ratings of emotional valence and emotional arousal ($p < .05$). Statistically significant differences were found in both emotional valence, $F(8, 133) = 2.644$, $p = .010$; Wilks's $\Lambda = .863$, partial $\eta^2 = .137$, and emotional arousal, $F(11, 130) = 2.175$, $p = .019$; Wilks's $\Lambda = .845$, partial $\eta^2 = .155$. Participants in the high empathy group were significantly more likely to show a greater degree of self–other discrimination than participants in the low empathy group.

Membership in the high or low empathy group had a statistically significant effect on degree of self–other discrimination for all stimulus groups except ratings of emotional valence for male faces depicting positive emotions ($p = .004$; see Table 3 and Figure 2).

Independent Samples *t*-Tests on Ratings of Emotional Valence and Emotional Arousal in the SELF and OTHER Conditions

Two sets of exploratory independent samples *t*-tests were performed on the SELF and OTHER conditions in isolation to determine whether there was an association between empathy group and ratings of emotional valence and arousal. Data are $M \pm SD$ unless otherwise stated, and values are based on the coordinates within the emotion space as defined above. Participants in the high empathy group rated the emotional valence of female neutral faces (-28.62 ± 17.32) as significantly more negative than participants in the low empathy group (-18.29 ± 23.75), $t(128.043) = 2.961$, $p = .004$. Participants in the high empathy group also rated the emotional valence of female negative faces (-61.17 ± 23.63) as significantly more negative than participants in the low empathy group (-47.70 ± 29.28), $t(134.015) = 3.016$, $p = .003$. There were no other significant differences between groups for emotional valence and emotional arousal in the OTHER condition.

There were no significant differences between high and low empathy groups for ratings of emotional valence or emotional arousal for faces rated in the SELF condition.

Discussion

Empathy requires understanding one's own empathic state of mind as distinct from the state of mind with which one is empathizing. In the presence of a sad person, for example, one may start to feel sad. Moving from emotional contagion to true empathy, however, requires that one understand one's sadness as a representation of, or response to, the sadness of the other. Therefore, in addition to other potential constitutive factors, empathy depends crucially on a distinction between self and other. Our results support the view that fractionating the concept of empathy and investigating its components individually is likely to be a fruitful strategy for understanding and defining empathy. This further supports a shift away from understanding empathy as a singular cognitive capacity and toward a view of empathy as an overarching concept comprising component processes that function together to produce empathic judgments.

We employed an emotion classification paradigm to investigate this aspect of the relationship between self–other discrimination and empathy. Our hypothesis was confirmed: participants classified as high in empathy exhibited a greater degree of self–other discrimination than participants classified as low in empathy both with respect to emotional valence and emotional arousal and across all stimuli groups with the exception of ratings of emotional valence

Table 3

MANOVA Results Comparing Average Self–Other Discrimination Between High and Low Empathy Groups for Emotional Valence and Emotional Arousal AQ10

	Face gender	Stimuli group	*df*	*F*(8, 133)	Sig.	*M* ± *SD* Low	*M* ± *SD* High
Emotional valence	All	All	1	15.766	<.001*	64.86 ± 29.90	83.15 ± 24.75
		Positive	1	11.830	<.001*	54.40 ± 23.44	66.55 ± 18.37
		Neutral	1	15.514	<.001*	61.50 ± 27.18	78.84 ± 25.24
		Negative	1	13.696	<.001*	73.45 ± 39.66	95.95 ± 32.41
	Female	All	1	13.932	<.001*	65.09 ± 31.01	82.88 ± 25.52
		Positive	1	12.175	<.001*	53.46 ± 24.54	67.01 ± 21.65
		Neutral	1	14.230	<.001*	62.06 ± 28.38	79.35 ± 26.19
		Negative	1	10.273	.002*	74.11 ± 41.32	94.63 ± 34.67
	Male	All	1	16.412	<.001*	64.63 ± 29.83	83.42 ± 25.23
		Positive	1	7.872	.006	55.34 ± 26.06	66.10 ± 19.11
		Neutral	1	14.356	<.001*	60.93 ± 27.91	78.32 ± 26.78
		Negative	1	16.154	<.001*	72.79 ± 39.74	97.27 ± 32.47
	Face gender	Stimuli group	*df*	*F*(11, 130)	Sig.	*M* ± *SD* Low	*M* ± *SD* High
Emotional arousal	All	All	1	17.783	<.001*	73.03 ± 30.47	92.66 ± 24.67
		Positive	1	14.774	<.001*	65.82 ± 29.03	84.06 ± 27.52
		Neutral	1	17.983	<.001*	72.64 ± 30.66	93.49 ± 27.86
		Negative	1	15.174	<.001*	77.62 ± 33.47	93.49 ± 25.50
	Female	All	1	15.788	<.001*	72.44 ± 30.47	91.00 ± 24.89
		Positive	1	11.924	<.001*	64.61 ± 29.77	81.42 ± 28.22
		Neutral	1	16.928	<.001*	71.58 ± 31.26	92.07 ± 28.02
		Negative	1	12.165	<.001*	77.61 ± 33.84	95.68 ± 27.58
	Male	All	1	18.666	<.001*	73.23 ± 31.24	94.12 ± 26.15
		Positive	1	15.157	<.001*	67.03 ± 30.32	86.71 ± 29.93
		Neutral	1	16.043	<.001*	73.22 ± 32.25	94.53 ± 31.14
		Negative	1	17.726	<.001*	76.88 ± 33.85	98.20 ± 25.98

Note. Bonferroni correction: $\alpha < .05/12$ comparisons (valence 12 items; arousal 12 items) $= \alpha < .004$.

for male faces depicting positive emotions. On the assumption that the IRI is an adequate measure of empathy, the confirmation of our hypothesis supports the notion that empathy does not necessitate emotional congruency between the self and the target other. Both conceptual and empirical investigation will be required to determine the scope of empathy proper. AQ3

The consistency of our findings across nearly all stimuli groups and on both the emotional valence and arousal dimensions is notable as the valence and sex of emotional stimuli have been found to influence the brain and behavioral response (Becker et al., 2007; Gross and Schwarzer, 2010; Herrmann et al., 2008; Johansson et al., 2004; Kauschke et al., 2019; Palermo and Coltheart, 2004; Preston & de Waal, 2002; Sokolov et al., 2011; Zeelenberg et al., 2006), and valence and arousal have been found to interact (i.e., highly positive or highly negative stimuli tend to be more emotionally arousing) but are cortically dissociable (Bradley & Lang, 1999; Citron et al., 2014; Colibazzi et al., 2010). Previous studies have found that the gender of the facial stimulus may affect empathic judgment and emotion recognition (Preston & de Waal, 2002; Sokolov et al., 2011). However, our results showed differential self–other discrimination between high and low empathy groups for both male and female faces. The consistency of our results across differences in valence and gender of the stimuli suggests that the capacity to discriminate between self and other may be independent of such factors.

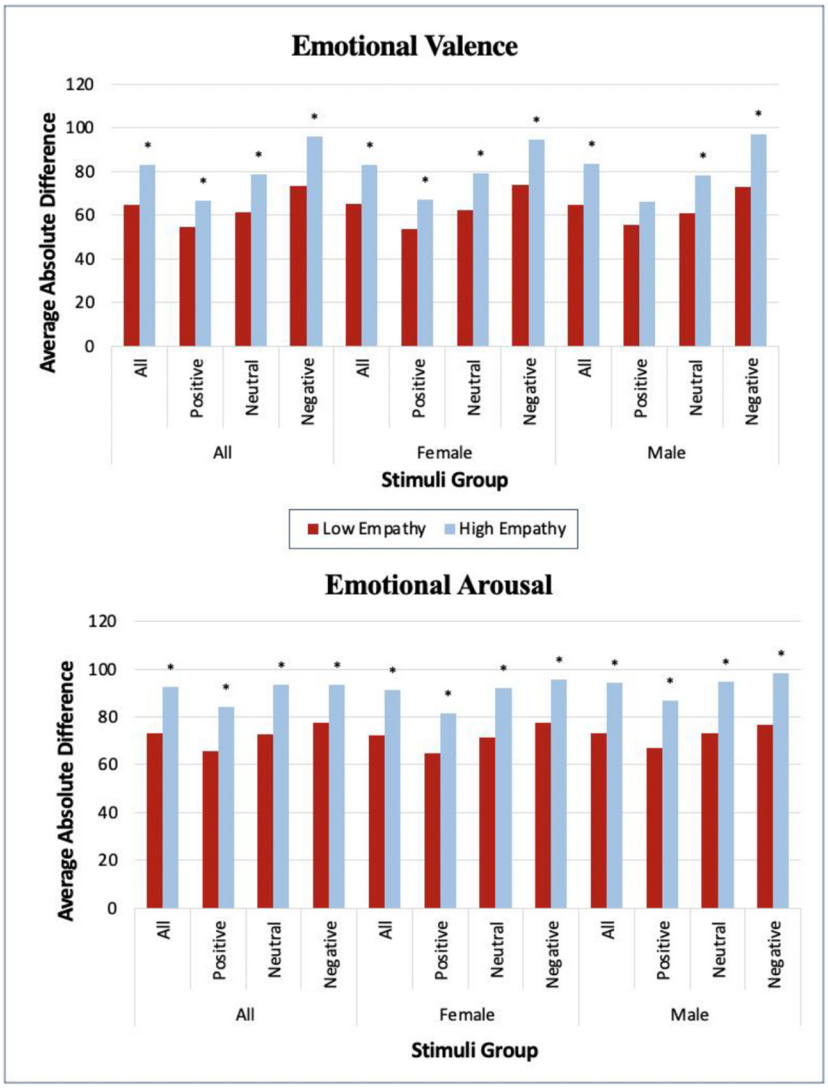
In addition to comparing the degree of self–other discrimination between high and low empathy groups, we investigated whether the groups differed significantly in their ratings of emotional valence and emotional arousal in the SELF and OTHER conditions in isolation. The purpose of this analysis was to examine whether there was an underlying rating pattern or bias in the SELF or OTHER condition that was driving the significant difference between empathy groups. Were this to be the case, the capacity for self–other discrimination might be reducible to more fundamental cognitive processes subserving empathic states, rather than a building block of empathy in itself. Our analyses revealed a few significant differences. High and low empathy groups differed significantly only in their average ratings of emotional valence in the OTHER condition for female faces depicting neutral and negative emotions. There were no other consistent significant differences in how high and low empathy groups rated emotional valence and emotional arousal in the SELF or OTHER condition. Based on these results, we were unable to identify an underlying pattern potentially subserving the differential self–other discrimination between high and low empathy groups, which suggests that there is a fundamental difference in how individuals with high trait empathy perceive and evaluate the emotional state of the self and the target other.

Conclusion

In this study, we examined whether individuals with high empathy scores, as measured by the IRI, are better able to discriminate between self and other for emotional states. We found that

Figure 2

Representation of Average Degree of Self–Other Discrimination for Ratings of Emotional Valence and Emotional Arousal Between Participants in the High and Low Empathy Groups.



Note. The red (dark gray) bars represent the low empathy group and the blue (light gray) bars represent the high empathy group. *$\alpha < .004$

individuals high in trait empathy showed a significantly greater degree of self–other discrimination than individuals low in trait empathy for ratings of emotional valence and emotional arousal across almost all stimuli groups. In the absence of findings that indicate an underlying difference in how high and low empathy groups rate emotional stimuli, high empathy individuals appear to fundamentally differ in how they represent the self and other when making empathic judgments.

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