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Opposing Contributions of Psychologically Distinct Components of Empathy to Empathic Accuracy

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What is it that provides us an accurate window into the thoughts and feelings of others? Although, intuitively, it might seem as though trait empathy would enhance this ability, research has produced decidedly mixed results, ultimately failing to uncover robust, systematic relationships between the two. Recent research has suggested, however, that different facets of empathy—emotional contagion, on the one hand, and empathic concern, on the other—are psychologically distinct and result in different behavioral tendencies (Jordan, Amir, & Bloom, 2016). In 5 preregistered studies involving nearly 2,600 participants, we assessed the opposing contributions of these distinct facets of empathy to empathic accuracy. We found that whereas trait concern is beneficial to empathic accuracy, trait contagion is, paradoxically, detrimental. These patterns emerged across 4 different measures of empathic accuracy that involve emotional and mental states communicated through the eyes (Study 1), paralinguistic cues in the voice (Study 2), facial expressions (Studies 2 and 4), and cues presented during a mock interview (Study 3). Moreover, in Study 4, we identified rational thinking style as a mechanism for these opposing effects. Whereas those who exhibit contagion tend to be less rational, those who exhibit concern tend to be more rational. These differences in cognitive style mediate the opposing relationships of contagion and concern with interpersonal accuracy. Our studies thus highlight the value of empirically separating psychologically distinct facets of empathy to more accurately characterize their independent contributions to interpersonal processes.

Keywords: empathy, contagion, empathic concern, emotion recognition, empathic accuracy

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John Steinbeck (2002) writes in *East of Eden*, "You can only understand people if you feel them in yourself" (p. 391). When considering people's ability to infer the thoughts and feelings of others (i.e., *empathic accuracy*; see Ickes, 2016 for a review), perhaps, as Steinbeck suggests, a likely candidate for improved accuracy lies in people's ability to experience what others are feeling. To the extent that we do not merely observe others from afar but also truly *feel* what they feel—stepping more fully into their emotional shoes and immersing ourselves in their experience—perhaps we can come to know and better understand their plight. Indeed, the very term *empathic* accuracy suggests an intuitive appeal to this hypothesis.

Yet despite the importance of empathic accuracy in a diverse array of interpersonal domains—including not only one's ability to successfully navigate social situations such as conflict resolution (Papp, Kouros, & Cummings, 2010), peer relations (Gleason, Jensen-Campbell, & Ickes, 2009), and negotiation (Fisher & Shapiro, 2005) but also one's own psychological adjustment (Simpson et al., 2011), work satisfaction (Byron, 2007), job performance (Elfenbein & Ambady, 2002), and self-esteem (Crosby, 2002)—efforts to point to underlying traits or dispositions related to accuracy have largely come up short. Although studies suggest that people's ability in this domain appears to be relatively stable over time (Gesn & Ickes, 1999; Marangoni, Garcia, Ickes, & Teng, 1995), research has nonetheless largely failed to identify any perceiver characteristics that robustly and consistently predict accuracy (Ickes, 2016; Ickes et al., 2000; Lewis, Hodges, Laurent, Srivastava, & Biancarosa, 2012). Indeed, even the intuitive link between trait empathy and empathic accuracy has been met with surprisingly mixed evidence. Some investigations have found that

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The procedures, sample size, exclusion criteria, hypotheses, and data analysis plans for all studies were preregistered before data collection on the Open Science Framework (Mayukha, Andrade, & Cone, 2020). The studies reported here were initially conceived of and designed as an honors thesis project completed by the first author in her senior year at Williams College. The seeds of these ideas came out of qualitative research that the first author did as a bioethics summer intern at the Mayo Clinic, attempting to understand the end-of-life experiences of patients and the role of clinicians in appreciating and responding to patients' emotional experiences. The role of cognitive style (i.e., intuitive/rational decision-making) emerged through the second author's work during the summer science program at Williams College in the summer after she graduated. We are now currently exploring the role that the relationships uncovered in the current studies play in the context of moral judgment and how those high in contagion versus empathic concern resolve deontological/utilitarian conflicts in moral dilemmas.

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aspects of trait empathy are positively related to accurately inferring others' mental and emotional states (Zaki, Bolger, & Ochsner, 2008, 2009). However, other studies have found no relationship (Grant, Fetterman, Weyhaupt, Kim, & Tullett, 2018; Ickes, Stinson, Bissonnette, & Garcia, 1990; Levenson & Ruef, 1992) and occasionally even negative relationships (e.g., Davis & Kraus, 1997; Myers & Hodges, 2009; Phillips, MacLean, & Allen, 2002). This has led some researchers to abandon an approach focused on finding "good judges"—traits or dispositions that predict empathic accuracy—altogether (Ickes, 2016; Ickes et al., 2000).

How can we explain this lack of correspondence between self-reported trait measures of empathy and behavioral measures of empathic accuracy? One possibility offered by researchers is that empathic accuracy may be strongly influenced by situational factors external to perceivers themselves. For example, target expressivity—that is, the extent to which the social cues received from another person are strong, unambiguous, and relatively easy to read—may be just as important as perceiver ability. Zaki and colleagues (2008, 2009) have found that measures of affective empathy interact with the expressivity of a target to predict accuracy: when target expressivity was high, trait affective empathy conferred an advantage, but it was relatively less beneficial when target expressivity was low (but see Grant et al., 2018 for a recent failure to replicate this result in a preregistered design using a different measure of trait empathy).

In the current work, we suggest an additional possibility. We propose that one reason why trait empathy has failed to serve as a reliable predictor is because different facets of empathy may make opposing contributions to empathic accuracy. *Whether* a person has a disposition to empathize with someone may not matter so much as *how* they empathize with him or her. In particular, we suggest that a dispositional tendency toward feeling other-oriented care and concern for someone's plight (*empathic concern*) is beneficial to getting an accurate window into the emotional experiences of others, while a dispositional tendency toward mirroring the emotional experiences of others (*contagion*) is detrimental to the same end. We first provide a brief overview of how empathy has been operationalized as a psychological construct in the literature. Next, we summarize research that has posited that, at least from an individual differences perspective, contagion and concern are psychologically distinct. Finally, we explore how each of these different facets of empathy might contribute to interpersonal accuracy and emotion recognition and outline our argument for why they might make opposing contributions to accuracy.

What Is Empathy?

Researchers have long recognized that empathy is a multifaceted construct that is comprised of many different interrelated subcomponents that include both affective and cognitive dimensions (e.g., Preston & de Waal, 2002; Wispé, 1986; Zaki et al., 2008). Perhaps because of this complexity, there has been a great deal of variation in the way that researchers have defined and measured empathy both across and within disciplines. Indeed, in a review of the literature, Cuff, Brown, Taylor, and Howat (2016) found 43 unique definitions that differed along at least eight different dimensions. In this section, we highlight some of these discrepancies that are most important to the current work.

Empathy Versus Sympathy

Classic research on the empathy-altruism hypothesis (Batson & Coke, 1981; Batson, Duncan, Ackerman, Buckley, & Birch, 1981; Batson, O'Quin, Fultz, Vanderplas, & Isen, 1983; Coke, Batson, & McDavis, 1978) identified an important distinction between a more self-oriented response to another's suffering (e.g., experiencing distress in response to another person's distress) versus an other-oriented consideration of the other person's plight, resulting in feelings of sympathy and compassion (e.g., experiencing tender feelings of concern in response to another person's distress). More recent research supports the importance of this distinction in a host of domains. For example, concern (i.e., feelings of care and compassion for others) and personal distress (i.e., anxiety during emergencies) are two subscales of the Interpersonal Reactivity index (ITI; Davis, 1983) that have historically been combined to measure affective empathy. However, Chrysikou and Thompson (2016) pointed out that when concern and personal distress are analyzed separately, they tend to predict personality disorders in opposing directions. Similarly, Decety and Yoder (2016) demonstrated that concern predicts sensitivity to others' injustice, but personal distress does not. In the medical literature, concern predicts work satisfaction among clinicians (Gleichgerrcht & Decety, 2013) and has also been shown to be protective against burnout (Lamothe, Boujut, Zenasni, & Sultan, 2014), while personal distress is associated with fatigue, burnout, and lower work satisfaction among clinicians (Gleichgerrcht & Decety, 2013; Thomas, 2013). Additionally, neuroscientific studies point to distinct brain regions associated with each of these distinct facets. Using a VR-based obedience paradigm, Cheetham, Pedroni, Antley, Slater, & Jäncke (2009) instructed participants to administer painful electrical shocks to an avatar, observing activity in the amygdala, ACC, insula, and other brain regions associated with empathy for pain. Distress predicted changes in neuronal activity during this paradigm, while concern did not, suggesting that they may be dissociable.

Recently, Jordan et al. (2016) empirically established the distinction between these two types of empathic responding (at the trait level) by factor analyzing a set of items composed of subscales of the IRI as well as two new subscales that captured elements of both emotional and behavioral contagion. They found that (a) emotional contagion for what one thinks others are feeling and concern loaded onto separate factors, suggesting that they are indeed empirically separable and psychologically distinct, and (b) they motivated different behaviors, with concern being a primary driver of prosociality and contagion being either unrelated or, in some cases, *negatively* related to prosocial choices. These results suggest that studies of empathy can benefit from parsing the empathic landscape into its empirically derived, psychologically distinct facets.

State Versus Trait Empathy

People exhibit stable variation in their tendency toward empathic responding (for a review, see Cuff et al., 2016), and a substantial amount of empathy research has sought to explore empathy from an individual differences perspective. At the same time, there is also evidence to suggest that people exhibit large amounts of variation in their tendency toward empathizing with others over time (Nezlek, Feist, Wilson, & Plesko, 2001; Toomey

& Rudolph, 2017), and empathic responding has been shown to be strongly affected by a whole host of situational factors, including interpersonal similarity with the target (Eklund, Andersson-Stråberg, & Hansen, 2009), mood (Pithers, 1999), and subjective feelings of power (Galinsky, Magee, Inesi, & Gruenfeld, 2006). Thus, empathy can be viewed from both the state and trait perspectives.

Importantly, the conclusions of research on empathy at the state and trait level need not align; different relationships could emerge across different levels of analysis, and they may be governed by different psychological processes (Clark, Robertson, & Young, 2019; Nezlek, Schutz, Lopes, & Smith, 2007). Jordan et al. (2016) found, for example, that trait contagion and concern appear to be psychologically distinct. However, they may be psychologically distinct at the trait level and nonetheless often co-occur at the state level. Similarly, although we propose, in the current work, that *trait* contagion and concern will make opposing contributions to emotion recognition accuracy, this is not to say that *state* contagion is not sometimes beneficial or that state empathic concern is not sometimes detrimental. Indeed, research suggests, for example, that "physiological linkage" at the state level is conducive to interpersonal accuracy (Levenson & Ruef, 1992) suggesting that some level of affect sharing at the state level may be beneficial (see also Zaki, Weber, Bolger, & Ochsner, 2009).

Nezlek et al. (2007) argued that such findings need not be seen as paradoxical or inconsistent because they occur at different levels of analysis, and thus both sets of conclusions may be correct. Consistent with this theorizing, Avenanti, Minio-Paluello, Bufalari, and Aglioti (2009) measured both state and trait empathic distress and found that each loaded onto separate factors in a principal components analysis. Moreover, these components each made independent contributions to self-reported responses to another person's pain and suffering, suggesting that they could be empirically disentangled. Similarly, FeldmanHall, Dalgleish, Evans, and Mobbs (2015) found that trait empathic distress was unrelated to participants' propensity to engage in costly altruism, but their situational distress toward the person's suffering in the moment did serve as a significant predictor. Finally, recent work suggests that manipulations of (state) perspective taking are unrelated to empathic accuracy (despite 25 separate attempts; Eyal, Steffel, & Epley, 2018), but this does not preclude the possibility that stable patterns could emerge at the trait level. Translating this distinction to the current work, we take an individual differences perspective to study how trait contagion and trait empathic concern are related to emotion recognition (in)accuracy. We do not, however, suggest that contagion or empathic concern at the state level in a relevant situation will exhibit the same patterns and relationships.

Empathy and Empathic Accuracy

A final point of conceptual disagreement worth highlighting is that some researchers have taken empathy to essentially be defined by the ability to accurately read another person's emotions or mental state—that is, they have defined empathy and empathic accuracy as essentially identical constructs (Zaki et al., 2008). On the other hand, other work has taken the perspective that empathic accuracy is an *outcome* of empathizing with someone else, viewing the two as distinct (e.g., Davis, 2009). Coll and colleagues (2017) argued that the conflation of empathy and emotion recognition results in a lack of specificity in models of empathic responding and advocate for separating the process of *emotion identification* from the experience of *affect sharing*, pointing to some of the theoretical and conceptual advantages of not lumping the process of empathizing with the potential outcome of shared emotional experience (see Bird & Viding, 2014; Happé, Cook, & Bird, 2017 for more detailed accounts and a proposal for a new measurement framework).

Here, we define trait empathic responding not as an outcome but rather as a process by which people attempt to understand someone else. We view contagion and empathic concern as two different strategies by which perceivers engage in this task, the outcome of which could be accuracy or inaccuracy in identifying someone else's emotional or mental state. Thus, it could be that perceivers have a dispositional tendency to mirror the emotions of someone else and come to an accurate understanding of their emotional experience. Alternatively, it could be that people have a dispositional tendency to take the perspective of someone else and come to better understand their plight, resulting is greater emotion recognition ability. We will use contagion and empathic concern as terms that define the tendency to engage in a particular strategy for stepping into someone else's emotional shoes, and we will use empathic accuracy or interpersonal accuracy as terms that define whether this process was successful, as defined by different operationalizations of accuracy.

Defining Empathy in the Current Studies

In the current work, we explore empathy from an individual differences perspective to ask how the psychologically distinct components of trait empathic responding identified in Jordan et al.'s (2016) research contribute to overall interpersonal accuracy. Specifically, we propose that each of these facets of empathy makes opposing contributions to the ability to accurately infer the emotional and mental states of others. By assessing each facet independently, we contend that these opposing contributions become more readily apparent. In this way, we propose that perhaps wholly abandoning an individual differences approach to uncovering accurate empathic perceivers is premature; instead, by further parsing the empathic landscape at the trait level, we seek to uncover stable relationships between empathy and interpersonal accuracy.

The Role of Cognitive Style

Why might a tendency toward emotional contagion versus a tendency toward care and concern for the welfare of others have opposing relationships with our ability to accurately infer others' emotional states? Our proposal is that these two factors differ in the extent to which they elicit a reliance on rational versus intuitive modes of thought (Epstein, 1998; Epstein, Pacini, Denes-Raj, & Heier, 1996) and that these differences in cognitive style explain variance in their empathic accuracy. Recent research has suggested that emotion recognition—a key component of empathic accuracy—is (counterintuitively) aided by a rational mode of thought (Ma-Kellams & Lerner, 2016). In both correlational designs that assessed participants' natural inclinations to engage in intuitive versus rational thinking as well as an experimental manipulation that encouraged participants to use one mode of thought over the other, participants relying on a more intuitive cognitive style tended to exhibit worse performance on measures of empathic accuracy, whereas those who were more rational and analytic performed better. Consistent with these findings, general intelligence has been shown to positively predict empathic accuracy (Davis & Kraus, 1997; Ickes et al., 1990), and manipulations of cognitive load—which reduce the ability to engage in rational deliberation—cause reductions in empathic accuracy (McLarney-Vesotski, Bernieri, & Rempala, 2011; Phillips, Channon, Tunstall, Hedenstrom, & Lyons, 2008; Phillips, Tunstall, & Channon, 2007; Tracy & Robins, 2008).

What, then, are the cognitive styles of those inclined to experience either contagion or concern? The contagion factor in Jordan et al.'s (2016) research consisted of three subscales: people's tendency to feel the emotions of those around them (empathy), the related tendency to mirror the behavior of others (behavioral contagion), and the tendency to feel anxious in emergencies (personal distress). These processes all capture a kind of inescapability from emotional experience. We suggest that a disposition toward these kinds of emotional experiences might lead to greater reliance on the rapid, automatic, experiential nature of intuitive thinking and relatively less reliance on a more deliberate, effortful, analytic perspective. Thus, we hypothesized that the contagion factor would be negatively associated with rational thinking or positively associated with a reliance on experientiality, or both.

In contrast, a key aspect of empathic concern is a more cognitive perspective taking of another person's viewpoint. Research has found consistent support for the notion that perspective taking is best explained by an anchoring-and-adjustment mechanism in which individuals anchor on their egocentric perspective, and only through motivation and effortful correction do they modify their judgments and inferences to account for differences in someone else's point of view (see Epley & Caruso, 2008 for a review). Thus, manipulations of either the motivation or ability to effortfully adjust—either by placing participants under cognitive load (Epley, Keysar, Van Boven, & Gilovich, 2004) or putting them in low motivation situations such as positions of high status, which leads them to be less inclined to adopt others' perspectives (Galinsky et al., 2006)—tend to result in greater egocentrism and less accurate inferences about others' thoughts and feelings. If participants have a tendency to engage in this kind of effortful correction to consider others' perspective, then perhaps, we hypothesized, they are also inclined toward a more deliberate, analytic thinking style in other aspects of their decision-making. Thus, we expected that they would report a greater reliance on rationality.

However, the concern factor in Jordan and colleagues' research is not solely defined by a tendency toward perspective taking. It is also infused with emotion: the other key subscale of this factor measures the tendency to focus on the feelings of others and care for their well-being. Norris and Epstein (2011) argue that tendencies toward intuitive or experiential modes of thought are characterized by a reliance on emotion. We thus predict that because the concern factor includes both cognitive perspective taking and more affective sympathy and compassion, it will be associated with a greater inclination to use both rational *and* experiential thinking styles.

The Current Studies

These considerations led us to hypothesize that those who sit highly on the concern factor would, through a greater reliance on analytic and deliberative thought, exhibit increased emotion recognition ability. On the other hand, if empathizing with others through a process of emotional contagion and affective mirroring is also associated with a tendency for a greater reliance on experientiality relative to rationality, then it may paradoxically lead to a reduced emotion recognition ability. If so, these studies would be among only a small handful of demonstrations that a component of empathic responding is not just unrelated but in fact *detrimental* to interpersonal accuracy.

Across five preregistered studies including nearly 2,600 participants, we tested these predictions using self-reported trait empathy items like those used in Jordan et al. (2016) and several different measures of interpersonal accuracy including the Reading the Mind in the Eyes Test (RMET; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Study 1a/1b), the Diagnostic Analysis of Non-Verbal Accuracy test for facial expressions (DANVA2-AF; Nowicki & Carton, 1993; Studies 2 and 4), the DANVA for paralanguage cues in voice clips (DANVA2-AP; Nowicki & Duke, 1994; Study 2), and a more naturalistic measure of emotion recognition in a mock interview paradigm (Study 3; Kraus, Côté, & Keltner, 2010; Ma-Kellams & Lerner, 2016). We found consistent support for the notion that while concern is valuable to interpersonal accuracy, contagion is, paradoxically, detrimental. In Study 4, we directly tested the mediating role of differential reliance on rational versus intuitive modes of thought and found that a tendency toward rationality mediates the effects of both contagion and concern, in opposing directions. This work thus highlights the importance of empirically separating psychologically distinct components of empathy to assess their independent contributions to person perception processes.

In each of our studies, we sought to recruit at least 200 participants per predictor in our regression analysis. In Study 3, we recruited 100 additional participants, because we randomly assigned participants to watch one of 14 different videos and expected this to increase variance. In Study 4, we also recruited 100 additional participants, because we sought to assess a multiple mediation model that required additional power. All of the study designs, sample sizes, exclusion criteria, and analysis plans were preregistered prior to collecting data and are available on the Open Science Framework along with the data sets (Mayukha et al., 2020).

Studies 1a/1b

In the first two studies, we assessed the opposing contributions of different facets of empathy to performance on the RMET (Baron-Cohen et al., 2001), a widely used and well-validated test of mental state inference. Study 1a was a preregistered study conducted on Mechanical Turk (MTurk). Study 1b was a direct replication of Study 1a in which we used the online platform Lucid to recruit a nationally representative sample on age, gender, ethnicity, and geographic location (Coppock & McClellan, 2019). The two studies were otherwise identical.

Method

Participants.

Study 1a. Four hundred MTurk workers participated in the experiment. One participant did not finish the survey and was excluded from analyses. This resulted in a final sample of 399 participants (199 male, $M_{age} = 38$).

Study 1b. We aimed to recruit 400 participants. Four hundred thirty-two people began the survey on Lucid's online platform. Nine people did not consent to participate in the experiment. Twenty additional participants failed to complete the full experiment and were excluded from analyses. The final sample was $N = 403$ (196 male, $M_{age} = 45.7$, $SD = 16.4$).

Procedure. All reported studies were reviewed and approved by the Williams College Institutional Review Board. First, participants completed the RMET, which consists of 36 black and white photographs depicting the eye region of an equal number of male and female Caucasian adults. On each trial, participants are asked to select which of four words best describes the target's emotional state (e.g., jealous, panicked, arrogant, hateful). We recorded the amount of time subjects spent on each of the 36 trials (Study 1a: $M = 8.0$ s per trial, $SD = 6.8$; Study 1b: $M = 9.8$ s per trial, $SD = 8.8$). Correct answers reflect the consensus judgments of a group of pretest participants (Baron-Cohen et al., 2001).

Following completion of the RMET, participants answered a battery of questionnaires assessing various aspects of their empathic experience (Jordan et al., 2016): the IRI (Davis, 1983), which includes the perspective-taking, fantasy, concern, and personal distress subscales, as well as the Empathy Index (EI; Jordan et al., 2016), which includes empathy and behavioral contagion subscales (see online supplemental materials). All six of these subscales consisted of seven statements that participants rated on a scale from 0 (*does not describe me well*) to 4 (*describes me well*). Finally, participants provided demographic information, including age, ethnicity, and education level, as well as exploratory measures of how difficult they found the emotion recognition task, how much attention they dedicated to it, whether they had seen the photographs included in this survey before, their general familiarity with surveys like this one, and whether they had trouble viewing any of the photographs in this study or trouble understanding the emotion descriptor words in the RMET.

Results

In both studies, the RMET was scored by summing the number of correct identifications out of 36 (as based on consensus judgments from past research; Study 1a: $M = 24.3$, $SD = 6.87$; Study 1b: $M = 22.8$, $SD = 6.00$). This sum served as the dependent measure in all of our analyses. These descriptive statistics are similar to those obtained by previous research conducted on MTurk (e.g., Kidd & Castano, 2013; Mascaro, Rilling, Tenzin Negi, & Raison, 2013; Panero et al., 2016).

Study 1a. To evaluate the psychologically distinct components of empathic responding, we factor analyzed the six subscales (all αs > .76) of the IRI and EI using the principal factor method and an oblique promax rotation (Jordan et al., 2016; see online supplemental materials for details of the reliability of the subscales as well as their factor loadings). Replicating earlier work, this analysis produced a two-factor solution: Factor 1 (contagion; $M = 1.96$, $SD = .614$) consisted of the empathy, behavioral contagion, and personal distress subscales, while Factor 2 (concern; $M = 2.73$, $SD = .701$) contained the perspective-taking and concern subscales. Like Jordan and colleagues' findings, the fantasy subscale loaded highly onto both factors and was held separately from the other two factors. Table 1 shows the correlations between all subscales, the two factors, and the RMET. There was no correlation between the contagion and concern factors, $r(397) = .058$. These results thus reinforce the notion that emotional contagion and affective mirroring are psychologically distinct from care and concern for others' feelings.

To assess how the different components of empathic responding were related to empathic accuracy, we conducted regression analyses with RMET as the outcome variable (see Table 2).[1] In Model 1, we included only the contagion and concern factors as predictors. Consistent with our preregistered prediction, increases in the concern factor were associated with higher scores on the RMET. However, also consistent with our hypotheses, increases in the contagion factor were associated with *lower* scores on the RMET, indicating that those who had a tendency to share in the emotional experience of others were also less likely to be able to accurately identify the mental states of others as communicated through their eyes. Table 1 shows the raw correlations between the RMET and the individual subscales of the IRI and EI, indicating that these opposing patterns were not unique to a particular subscale.

The opposing contributions of the two factors were consistent across all the models we tested. In (an exploratory) Model 2, we included the interaction between the two factors and found that it also significantly predicted RMET scores, $B = 3.22$, $SE = .60$, $p < .001$. Interpreting this interaction, for those with low contagion scores, increasing levels of concern had relatively less impact on empathic accuracy. However, as contagion scores increased, higher concern became much more consequential for RMET scores (see Figure 1). Thus, the interaction between contagion and concern revealed that individuals with high contagion especially benefited from increased concern, but individuals with low concern were vulnerable to the detrimental effects of contagion on emotion recognition accuracy.

Finally, in (an exploratory) Model 3, we added demographic variables. This revealed that both age and gender were significant predictors of RMET scores. (Men had higher RMET scores than women, and older individuals had higher RMET scores than younger individuals.) However, even after controlling for these two variables, the two factors remained significant opposing predictors.

Study 1b. We replicated the analyses we conducted in Study 1a on the nationally representative sample obtained from Lucid. First, we factor analyzed the six subscales (all αs > .70) of the IRI and EI using the principal factor method and an oblique promax rotation (Jordan et al., 2016; see online supplemental materials for details of the reliability of the subscales as well as their factor loadings). Replicating earlier work, this analysis produced a two-factor solution: Factor 1 (contagion; $M = 2.00$, $SD = .68$) consisted of the empathy, behavioral contagion, and personal distress

[1] Ninety-nine participants (24.8%) reported having seen the pictures from the RMET before. Additionally, 25 (6.3%) reported having trouble seeing at least one of the photographs, and five (1.3%) reported not recognizing all the emotion descriptors. Excluding these participants in this or any subsequent studies does not alter any of our conclusions.

Table 1
Correlations Among Self-Report Measures and RMET Scores in Study 1a

Empathy subscale	RMET	F1	Empathy	Contagion	Distress	F2	Concern	Perspective
F1: Contagion	−.39*							
Empathy	−.37*	.86*						
Behavioral contagion	−.22*	.82*	.68*					
Personal distress	−.34*	.74*	.42*	.34*				
F2: Concern	.28*	.06	.21*	.16*	−.20*			
Concern	.29*	.06	.16*	.17*	−.17*	.90*		
Perspective taking	.19*	.04	.21*	.10	−.18*	.87*	.56*	
Fantasy	.09	.34*	.44*	.42*	.01	.43*	.40*	.36*

Note. RMET = Reading the Mind in the Eyes Test.
* $p < .05$.

subscales, while Factor 2 (concern; $M = 2.66$, $SD = .58$) contained the perspective-taking and concern subscales. Fantasy loaded on both and as a complex factor. See the online supplemental materials for full details of the factor loadings for each subscale.

Once again, there was no correlation between the contagion and concern factors, $r(403) = .03$. These results thus reinforce the notion that emotional contagion and affective mirroring are psychologically distinct from care and concern for others' feelings. This indicates that the factor structure identified in past research (Jordan et al., 2016) generalizes to a nationally representative sample. Table 3 shows the correlations among all the subscales and the RMET.

Table 2 summarizes the same three models we used to analyze Study 1a. The pattern of results is qualitatively identical to those observed in the MTurk sample. Specifically, we found opposing contributions of contagion and concern as well as a significant interaction between these two factors that are robust to controlling for demographic factors including age and gender. The interaction in Model 2 exhibited a similar pattern to the one observed in Study 1a (see Figure 1).

Discussion

Replicating the results of previous research (Jordan et al., 2016), in a factor analysis of subscales from the IRI and EI, we found that a tendency to feel what (we think) others are feeling is psychologically distinct from care and concern for what (we think) others feel. In fact, the factors were correlated only very weakly and nonsignificantly (Study 1a: $r = .06$; Study 1b: $r = .03$)—a pattern that was also observed in all subsequent studies. Also similar to past research, we found that the fantasy subscale was the only complex factor that loaded on both factors (and did not correlate with interpersonal accuracy; see Table 1). Finally, this factor structure was replicated using a nationally representative sample collected using an online platform.

More importantly, however, we found that this distinction is highly consequential for interpersonal accuracy: whereas concern

Table 2
Regression Models for All Five Studies. Standard Errors Are Reported in Parentheses

	Study 1a			Study 1b			Study 2		
Model	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Dependent Variable		RMET			RMET			DANVA2-AF	
Contagion	−4.27***	−4.15***	−3.97***	−2.17***	−2.30***	−1.93***	−1.69***	−1.56***	−1.60***
	(1.47)	(.45)	(1.71)	(.41)	(.41)	(.42)	(.27)	(.27)	(.27)
Concern	2.96***	3.47***	2.88***	2.54***	2.71***	2.22***	1.44***	1.88***	1.55***
	(.43)	(.43)	(.44)	(.48)	(.48)	(.48)	(.27)	(.28)	(.28)
Contagion × Concern		3.22***	3.03***		1.88**	1.70*		1.53***	1.49***
		(.60)	(.58)		(.69)	(.68)		(.33)	(.32)
Age			.07**			.07***			.045**
			(.02)			(.02)			(.016)
Gender			−1.03**			−.63*			−.63**
			(.29)			(.28)			(.19)
Constant	24.6***	22.8***	21.5***	20.4***	20.2***	17.6***	17.1***	15.6***	15.0***
	(1.47)	(1.46)	(1.70)	(1.51)	(1.50)	(1.67)	(.92)	(.95)	(1.14)
Observations	399	399	399	403	403	403	399	399	399
Adjusted R^2	.24	.29	.32	.12	.13	.17	.14	.18	.22

Note. RMET = Reading the Mind in the Eyes Test; DANVA2-AP = Diagnostic Analysis of Non-Verbal Accuracy test for paralanguage cues; DANVA2-AF = Diagnostic Analysis of Non-Verbal Accuracy test for facial expressions. The number of observations between models in Studies 3 and 4 differ because one participant failed to report age in each study.
* $p < .05$. ** $p < .01$. *** $p < .001$.

positively predicted identification of the mental and emotional states of others, contagion *negatively* predicted this ability. This pattern was consistent across all the subscales of each factor and held when controlling for factors sometimes implicated in both empathy and emotion recognition accuracy, such as age and gender. These patterns were present in both a convenience sample (Study 1a) and a nationally representative sample (Study 1b).

In an exploratory analysis that included the interaction between contagion and concern as a predictor, we also found additional evidence across both studies that contagion was detrimental to accuracy, whereas concern was beneficial: when participants were low in concern, contagion was an especially strong predictor of RMET score. However, as levels of concern increased, the effects of contagion became weaker and weaker. This suggests that the detrimental effects of contagion are especially problematic when perceivers are low in concern, but these effects are ameliorated as empathic concern increases. This result is consistent with the idea that empathic concern is protective against the detrimental impact of trait contagion.

One important limitation of Study 1, however, is that it made use of a single measure of interpersonal accuracy. Although the RMET is a well-validated measure that has been used extensively in past work, one of its distinguishing features is that the correct answers are determined by consensus judgment. Thus, these results may be partly driven not just by a successful judgment of others' mental states but also a better understanding of what others' assessments of those mental states might be. Additionally, one critique of the RMET is that it captures not just interpersonal accuracy but also verbal intelligence (Peterson & Miller, 2012). Thus, in Study 2, we sought to conceptually replicate the results of Study 1 using a different measure of interpersonal accuracy, the DANVA (Nowicki & Carton, 1993; Nowicki & Duke, 1994). The DANVA2-AF is a well-validated measure of a person's competence in affect recognition from facial expressions. The DANVA and RMET are positively correlated ($r \sim = .4$; Franklin & Adams, 2010); however, unlike the RMET, the targets in the photos in the DANVA were asked to convey a particular emotion, and there is thus an objectively correct answer that is not determined by consensus judgment. Additionally, we sought to extend our findings beyond interpersonal accuracy in facial expressions by having participants also complete the DANVA2-AP, which requires participants to identify a person's current emotional state using nonverbal indicators provided in an audio clip of their voice. This measure has also been used extensively in past work and, like the DANVA2-AF, has objectively correct answers. Our main hypothesis was that contagion would negatively predict scores on both DANVAs and that concern would positively predict them.

Study 2

Method

Participants. We recruited a total of 400 participants (214 male, $M_{\text{age}} = 36.36$) through Amazon's MTurk. One participant submitted a completion code but did not complete all components of the study. This participant was excluded from analyses, leaving a final sample of $N = 399$.

Procedure. The procedure for Study 2 was identical to Study 1 except for the following. First, instead of completing the RMET, participants completed the DANVA2-AF. The task consisted of 24 photographs of actors expressing particular emotions of varying intensity, thus making some items more difficult than others. Following prior work (e.g., Glanville & Nowicki, 2002), each image was displayed for a maximum of 2 s before going blank. Each trial had four response options: happy, sad, angry, and fearful.

Following the DANVA2-AF, participants next completed the DANVA2-AP, which is similar in structure but requires partici-

Study 2			Study 3			Study 4		
Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
DANVA2-AP			Empathic Error			DANVA2-AF		
-1.84^{***}	-1.69^{***}	-1.73^{***}	3.19^{***}	3.19^{***}	3.35^{***}	-1.34^{***}	-1.24^{***}	-1.15^{***}
(.28)	(.27)	(.27)	(.50)	(.49)	(.51)	(.24)	(.23)	(.25)
1.58^{***}	2.07^{***}	1.82^{***}	-1.66^{***}	-2.14^{***}	-1.69^{***}	1.86^{***}	2.22^{***}	2.03^{***}
(.27)	(.28)	(.28)	(.49)	(.50)	(.50)	(.26)	(.26)	(0.26)
	1.74^{***}	1.70^{***}		-2.67^{***}	-2.43^{***}		1.79^{***}	1.71^{***}
	(.33)	(.33)		(.61)	(.61)		(.32)	(.32)
		0.03^{*}			$-.08^{*}$			$.06^{***}$
		(.016)			(.03)			(.02)
		$-.51^{**}$			1.18^{**}			$-.21$
		(.19)			(.37)			(.18)
14.4^{***}	12.7^{***}	12.3^{***}	18.9^{***}	20.4^{***}	21.8^{***}	15.3^{***}	14.2^{***}	12.5^{***}
(.93)	(.95)	(1.16)	(1.63)	(1.64)	(2.12)	(.87)	(.87)	(1.03)
399	399	399	498	498	497	496	496	495
.16	.22	.24	.09	.12	.15	.14	.19	.21

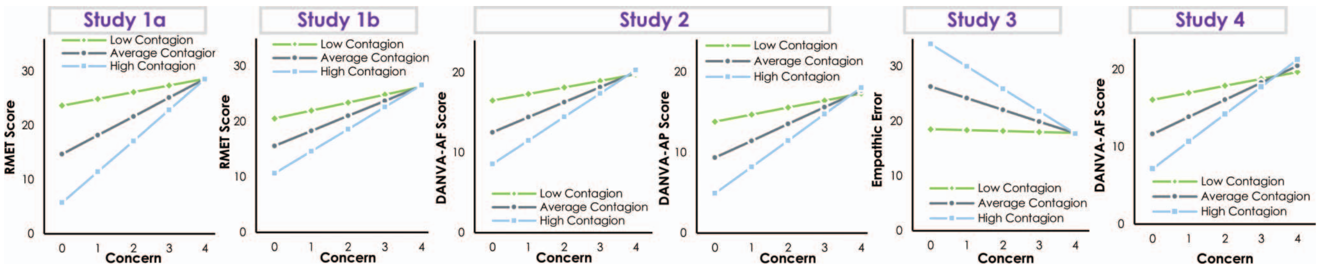

Figure 1. The predicted values for the outcome measure in each study based on the regression equation in Model 2 of each experiment. Values are plotted at low (−1 *SD*), average, and high (+1 *SD*) levels of contagion for each study. RMET = Reading the Mind in the Eyes Test; DANVA2-AP = Diagnostic Analysis of Non-Verbal Accuracy test for paralanguage cues; DANVA2-AF = Diagnostic Analysis of Non-Verbal Accuracy test for facial expressions. See the online article for the color version of this figure.

pants to identify emotions from an audio clip of an actor reading a neutral sentence ("I am going out of the room but I'll be back later"). Each audio clip played automatically at the beginning of each trial. The four response options were the same as the DANVA2-AF. After completing the DANVAs, participants completed the same IRI and EI items as Study 1. Finally, participants completed a similar demographics questionnaire to Study 1, as well as some additional questions about their familiarity with the images and audio clips, whether they had trouble viewing or listening to any of the stimuli, and whether they listened to any of the audio clips more than once.

Results

We calculated participants' DANVA2-AF and DANVA2-AP scores by summing up the number of correct answers out of 24 (AF: $M = 17.66$, $SD = 4.05$; AP: $M = 15.05$, $SD = 4.15$). There was a significant correlation between participants' scores on each measure, $r(397) = .61$, $p < .001$. Like Study 1, a factor analysis revealed a two-factor solution in which one factor was composed of the empathy, behavioral contagion, and personal distress subscales (contagion; $M = 1.97$, $SD = .69$), and the other was composed of the perspective-taking and concern subscales (concern; $M = 2.73$, $SD = .71$; for all subscales, $\alpha s > .77$; see online supplemental materials). There was once again no correlation between the two factors, $r(397) = .01$.

We conducted regression analyses using the same models as Study 1. Replicating our initial results, increases in the concern factor were associated with higher scores on both DANVAs, while increases in the contagion factor were associated with lower scores on both. Table 4 shows the raw correlations between the DANVA2 scores and the individual subscales of the IRI and EI, indicating, like Study 1, that these opposing patterns were not unique to a particular subscale. We also replicated, in Model 2, a significant interaction between the two facets of empathy predicting scores on both DANVAs (Figures 1). These results held even after controlling for age and gender (Model 3).

Discussion

Study 2 confirms that contagion and other-regarding concern are psychologically distinct constructs that make opposing contributions to interpersonal accuracy. These findings also confirm that the relationship between these different facets of empathic experience and interpersonal accuracy generalize beyond our initial demonstration to a different measure of emotion recognition in facial expression (as opposed to just the eyes)—one based on objectively correct answers determined by a researcher (DANVA2-AF) rather than consensus judgments provided by participants (RMET). Additionally, some research has suggested that a proportion of the variance on the RMET may be explained by verbal intelligence (Peterson & Miller, 2012). However, this is not the case in either version of the DANVA because it focuses solely on basic emotions that are easy to understand, such as happiness, sadness, fear, and anger. Finally, we found that the results are not specific to visual

Table 3
Correlations Among Self-Report Measures and RMET Scores in Study 1b

Empathy subscale	RMET	F1	Empathy	Contagion	Distress	F2	Concern	Perspective
F1: Contagion	−.24*							
Empathy	−.25*	.89*						
Behavioral contagion	−.11*	.84*	.70*					
Personal distress	−.23*	.71*	.44*	.33*				
F2: Concern	.24*	.03	.14*	.15*	−.23*			
Concern	.29*	.03	.09	.15*	−.19*	.86*		
Perspective taking	.12*	.03	.14*	.11*	−.20*	.84*	.45*	
Fantasy	.07	.36*	.45*	.31*	.12*	.37*	.33*	.30*

Note. RMET = Reading the Mind in the Eyes Test.
* $p < .05$.

Table 4
Correlations Among Self-Report Measures and DANVA2-AF and DANVA2-AP Scores

Measure	DANVA2-AF	DANVA2-AP	F1	Empathy	Contagion	Distress	F2	Concern	Perspective
DANVA2-AP	.61*								
F1: Contagion	−.29*	−.31*							
Empathy	−.27*	−.31*	.85*						
Behavioral contagion	−.20*	−.19*	.83*	.69*					
Personal distress	−.22*	−.24*	.74*	.38*	.36*				
F2: Concern	.25*	.27*	.01	.15*	.09	−.21*			
Concern	.24*	.26*	.03	.12*	.10*	−.13*	.90*		
Perspective taking	.19*	.22*	−.03	.16*	.05	−.26*	.86*	.55*	
Fantasy	.05	.09	.25*	.35*	.26*	.01	.33*	.33*	.24*

Note. DANVA2-AF = Diagnostic Analysis of Non-Verbal Accuracy test for facial expressions; DANVA2-AP = Diagnostic Analysis of Non-Verbal Accuracy test for paralanguage cues.
* $p < .05$.

social cues and also apply to paralinguistic information such as the intonation and inflection in someone's voice.

Still, despite this evidence for the generalizability of our findings, an important limitation of all three of the measures used in these studies is that they make use of static, posed, experimenter-selected images or audio clips to assess interpersonal accuracy. It could be that trait emotional contagion becomes more valuable in situations that involve more dynamic and complex displays of verbal and nonverbal behaviors. Thus, in Study 3, we sought to replicate our findings using a more naturalistic measure of empathic accuracy in which participants were asked to observe a video of someone engaging in a mock interview and to indicate the extent to which the person was experiencing a diverse array of emotions (Kraus et al., 2010; Ma-Kellams & Lerner, 2016). Importantly, these were the actual emotional experiences of actual participants, and these participants provided their own self-assessments of how they felt during the interview immediately after it occurred. We compared participants' judgments to the interviewees' own answers to these same questions, with the total deviation across all the emotion items serving as a measure of empathic error. We predicted that participants' contagion and concern scores would, like the previous studies, make opposing contributions to their total amount of empathic error. However, importantly, we predicted that contagion would lead to *increases* in empathic error and that empathic concern would lead to *decreases*.

Study 3

To create a more naturalistic measure of empathic accuracy, we first created a set of videos in which participants completed a short mock interview with an experimenter. The interviewees provided self-assessments of the extent to which they felt a series of different emotions during the interviews. These videos were then viewed by online participants, who were asked to indicate the emotions they thought the person was experiencing, with the difference between perceivers' guesses and interviewees' self-assessments serving as our measure of empathic error.

Method

Participants. Five hundred MTurk workers participated in the experiment. Two participants did not finish the survey and were excluded from analyses. This resulted in a final sample of 498 participants (257 male, $M_{age} = 37$).

Stimulus videos. To create a stimulus set for the full experiment, we recruited 17 Williams College undergraduates from the psychology department's subject pool. One participant did not provide consent to have her video used in the experiment, and the videos of two other participants were lost due to technical errors, leaving a final set of 14 videos. After providing informed consent, participants were videotaped completing a brief mock interview with an experimenter in which they answered a series of questions about themselves (e.g., "Where do you see yourself five years from now?"). The interviews lasted approximately 3 min ($M = 184$ s, $SD = 31$ s). Next, participants completed a Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) that asked them to indicate how much they felt a series of 20 different emotions during the interview (e.g., nervous, enthusiastic, ashamed, determined, afraid). Finally, they completed a Berkeley Expressivity Questionnaire (Gross & John, 1997) to measure target expressivity (see Zaki et al., 2008). Afterward, they were debriefed, thanked, and dismissed.

Procedure. Participants were told that they would be watching a short video of someone who had been asked to complete a mock interview and that at the end of the interview, the interviewee was asked to indicate how much they felt a variety of different emotions. They were told that their task would be to guess the emotions the person was experiencing during the interview. After they watched one of the 14 (randomly assigned) interview videos, they indicated how much the interviewee experienced each of 20 different emotions, using the same PANAS questionnaire as the interviewees themselves had filled out at the end of the interview. After completing the mock interview emotion recognition exercise, participants completed the same IRI and EI items as Study 1. Finally, participants completed a similar demographics questionnaire to Study 1, as well as some additional questions about whether they had trouble viewing or listening to the video.

Results

We calculated the absolute deviation between the interviewees' answers to each emotion item and the participants' inferences about their emotional experience on each item. We then summed these across the 20 items. This produced a measure of total empathic error ($M = 20.3$, $SD = 8.5$).

To evaluate the psychologically distinct components of empathic responding, we factor analyzed the six subscales (all αs $>$ .80) of the IRI and EI using the principal factor method and an oblique promax rotation (Jordan et al., 2016; see online supplemental materials). Replicating the earlier studies, this analysis produced a two-factor solution: Factor 1 (contagion; $M = 1.96$, $SD = .614$) consisted of the empathy, behavioral contagion, and personal distress subscales, while Factor 2 (concern; $M = 2.73$, $SD = .701$) contained the perspective-taking and concern subscales. Unlike the previous studies, however, the fantasy subscale loaded more heavily onto Factor 2 (loading = .746) than Factor 1 (loading = .385). To allow for direct comparisons across all our studies, we decided to maintain the same factor structure as the previous studies. However, we report subsidiary analyses in the online supplemental materials with fantasy included as part of the Factor 2 composite. (Including fantasy in Factor 2 did not alter any of our conclusions.) Consistent with the first two studies, there was no correlation between the contagion and concern factors, $r(496) = .09$. Table 5 shows the pairwise correlations for all the measures collected.

To assess how the different components of empathic responding were related to empathic accuracy, we conducted regression analyses analogous to the previous studies, with empathic error as the outcome variable (see Table 2; Note that this means that we expected the contributions of each factor to reverse because higher values indicate greater empathic error rather than greater accuracy). Consistent with our preregistered prediction, increases in the concern factor were associated with reduced empathic error. However, also consistent with our hypotheses, increases in the contagion factor were associated with greater empathic error, indicating that those who tended to share in the emotional experience of others were also less likely to be able to accurately identify the mental states of others in a recorded interview. In Model 2, the interaction between the two factors significantly predicted empathic error, $B = -2.67$, $SE = .61$, $p < .001$ (see Figure 1). Finally, in Model 3, both age and gender were significant predictors of empathic error. However, even after controlling for these two variables, the two factors remained significant opposing predictors.

We also tested a larger regression model that included the effects of which of the 14 interview videos participants viewed, as well as all the higher-order interactions between video and the two components of empathy. This analysis revealed a main effect of video, $F(13, 436) = 4.06$, $p < .001$, indicating that some interviewees' emotional experiences were easier to identify than others. However, video did not interact with either of the empathy measures, Fs < 1.52, ps $> .11$.

Discussion

Study 3 serves to demonstrate that our findings generalize to a more naturalistic measure of emotion recognition accuracy in which participants were tasked with watching someone engage in a dynamic interview with an experimenter rather than simple exposure to a static image or short audio clip. This is an important result because it suggests that our results are not limited to static displays in standardized measures that are potentially lacking in ecological validity. An additional contribution of Study 3 is that it demonstrates that our findings generalize to a different operationalization of accuracy: whereas Study 1 made use of consensus judgments and Study 2 made use of artificial expressions from a trained actor, Study 3 took participants' own self-assessments of their emotional experience during a task as the standard to which participants' assessments of emotional experience was held. Although participants were more accurate for some targets than others, our results nonetheless held across all randomly selected videos, indicating that the opposing contributions of different facets of empathy were not specific to a particular target's responses or behaviors.

Study 4

Having established the robustness of the opposing contributions of different facets of empathy to interpersonal accuracy across four different measures, in our final study, we sought to understand the mechanism behind these effects. Recent research suggests that rational (as opposed to intuitive) thought is associated with higher emotion recognition accuracy. Ma-Kellams and Lerner (2016) demonstrated, for example, that participants with higher Cognitive Reflection Test scores (reflecting a tendency to override incorrect intuitive responses to arrive at a normatively correct rational response) achieved better scores on the RMET, suggesting that rationality improves empathic accuracy. Given these results, we sought to assess the cognitive styles of those high on the contagion and concern factors and evaluate the mediating role of differences in these cognitive styles in explaining the opposing relationships

Table 5
Correlations Among Self-Report Measures and Empathic Error in the Interview Emotion Recognition Paradigm

Empathy subscale	Empathic error	F1	Empathy	Contagion	Distress	F2	Concern	Perspective
F1: Contagion	.26*							
Empathy	.30*	.86*						
Behavioral contagion	.19*	.84*	.70*					
Personal distress	.16*	.77*	.45*	.41*				
F2: Concern	−.12*	.09*	.22*	.14*	−.12*			
Concern	−.11*	.13*	.22*	.17*	−.06	.89*		
Perspective taking	−.11*	.03	.17*	.08	−.15*	.87*	.55*	
Fantasy	.001	.31*	.41*	.30*	.06	.51*	.48*	.41*

* $p < .05$.

with emotion recognition accuracy. We hypothesized that contagion would negatively predict rationality or positively predict experientiality (i.e., tendencies toward intuitive thought) or both. We also predicted that concern would positively predict both rationality and experientiality. However, following Ma-Kellams and Lerner's work, we predicted that rationality (and not experientiality) would ultimately mediate the effect of both contagion and concern on emotion recognition accuracy.

Method

Participants. We recruited 500 participants through MTurk. Of those participants, four did not finish all components of the study and were excluded from analyses. This resulted in a final sample of 496 participants (270 male, M_{age} = 35.85).

Procedure. Participants first completed the facial expression version of the DANVA, followed by the IRI and EI subscales following the same protocol as Study 2 (M = 17.63, SD = 4.19). Next, participants completed the Rational-Experiential Inventory (REI), which is a 40-item measure that captures individual differences in intuitive/experiential versus analytical/rational thinking styles. Responses were provided on 1 (*definitely not true of myself*)–5 (*definitely true of myself*) Likert scales. The measure consists of four subscales (10 items each) that measure rational ability (i.e., an ability to think logically and analytically; M = 3.60, SD = .74), rational engagement (i.e., an enjoyment of analytic and logical thinking; M = 3.44, SD = .78), experiential ability (i.e., an ability to rely on one's intuitive gut feelings; M = 3.28, SD = .70), and experiential engagement (i.e., an enjoyment of intuitive impressions and feelings in decision-making; M = 3.17, SD = .75). Following past work (Handley, Newstead, & Wright, 2000; Pacini & Epstein, 1999), because the ability and engagement subscales were highly correlated (rs > .79), we created two composites that collapsed across the ability/engagement subscales, thus producing two subscales that captured an overall tendency toward rationality (M = 3.52, SD = .72) and experientiality (M = 3.23, SD = .70).

Next, participants provided demographic information (e.g., age, ethnicity, education level). They also responded to two exploratory items that measured how difficult they found the emotion recognition task and how attentive they were to each of the photographs. Finally, they reported whether they had seen any of the photographs used in the emotion recognition task before and whether they had any technical trouble viewing any of the photographs in this study.

Results

The IRI and EI subscales (αs > .79) exhibited an identical factor structure to Studies 1a/1b and 2 (contagion: M = 2.05, SD = .74; concern: M = 2.70, SD = .68; see online supplemental materials). Table 6 shows the correlations between each measure and interpersonal accuracy.

First, we sought to replicate the results of the previous three studies by conducting a regression analysis with DANVA scores as the outcome variable (see Table 2). This analysis confirmed that contagion was significantly negatively associated with emotion recognition, whereas concern was significantly positively associated (Model 1). The interaction was also once again significant, indicating that concern became a stronger predictor of emotion recognition score as levels of contagion increased (Model 2; see Figure 1). Finally, these results held even after controlling for age and gender (Model 3).

To assess the mechanism behind these effects, our analysis strategy consisted of a series of bootstrapped mediation analyses (Preacher & Hayes, 2008) in which contagion or concern (separately) served as independent variables, DANVA scores served as the dependent variable, and various subscales from the REI served as potential mediators. In the first set of analyses, we included each of the subscales in the REI separately in order to assess their independent contributions to emotion recognition accuracy. Our main prediction was that rational ability would significantly mediate the effects of both contagion and concern on emotion recognition accuracy. Confirming this prediction, we found that the total effect (c) of contagion on emotion recognition was significant, $B = -1.32$, SE = .25, $p < .001$, and it remained significant after including rational ability in the model (c'), $B = -.70$, SE = .27, $p < .01$. The total indirect effect (ab), however, was also significant, $B = -.63$, 95% CI [−.91, −.41]. Thus, these results are consistent with a partial mediation of contagion on emotion recognition such that the negative association between contagion and DANVA scores was partially explained by a reduction in rational ability. (All of these conclusions hold if concern is entered as a covariate in the analysis.)

Similarly, we also found evidence to suggest that rational ability was a significant mediator of the effect of concern on emotion recognition, though in the opposite direction. The total effect was significant, B = 1.84, SE = .26, $p < .001$, and remained significant after including rational ability in the model, B = 1.25, SE = .29, $p < .001$. The total indirect effect was significant, B = .60,

Table 6
Correlations Among Measures in Study 4

Measure	DANVA	Rationality	RA	RE	Experientiality	EA	EE	F1
Rationality	.27*							
RA	.31*	.95*						
RE	.21*	.95*	.79*					
Experientiality	.01	.00	.02	−.02				
EA	.02	.03	.07	.00	.96*			
EE	.01	−.03	−.02	.00	.96*	.83*		
F1: Contagion	−.23*	−.41*	−.43*	−.35*	.10*	.08	.11*	
F2: Concern	.30*	.44*	.44*	.39*	.17*	.18*	.16*	.00

Note. DANVA = Diagnostic Analysis of Non-Verbal Accuracy; RA = rational ability; RE = rational engagement; EA = experiential ability; EE = experiential engagement.
* $p < .05$.

95% CI [.36, .85], once again indicating partial mediation, suggesting that one mechanism by which concern increases emotion recognition is through an increased perceived ability to engage in analytic thought. Again, all these conclusions hold when including contagion as a covariate in the analysis. As indicated in our preregistration, we did not make a prediction about whether other subscales of the REI would mediate the effect, but we evaluated each of them separately. In these analyses, only rational engagement emerged as an additional significant mediator (see online supplemental materials).

Next, we sought to evaluate a multiple mediation model that included all the subscales of the REI in the model simultaneously. However, upon data inspection, we discovered that the ability and engagement components of the REI subscales were highly correlated with one another (*r*s > .79). Thus, to avoid issues of multicollinearity, we decided to deviate from our original analysis strategy by using only two subscales: a rationality component and an experientiality component that collapsed across the ability/engagement subscales. There is a strong precedent in the literature for the usage of these larger subscales (e.g., Epstein, 2003). Nevertheless, we report the results of our registered analysis strategy in the online supplemental materials, and, importantly, none of our conclusions are altered by this deviation.

We found significant mediation for both contagion (Figure 2A) and concern (Figure 2B), in which rationality was the sole driver of effects on emotion recognition. Contagion was negatively predictive of rationality, whereas concern was positively predictive, and these patterns significantly mediated the total direct effect on DANVA scores. Experientiality did not predict emotion recognition and thus did not mediate the effects, even though it was positively related to both contagion and concern.

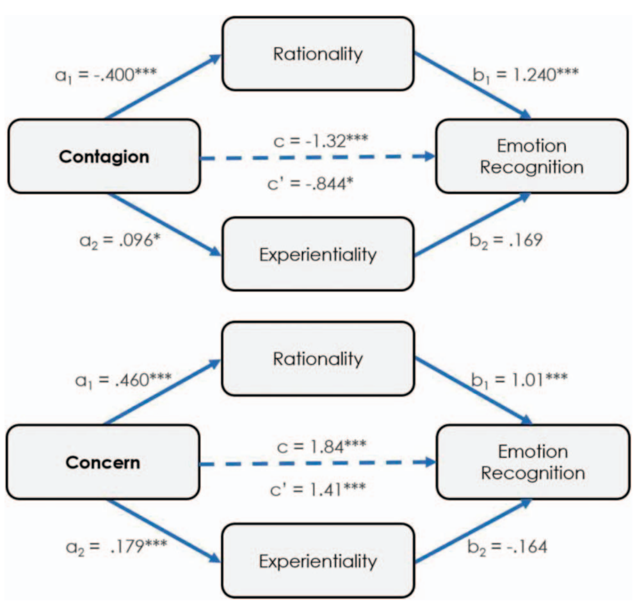

Figure 2. Multiple mediation models exploring the role of rationality and experientiality as simultaneous mediators of the effects of contagion (A) and concern (B) on emotion recognition accuracy. Both models provide evidence for a partial mediation of rationality. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. See the online article for the color version of this figure.

Discussion

Study 4 confirms two key findings from the previous two studies: (a) that contagion and concern are empirically separable in reliable and predictable ways and (b) that each makes opposing contributions to emotion recognition accuracy, with contagion negatively predicting scores and concern positively predicting them. More importantly, however, Study 4 sheds light on a potential mechanism by which these opposing effects occur: the cognitive style and mode of thought that people are most inclined to use in their decision-making. It is worth highlighting that contagion and concern were not strongly distinguished by their tendency toward experientiality; indeed, both factors tended to be weakly positively related to these subscales of the REI. However, they exhibited opposing relationships with rationality: whereas contagion was negatively associated with a tendency towards thinking logically and analytically, concern was positive associated with these same inclinations.

Moreover, these tendencies had important implications for participants' emotion recognition ability. Consistent with prior research (Ma-Kellams & Lerner, 2016), we found that, somewhat paradoxically, increases in a tendency to think rationally led to better performance in emotion recognition, and this explained the opposing contributions that each factor made to emotion recognition, whereas experientiality was not a significant predictor of DANVA scores. These findings thus conceptually replicate earlier work, suggesting that it is not the tendency to automatically and intuitively catch the emotions that (one thinks) someone is experiencing that contributes to accuracy but rather a more cognitive and rational mentalizing in which individuals attempt to take his or her perspective and respond emotionally to that perspective. The current study extends these conclusions to the DANVA2-AF, whereas earlier work made use of a one-on-one interview context as well as the RMET.

A striking aspect of our findings, however, is that it is not just the perspective-taking subscale of the concern factor that is related to a tendency toward rationality. We might have expected that any correlations with rationality would have been primarily driven by the more cognitive elements of mentalizing. However, we find that the more emotionally laden concern factor also exhibited a positive correlation with rationality. Similarly, all components of contagion negatively correlated with rationality; the correlation was not driven by any one particular subscale. This suggests that the findings are broadly consistent across all the behavioral tendencies that comprise each factor. These findings thus not only shed light on the phenomenology of each of two distinct ways of knowing and understanding someone else but also point to what it is that distinguishes them.

These results do raise a potential concern, however. Cognitive ability has been implicated in emotion recognition and other components of emotional intelligence. For example, those who have higher college GPAs and SAT scores tend to also have higher emotional intelligence and emotion recognition ability (Brackett, Mayer, & Warner, 2004). Can the differences we observe here be explained by differences in cognitive ability? Although we did not directly measure intelligence in any of our studies, we did collect a measure of educational attainment in our demographics questionnaire. Reanalyzing the data in all four studies while controlling for educational attainment did not alter any of our conclusions.

Educational attainment is, of course, only an imprecise proxy for cognitive ability, and we thus cannot rule out its importance, but these analyses nonetheless suggest that the patterns continue to hold when controlling for its influence.

Finally, although speculative, these findings could provide a potential explanation for why we observed a highly consistent, robust, significant interaction between contagion and concern across all our studies. In the current study, concern was a particularly strong predictor of participants' tendency to engage in rational decision-making strategies in their everyday life. Because such strategies are strongly related to emotion recognition ability (Ma-Kellams & Lerner, 2016), this could suggest that one way that increasing levels of concern serve to ameliorate the detrimental effects of a dispositional tendency toward contagion is through an increased tendency to rely on rational decision-making strategies in interpersonal accuracy tasks.

General Discussion

Emotions are, in many respects, defined by an internal subjective experience that is not always readily available to those around us. What is it that provides a window into the internal states of others? Across five preregistered studies, we demonstrate that a tendency toward feeling what others are feeling does not necessarily give us any valuable insight into what those feelings actually are. In fact, we consistently found that a disposition toward "feeling [others] in yourself," in Steinbeck's terms, was, paradoxically, *negatively* related to successfully inferring the mental and emotional states of others based on cues in their eyes (Study 1), facial expressions (Studies 2 and 4), voice (Study 2), or a more naturalistic and dynamic exposure to someone's verbal and nonverbal behaviors in a mock interview context (Study 3).

Yet, at the same time, not all empathic tendencies were found to be associated with decreased performance. Those who exhibited an other-regarding tendency to take another's perspective and to experience tender feelings of care and concern for their plights had better performance on all measures of empathic accuracy. Both of these patterns held even when controlling for other demographic factors sometimes implicated in emotion recognition ability, such as age (Isaacowitz et al., 2007; Mill, Allik, Realo, & Valk, 2009) and gender (Klein & Hodges, 2001; Stinson & Ickes, 1992).

Study 4 also identified a potential mechanism by which these opposing relationships emerge via differential tendencies among those who are inclined toward emotional contagion versus care/concern in the extent to which they rely upon and prefer to use rational, analytic, systematic thinking in their decision-making. Those who have a tendency toward rationality gain an advantage in emotion recognition (Ma-Kellams & Lerner, 2016), and, consistent with this earlier work, we found evidence that the rational subscales of the REI were strong predictors of empathic accuracy. More important to the current work, these tendencies mediated the relationships between contagion and (worse) emotion recognition and, separately, concern and (better) emotion recognition.

Beyond the Affective/Cognitive Dimension

One of the key insights of Jordan and colleagues' (2016) work is that different affective tendencies that contribute to empathic processes may load onto different factors that are psychologically distinct and largely independent of one another; those that experience emotional contagion are not necessarily also inclined to show other-oriented feelings of concern and sympathy, nor are they necessarily simultaneously inclined to take another's perspective, and vice versa. Not only did we independently confirm this factor structure in our own studies, but we also consistently found that the two factors were only very weakly and nonsignificantly correlated with one another (rs $< |.06|$). (Note that this could have occurred because, like Jordan and colleagues, we used a factor rotation method that allowed the factors to correlate with one another.)

However, even more importantly, we also found that empirically separating the factors in this way uncovers systematic relationships with empathic accuracy where we otherwise might not have found them. To underscore this point, we reanalyzed our data by combining the subscales of the IRI to create affective (personal distress, empathic concern) and cognitive (perspective taking, fantasy) composites, as has been the practice in several past investigations (e.g., Harari, Shamay-Tsoory, Ravid, & Levkovitz, 2010; Shamay-Tsoory, Aharon-Peretz, & Perry, 2009). While the cognitive empathy component was only weakly—and in Studies 1 and 3, nonsignificantly—correlated with interpersonal accuracy in all of our studies ($-.05 < r$s $< .18$), the affective component did not show any significant associations (rs $< .05$). This might have suggested that a tendency toward affective mirroring bears no relation to the quality of people's insights into the mental states and emotional experience of others. Indeed, this very conclusion has been reached in several previous investigations (e.g., Ickes et al., 2000; Levenson & Ruef, 1992).

However, as our results clearly establish, this nonrelationship occurs only because the affective empathy dimension is composed of two opposing effects that effectively cancel one another out. Thus, by empirically separating different dispositional tendencies from one another, we uncovered unique opposing relationships to empathic accuracy that might otherwise have been overlooked. Indeed, this may very well be why attempts to discover relationships between individual difference measures—and particularly affective empathy—and empathic accuracy have so often come up short and failed to produce reliable results or point to robust replicable predictors of strong performance (Ickes et al., 2000; Zaki et al., 2008, 2009). Earlier investigations have pointed to the importance of situational factors, including, in particular, characteristics of the target such as their trait as explanations for the lack of emergence of perceiver characteristics as robust predictors. However, the results of our studies suggest that one additional reason why such predictors may have been elusive is that different seemingly related facets of empathy may act in opposition to one another. These findings thus build on Jordan and colleagues' (2016) work and implicate empathic accuracy as an additional domain where factor analyzing the structure of empathic traits and using these empirically derived components as simultaneous predictors can contribute to a more nuanced understanding of how they are related to important psychological outcomes.

Emotional Contagion Is Detrimental to Accuracy

Though several theorists have pointed to the value of mentalizing and more cognitive forms of empathy in knowing and understanding others (Jordan et al., 2016; Olderbak & Wilhelm, 2017), these findings join only a small handful of studies (Davis & Kraus, 1997; Jordan et al., 2016; Myers & Hodges, 2009) to simultaneously suggest that some aspects of empathy—most notably those associated with emotional/behavioral contagion and personal distress—may not just be *unrelated* to interpersonal processes but in fact may be *detrimental*. Though the idea that a tendency to feel what (we think) others feel might give us a window into their emotional and mental lives has a great deal of intuitive appeal, our findings suggest that these tendencies are also bound up in less analytic approaches to judgment and decision-making that may sometimes contribute to worse performance.

Nonetheless, we should make explicit that we are not making any prescriptive claims about the value of one facet of empathy over another (though see Bloom, 2017 for an extended prescriptive argument against empathy). First, as others have pointed out (Zaki & Ochsner, 2011), the ability to recognize others' emotions, though clearly often quite valuable, may not necessarily always be an unadulterated good; sometimes having an accurate window into others' feelings can cause distress, particularly if those feelings are directed at oneself and we do not like what those feelings are. There is sometimes bliss in emotional ignorance, allowing us to maintain positive illusions about how others feel about us. Second, we should expect there to be a host of domains in which emotional contagion and concern will exhibit a reversal of the patterns we document here. The results of Study 4 suggest that cognitive style is a key distinction between the two components of empathy, and we should thus expect that any context in which analytical approaches perform more poorly relative to more intuitive strategies will be situations in which contagion may gain a relative advantage. For example, Wilson and colleagues have provided evidence to suggest that overthinking can often result in less subjectively satisfying and normatively inferior choices, especially in domains that they characterize as more affective in nature (Wilson & Schooler, 1991); these ought to also be domains in which concern is less beneficial. Another example may be moral judgment, in which theorizing has strongly implicated intuitive and rational decision-making processes in the extent to which participants endorse deontological (i.e., rule-based moral reasoning) versus utilitarian/consequentialist (i.e., outcome-based evaluations of the consequences of moral actions) choice. The connection to the REI documented in Study 4 would predict, then, that those high in contagion will engage in a qualitatively different reasoning process relative to those high in empathic concern—a possibility we are currently exploring in follow-up work.

Second, we should also reiterate that there is danger in overgeneralizing the results of a trait-level analysis to the state level (Clark et al., 2019; Nezlek et al., 2007). Although our findings provide consistent support for the detrimental effects of *trait* contagion on several different kinds of interpersonal accuracy, this is not to suggest that sharing in the emotional experiences that (we think) someone else is having cannot have important benefits for getting a window into their emotional and mental life. Indeed, all that we can conclude from our results is that those who tend to exhibit these broader tendencies will, when faced with an opportunity to assess someone's mental state, exhibit decrements in their performance. Nonetheless, "physiological linkage" (e.g., Levenson & Ruef, 1992) and affect sharing in the moment may confer some benefits—not just for interpersonal accuracy but perhaps for other socially desirable outcomes such as costly altruism (FeldmanHall et al., 2015).

Target expressivity may also be a key moderator that determines the relationships between contagion, concern, and emotion recognition. In the current studies, trials were composed of ambiguous stimuli that are, by design, relatively difficult to interpret. However, Zaki and colleagues (2008) have shown that affective empathy (as measured by the Balanced Emotional Empathy Scale (BEES); Mehrabian & Epstein, 1972) is particularly beneficial when targets are especially expressive (cf. Grant et al., 2018). Whether concern is still beneficial under such circumstances remains to be explored in future work.

The Phenomenology of Different Facets of Empathy

These studies are also the first, to our knowledge, to assess the cognitive styles of those who possess different empathic orientations, and they provide new insight into the nature of these different ways of stepping into the emotional shoes of others. Given that emotional and behavioral contagion have often been characterized as largely automatic, less controllable tendencies, it is perhaps not surprising that those who adopt such an approach also appear to be those that tend to increase their relative reliance on experiential modes of thought relative to more deliberate ones. Indeed, Norris and Epstein (2011) proposed that experientiality is an essential defining component of empathy and found that a modified experientiality subscale was positively correlated with trait empathy, whereas rationality was uncorrelated. Yet our results suggest that contagion is perhaps better defined not by a reliance on experientiality but rather by a *decreased* tendency to rely on rationality. One plausible explanation for the inconsistencies between our results and those of Norris and Epstein is that they made use of an empathy scale that appeared to include both contagion and concern items and dropped those items that they proposed indicated "a dysfunctional inability to separate one's reactions from those of others" (p. 1060). Thus, their items might be better characterized as a measure of empathic concern, rather than contagion, and this form of empathy is indeed positively associated with experientiality, as we found in our studies.

Study 4 also suggests that empathic concern is defined not just by an increased reliance on one mode of thought over the other but rather with increases in the reliance on both experientiality *and* rationality. Jordan and colleagues (2016) proposed that concern is defined by a set of tendencies in which people are more inclined toward taking the perspective of others through a process of mentalization but that, having done so, this elicits an emotional experience of feelings of concern, sympathy, and compassion, which then fosters a greater tendency toward prosociality. In this way, concern is defined not just by a cold, rational, deliberate orientation but rather by increases in individuals' beliefs about the value of both rational *and* intuitive modes of thought. It is cognitive in nature, but it is also simultaneously infused with emotional experience, as its subscales of perspective taking and empathic concern might suggest.

Limitations

A common limitation to all our studies is that they are, by necessity due to our focus on a trait-level analysis, correlational in nature, which limits our ability to draw causal conclusions in two important respects. First, we cannot make any strong claims about whether empathy and concern are the true mechanisms by which these increases and decreases in empathic accuracy occur. However, it is worth reiterating that these relationships hold even when controlling for some common correlates of accuracy, including age, gender, and education level. Still, we cannot successfully rule out all potential confounding factors that may have influenced our results.

Some previous work has successfully made use of interventions to selectively induce either empathy or compassion. For example, Klimecki, Leiberg, Ricard, and Singer (2013) found that empathy training and cognitive-based compassion training inductions had opposing effects on responses to another person's suffering in an intervention study that had participants engage in both types of training over a several-week period. If these inductions could be shown to have differential effects on empathic accuracy, they would help to establish the causal significance of the patterns we document here. Suggestive of this possibility, a recent investigation demonstrated that the compassion induction enhanced performance on the RMET (Mascaro et al., 2013). Our findings suggest the interesting additional possibility that an empathy training induction ought to have the opposite effect—at least to the extent that such training procedures differentially impact tendencies toward contagion and concern, which remains to be established in future research.

Second, we cannot firmly establish the causal implications of the correlations and mediational pathways that emerged between empathy and concern and cognitive style. It is not possible with our study designs to determine whether tendencies toward different kinds of empathic experience result in changes in cognitive style, whether differences in cognitive style may give rise to different kinds of responses to others' emotional experience, or whether some other unmeasured dispositional tendency gives rise to both. Still, these opposing contributions are nonetheless intriguing, and, at the least, our findings point to a constellation of dispositions that are bound together and that have important implications for interpersonal accuracy.

Finally, it is still unclear whether the relationships we documented in the current studies are unique to perceptions of emotion or if they might generalize to other kinds of interpersonal accuracy. These might include the perception of other social cues, such as whether two people are related, or more general trait inferences and impressions, such as a person's trustworthiness. It is worth noting, however, that the current studies demonstrated a stability of these relationships across different types of interpersonal accuracy and different operationalizations of accuracy, including consensus judgments, posed stimuli with well-defined correct answers, and more dynamic displays that use self-assessments as a comparison, already providing some evidence of the generalizability of these effects.

Conclusion

Though it might seem that the best way to step into the emotional shoes of others is to "feel them in yourself," our findings suggest that such intuitions may be misplaced. Instead, a tendency to "catch" the emotions of others may paradoxically make it harder for us to accurately understand what those feelings actually are. When it comes to getting an accurate window into the mental life of other people, a tendency to not merely "catch" emotions but rather to reflect on and express care, concern, and compassion may be much more valuable. Though these two ways of knowing others may feel qualitatively similar, our work suggests that disentangling their influences may be essential to more fully understanding how empathy, broadly construed, contributes to a range of interpersonal processes.

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Correction to Mayukha, Andrade, and Cone (2020)

In the article "Opposing Contributions of Psychologically Distinct Components of Empathy to Empathic Accuracy" by Ananya Mayukha, Isabel Andrade, and Jeremy Cone (*Journal of Experimental Psychology: General*. Advance online publication. May 14, 2020. http://dx.doi.org/10.1037/xge0000768), the significance levels indicated by the asterisks in Table 2 are incorrect. The corrected Table 2 should appear instead as follows:

Table 2

Regression Models for All Five Studies. Standard Errors Are Reported in Parentheses

Predictor	Study 1a			Study 1b			Study 2						Study 3			Study 4		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Dependent Variable	RMET			RMET			DANVA2-AF			DANVA2-AP			Empathic Error			DANVA2-AF		
Contagion	−4.27***	−4.15***	−3.97***	−2.17***	−2.30***	−1.93***	−1.69***	−1.56***	−1.60***	−1.84***	−1.69***	−1.73***	3.19***	3.19***	3.35***	−1.34***	−1.24***	−1.15***
	(1.47)	(.45)	(1.71)	(.41)	(.41)	(.42)	(.27)	(.27)	(.27)	(.28)	(.27)	(.27)	(.50)	(.49)	(.51)	(.24)	(.23)	(.25)
Concern	2.96***	3.47***	2.88***	2.54***	2.71***	2.22***	1.44***	1.88***	1.55***	1.58***	2.07***	1.82***	−1.66***	−2.14***	−1.69***	1.86***	2.22***	2.03***
	(.43)	(.43)	(.44)	(.48)	(.48)	(.48)	(.27)	(.28)	(.28)	(.27)	(.28)	(.28)	(.49)	(.50)	(.50)	(.26)	(.26)	(0.26)
Contagion × Concern		3.22***	3.03***		1.88**	1.70*		1.53***	1.49***		1.74***	1.70***		−2.67***	−2.43***		1.79***	1.71***
		(.60)	(.58)		(.69)	(.68)		(.33)	(.32)		(.33)	(.33)		(.61)	(.61)		(.32)	(.32)
Age			.07**			.07***			.045**			0.03*			−.08*			.06***
			(.02)			(.02)			(.016)			(.016)			(.03)			(.02)
Gender			−1.03**			−.63*			−.63**			−.51**			1.18**			−.21
			(.29)			(.28)			(.19)			(.19)			(.37)			(.18)
Constant	24.6***	22.8***	21.5***	20.4***	20.2***	17.6***	17.1***	15.6***	15.0***	14.4***	12.7***	12.3***	18.9***	20.4***	21.8***	15.3***	14.2***	12.5***
	(1.47)	(1.46)	(1.70)	(1.51)	(1.50)	(1.67)	(.92)	(.95)	(1.14)	(.93)	(.95)	(1.16)	(1.63)	(1.64)	(2.12)	(.87)	(.87)	(1.03)
Observations	399	399	399	403	403	403	399	399	399	399	399	399	498	498	497	496	496	495
Adjusted R^2	.24	.29	.32	.12	.13	.17	.14	.18	.22	.16	.22	.24	.09	.12	.15	.14	.19	.21

Note. RMET = Reading the Mind in the Eyes Test; DANVA2-AP = Diagnostic Analysis of Non-Verbal Accuracy test for paralanguage cues; DANVA2-AF = Diagnostic Analysis of Non-Verbal Accuracy test for facial expressions. The number of observations between models in Studies 3 and 4 differ because one participant failed to report age in each study.

* $p < .05$. ** $p < .01$. *** $p < .001$.

All versions of this article have been corrected.

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