



Published in final edited form as:

Motiv Emot. 2018 June ; 42(3): 446–457. doi:10.1007/s11031-018-9671-9.

Empathic Understanding: Benefits of Perspective-Taking and Facial Mimicry Instructions are Mediated by Self-Other Overlap

Alison N. Cooke¹, Doris G. Bazzini², Lisa A. Curtin², and Lisa J. Emery²

¹North Carolina State University

²Appalachian State University

Abstract

The current study sought to better understand the utility of two strategies – perspective-taking and facial mimicry – proposed to increase empathic responding. Thirty-seven female participants were presented an interpersonal situation (a betrayal) that would elicit the use of empathic responding to achieve conflict resolution between friends. Each participant was given instructions to partake in either perspective-taking, facial mimicry, or to remain neutral (control condition). The results demonstrated that individuals who engaged in perspective-taking reported significantly higher state empathy than the control condition, but there was no significant difference in state empathy between the mimicry and control condition. Also, those who engaged in either strategy reported significantly higher self-other overlap relative to those not instructed to engage in a particular strategy. Importantly, self-other overlap mediated the association between the instructional sets and state empathy. Both strategies are arguably means of enhancing interpersonal understanding.

Keywords

facial mimicry; perspective-taking; state empathy; self-other overlap

As social creatures, human beings spend a great amount of time trying to understand others. Further, the skill of understanding others' nonverbal messages, also known as "decoding", "receiving", or "empathic responding," is known to be highly important to one's interpersonal relationships and social standing (Carton, Kessler, & Pape, 1999; Halberstadt, Denham, & Dunsmore, 2001; Nowicki & Duke, 1989; O'Brien, DeLongis, Pomaki, Puterman, & Zwicker, 2009). In healthy, well-functioning relationships, successful induction of empathy should lead to an increase in understanding of the encoder's cognitive and emotional state (i.e., empathic responding; O'Brien et al., 2009). To further develop knowledge in how to increase empathic understanding, we tested two instructional sets previously shown to induce empathic responding of a listener: perspective-taking (a cognitive strategy aimed at reframing the event from the view of the target; e.g., Batson, Early, & Salvarani, 1997) and facial mimicry (a physio-behavioral strategy aimed at physically experiencing the emotions of the target; e.g., Stel van dan Heuvel & Smeets, 2008). Although never empirically tested together, these interpersonal empathic understanding strategies have been described as increasing empathy *through* evoking self-

other overlap (Galinsky, Ku, & Wang, 2005). We assessed whether highlighting these two strategies to participants would hold some comparative advantage in inducing empathy towards a target over not receiving either instructional set. Additionally, we tested whether this effect was due to an increase in self-other overlap.

Although individuals vary dispositionally on whether they are cognitively and affectively responsive to the emotional needs of others (trait empathy; Davis, 1983), a variety of strategies may enhance whether they empathetically respond to specific situations involving others (state empathy). According to Shen (2010), despite stable factors that contribute to cognitive abilities related to understanding the thoughts of others and to affective reactivity to others emotional experiences, state empathy involves a malleable, associative component (see also Decety & Jackson, 2006; Decety & Lamm, 2006). Shen defined associative empathy as the identification an individual feels with a target during a given interaction due to a vicariously shared experience (e.g., an actor cries in a movie, prompting a viewer to cry as well). The focus of the current research targets this more situationally-based form of empathic responding. Below we discuss two potential pathways toward greater empathic understanding.

Empathic Understanding via Perspective-Taking

Perspective-taking has been found to enhance individuals' communicational experiences by making interactions more easily interpretable and providing common ground for continued engagement (e.g., Galinsky et al., 2005; Galinsky, Maddux, Gilin, & White, 2008; Neale & Bazerman, 1983). By actively trying to understand the perspective of a member of an out-group, an observer can more accurately assess how best to communicate with varying individuals (Galinsky et al., 2005). In addition to creating more effective communications, perspective-taking can alter the observer's and target's opinions of each other. Perspective-taking can reduce an observer's biased thinking (Davis, Conklin, Smith, & Luce, 1996; Galinsky & Moskowitz, 2000) or positively change his/her opinion about an individual belonging to another group (Galinsky et al., 2005), usually one that is commonly stereotyped, as well as the group as a whole.

Two types of perspective-taking strategies have been tested to assess the efficacy of each in increasing empathy: imagining what the target of a story might be feeling or experiencing (*imagine-other*) or imagining how one would personally feel about a situation (*imagine-self*; Batson, Early, & Salvarani, 1997). Extensive research suggests that when individuals place themselves in the position of another they are more likely to experience feelings of empathy toward that person (Batson et al., 1997; Davis, 1983; Davis et al., 1996), a finding that has been robustly replicated over the years (Batson et al., 2003; Lamm, Porges, Cacioppo, & Decety, 2008; Galinsky & Moskowitz, 2000; Goldstein, Vezich, & Shapiro, 2014). More recently, the imagine-self form of perspective-taking has been termed "emotional perspective-taking" in which an individual is seeking to understand the emotional state of another (Van Boven, Loewenstein, Dunning, & Nordgren, 2013), because of its underlying affective component. Van Boven and colleagues proposed a dual-judgment model of perspective-taking requiring that the perceiver (1) consider how he/she would respond in the emotional situation (imagine-self in Batson et al., 1997) and (2) adjust this estimate to fit

how he/she thinks the person with whom he/she is interacting will respond (imagine-other in Batson et al., 1997). By engaging in both aspects of perspective-taking, an individual ideally can achieve state empathy, a more personal form of empathic responding (Shen, 2010).

Empathic Understanding via Facial Mimicry

Taking another's perspective may be a mechanism by which empathic understanding is enhanced, but there are likely more basic tools that enable emotional connections to others as well. From as early as infancy, humans have the ability to mimic the facial movements of another (Hoffman, 2000; Meltzoff & Moore, 1977, 1983), a "biologically hard-wired" propensity believed to facilitate empathic reactions to other humans (Hatfield et al., 1994; Hoffman, 2000; Meltzoff, & Moore, 1977, 1983). Facial mimicry has historically been thought to aid in interpersonal interactions by facilitating communication through the transmission of emotional states (Lipps, 1907).

Facial mimicry may work by helping individuals to assess another's current emotional state by mimicking a target's bodily movements to employ a feedback process helping individuals to make a decision about the target's nonverbal facial cues. The facial feedback hypothesis suggests that individuals understand their own emotional states as a function of their personal facial expressions, such that "If I am frowning, then I must be sad" (Adelmann & Zajonc, 1989; Darwin, 1872; Hess, Kappas, McHugo, Lanzetta, & Kleck, 1992; James, 1884; McIntosh, 1996). Therefore, it seems reasonable that if one mimics another's facial expression, then he/she can gain an understanding of that person's emotional state through facial feedback, i.e., "If you're frowning, and I frown when I'm sad, then you must be sad" (Cheung, Slotter, & Gardner, 2015; Hess, Blaison, & Dandeneau, 2016; see Blairy, Herrera, & Hess, 1999 for an exception with voluntary mimicry).

Empirically, facial mimicry has linked to improved emotion recognition (e.g., Dimberg, Thunberg, & Elmehed, 2000; Ponari, Conson, D'Amico, Grossi, & Trojano, 2012; Wallbott, 1991). Indeed, two theories, the embodied cognition theory (Niedenthal, 2007) and reverse simulation theory (Goldman, 2006; Goldman & Siripada, 2005), propose that individuals understand the emotions of others by first experiencing those emotions themselves through simulation, replication, or reproduction, and then by inferring the target's emotional state based on past personal experience. Further, when an individual's ability to mimic is inhibited, he/she is less likely to be able to recognize emotions of another (Oberman, Winkielman, & Ramachandran, 2007), pointing to the underlying advantages of being able to use facial mimicry in understanding another's emotional state. Indeed, individuals who demonstrate high facial mimicry (as measured by an electromyography, EMG) also score significantly higher in empathic responding than those who are low in facial mimicry (Sonnby-Borgström, 2002; Sonnby-Borgström, Jönsson, & Svensson, 2003; see also, Rymarczyk, Zurawski, Jankaowiak-Siuda, & Szatkowska, 2016). Therefore, it seems reasonable participants who actively engage in facial mimicry will be able to better understand another and achieve state empathy.

Self-Other Overlap and Empathic Understanding

Although not previously explored in a single study, both perspective-taking and facial mimicry may serve as catalysts for persons to experience a heightened sense of felt psychological closeness to another -- self-other overlap (Myers, Laurent, & Hodges, 2014). According to Aron, Aron, and Norman (2001) in the pursuit of the motivation to increase efficacy (i.e., self-expand), humans can extend the self through the development of relationships with others. Self-expansion theory posits that as two individuals share information about each other and disclose perspectives about their respective world views, both are changed by means of inclusion of the other in the self (Aron et al., 2001). The closer the shared bond between individuals, the greater the likelihood of this mutual self-other inclusion. Evidence that individuals can be unified in such a manner has been demonstrated in recent fMRI brain imaging showing that the area of the brain (dorsal anterior cingulate cortex) involved in firsthand experiences of social exclusion is activated when observing the exclusion of a close friend but not of a stranger (Meyer et al., 2013).

The induction of empathy is allegedly facilitated by the degree of identification with a target (Hornstein as cited in Batson et al., 1997), which ultimately reduces personal distinctiveness and renders the target more “self-like” (Davis, Conklin, Smith, & Luce, 1996). Galinsky et al. (2005) suggested that the prosocial benefits observed after implementing the perspective-taking instructional set occurs through the “overlap between mental representations of the self and mental representations of the other”(p. 110; see also Aron, Lewandowski, Mashek, & Aron, 2013). Indeed, a body of research argues that empathic understanding cannot occur without the mediation of self-other overlap between processing interpersonal information and achieving empathy (Cialdini, Brown, Lewis, Luce, & Neuberg, 1997; Myers & Hodges, 2011; Neuberg, Cialdini, Brown, Luce, & Sagarin, 1997; but, see Batson, 1997; Batson et al., 1997).

If imagining the plight of another can simulate that individual’s cognitive state of mind, it seems reasonable that engaging in a physical replication of their emotional states via mimicry might likewise induce reciprocal overlap between self and other. Indeed, facial mimicry has been linked to facets of social bonding by simulating parallel emotional processes. For example, observers who witnessed a target wince while listening to a painful incident disclosed by another person believed that the target “knew” and “cared” more about that person (Bavelas, Black, Lemery, & Mullett ; 1986). Similarly, spontaneous facial mimicry observed between two parties increased perceived interpersonal rapport through the presumption that the two were “better” friends with one another (Chueng et al., 2015). Finally, direct instruction to mimic the facial expressions of another has been shown to enhance social bonding and emotional convergence (elements of self-other overlap) (Stel & Vonk, 2010). What is not clear is whether the interpersonal rapport induced by instructions to mimic results in increases in empathy. Although it has been suggested that the effects of mimicry on empathic understanding may also be achieved through self-other overlap (Galinsky et al., 2005), this particular mediational pathway has yet to be directly tested. We do so in the present study.

The Current Study

The empathic responding benefits of perspective-taking have been well established (Batson et al., 2003; Lamm et al., 2008; Galinsky & Moskowitz, 2000; Goldstein et al., 2014). However, the direct association between induced facial mimicry and achieved empathy has not yet been tested. Thus, the first aim of the present study was to test our hypothesis that emphasizing two particular strategies, perspective-taking (replication) and facial mimicry, would create empathic responding to a greater degree than asking individuals to remain neutral. We had no reason to imagine one strategy was better than other, thus we made no predictions pitting the value of one strategy against the other.

The second aim was to replicate associations between perspective-taking and self-other overlap and to test hypothesized associations between mimicry and self-other overlap (Galinsky et al., 2005). Finally, the third aim was to assess whether self-other overlap does indeed mediate the association between instructions to partake in empathic understanding strategies and state empathy. We hypothesized that self-other overlap would be higher for both the perspective-taking and mimicry than the control condition, and that self-other overlap would mediate the relationship between interpersonal information processing and state empathy.

To create a situation in which participants would need to empathically respond to a target, we had participants watch an interview with a same-sex individual who had admitted to and expressed regret for lying to a friend. Previous research highlights the importance of using a dynamic stimulus in order to induce interpersonal understanding strategies (Chen, Yates, & McGinnies, 1988), and one interpersonal interaction known to create empathic responding is forgiveness (Davis & Gold, 2011). For this reason, active understanding instructions were given to female¹ participants who were randomly assigned to one of three conditions: perspective-taking (imagining oneself as the target; Batson et al., 1997), facial mimicry (imitating the target's facial expressions; Stel, van Dijk, & Olivier, 2009), or remaining objective while evaluating the target in the interview (control condition). Empathic responding was assessed via a measure of state empathy.

Method

Participants

Our initial sample of 95 female participants ($M = 19.34$, $SD = 1.47$) was recruited through an online subject pool of undergraduate students taking an Introductory Psychology course at a Southeastern university in the United States. Participants received credit toward a course requirement for their participation. Because we knew that participants in a previous study (e.g., Batson et al., 1997) have had difficulty following instructions, we recruited more participants than needed. As in those studies, many participants failed to correctly identify the instructional directions they received. Thirty-six percent ($n = 12$) of the perspective-taking condition, 41% ($n = 14$) of the mimicry condition, and 39% ($n = 11$) of the control

¹The infraction was deemed more consistent with the nature of female than male friendships, and thus, only female participants were used for the study. Female friendships are characterized as emphasizing intimacy and security relative to males' more functional relationships (Vigil, 2007).

condition reported using the instructional sets to which they had actually been assigned. Including only participants who followed the instructions (accurately answered the manipulation check) reduced the final sample to 37 participants between the ages of 18 and 24 ($M = 19.49$, $SD = 1.54$). In this sample, the average age was $M = 19.49$, $SD = 1.54$, and the racial composition included 89.2% European American, 5.4% Hispanic American, 2.7% Asian American, and 2.7% from mixed-ethnic backgrounds. Importantly, individuals who did not correctly identify the strategy did not differ significantly in trait empathy ($M = 3.55$, $SD = .30$) from those who did identify the assigned strategy correctly (perspective-taking, $M = 3.53$, $SD = .39$; mimicry, $M = 3.47$, $SD = .25$; control, $M = 3.43$, $SD = .37$) ($F[3,94] = .564$, $p < .64$, *partial* $\eta^2 = .64$). The average observed power for the two main effects, which will be discussed below, was $\alpha = .81$, indicating that even with 37 participants, the current study was still sufficiently powered.

Materials

Interpersonal Infraction Story—We utilized an engaging and goal-oriented stimulus based on recommendations by Chen et al. (1988). A video recording of a target named Jessica was created, describing a situation in which she wronged a friend and apologized. The video was made to look like a self-disclosed video posted to YouTube to increase legitimacy. The video was scripted as follows:

A couple of months ago I began hanging out with a new group of friends that I met through a class group project. They invited me to go out to eat with them at Chili's one Friday night and then over to someone's house to watch a movie. I accepted. A couple of hours after I made plans with those friends in class you asked me what I was doing this Friday. I felt awkward about inviting you to go along with us. I don't know why. I guess I wasn't sure how well you'd get along with this new group so it seemed easier to lie about it. I told you that I had a big project due on Monday that I had to work on and could we plan on doing something the next weekend. When my friends and I got to Chili's I saw you in the restaurant. I knew that you saw me and that you were upset with me. I stopped to say hi but before I could say anything you asked me 'I thought you had a project to work on?' Then you and Stephanie got up and walked out of Chili's. I felt terrible. [Pause to look down] I went outside to talk to you but you were gone. I am very sorry. I know I have hurt you and I didn't mean to. I should have told you the truth. I didn't want to tell you I had plans that you weren't necessarily invited to. Please forgive me.

Empathic Understanding Strategy Instructions—Three different instructional sets were created for the study. Instructions for strategies were adopted from previous experiments in which each instructional set was found to be effective in order to potentially replicate previous findings.

Perspective-taking: In order to engage participants in empathic understanding, those in the perspective-taking condition were instructed to imagine they are the target of the story who committed the betrayal. These instructions were modified from Batson et al. (1997)'s "imagine-self" condition and have been used in more recent research (Galinsky et al., 2008; Goldstein et al., 2014). The instructions read as follows:

While you are watching the following video try to imagine how you yourself would feel if you were experiencing what has happened to Jessica, who lied to her best friend, and how this experience would affect your life. Try not to concern yourself with attending to all the information presented. Just concentrate on trying to imagine how you yourself would feel.

Mimicry: In order to engage participants in empathic understanding, those in the mimicry condition were explicitly instructed to mimic the facial expressions of the target while watching the video. Stel et al.'s (2009) instructions for voluntary mimicry were adapted for the study. The instructions read as follows:

While you are watching the following video, please pay particular attention to the eyes, eyebrows, and mouth of the target, Jessica. Then actively try to recreate those movements with your own face. That is, try to mirror the facial movements of Jessica.

Control condition: The instructional set for the control condition asked participants to remain objective in their assessments about the target, or to constrain the use of other empathic understanding strategies. The instructions were modified from those of Stel et al. (2009) who instructed participants not to mimic the target and Batson et al., (1997) who instructed participants to remain objective. The instructions read as follows:

While you are watching the following video, please pay particular attention to the eyes, eyebrows, and mouth of the target, Jessica. To the best of your ability, DO NOT recreate these movements with your face, only observe Jessica as she tells her story. In addition, please try to remain objective and not take a side when listening to Jessica's interview.

Measures

Covariate—Trait empathy was included as a covariate in our current analyses because we wanted to capture participants' real-time state empathy above and beyond their individual trait empathy. To capture trait empathy, we used the Interpersonal Reactivity Index (IRI; Davis, 1980) with 28 questions, measured on a 5-point Likert scale (1 = does not describe me well; 5 = describes me very well). Four components of trait empathy are included, each with seven questions: Fantasy (e.g., "I really get involved with the feelings of the characters in a novel"), Perspective-taking (e.g., "I try to look at everybody's side of a disagreement before I make a decision"), Empathic concern (e.g., "I am often quite touched by things that I see happen") and Personal distress (e.g., "I tend to lose control during emergencies"). Cronbach's alpha for the total scale in this sample was .75. Test-retest reliability for this scale ranges from .61 to .79 for males, and .62 to .81 for females (over a 60–75 day period; Davis, 1980). To match the number of questions relating to perspective-taking, so as not to prime for one condition rather than the other, we added seven items on facial mimicry (e.g., "I sometimes find myself mimicking the body postures of my friends."). In addition, 21 other questions were added to the scale to distract from the purpose of the experiment for a total of 56 questions. The relevant, original 28 items were averaged with higher scores indicating greater trait empathy.

Self-Other Overlap—The Self-Other Overlap Scale assesses the extent to which a participant identifies with the target (Goldstein et al., 2014). The first eight questions measure the participant’s perceived similarity with the target, and are measured on a 7-point Likert scale (1 = *not at all*, 7 = *very much*) (e.g., “To what extent do you feel you are similar to Jessica?”). The ninth question (Aron et al., 1992) presents seven Venn diagrams with varying degrees of overlap (1 = two non-overlapping circles, 7 = two nearly completely overlapping circles). Test-retest reliability of this scale was reported as .83 (over a two-week period; Aron et al., 1992). The eight-item scale with the Likert questions and the Venn diagram were combined to create an average self-other overlap score in order to replicate findings from Goldstein et al. (2014), to avoid issues associated with mono-question measures, and because the eight item scale and single item, Venn diagram, were highly correlated ($r = .78, p < .001$). Cronbach’s alpha for the 9-item scale was .95 in the current study.

State Empathy Scale—The 12-item State Empathy Scale (Shen, 2010) includes four questions relating to each of the three types of empathy: Cognitive empathy (e.g., “I recognize Jessica’s situation”), Affective empathy (e.g., “I experienced the same emotions as Jessica when watching the video”), Associative empathy (e.g., “I can identify with the situation described in the video”), and responses are measured on a 5-point Likert scale (0 = *not at all*, 4 = *completely*). The name “Jessica” was substituted for the original term “character” to increase relevance to the current vignette. Cronbach’s alpha for this sample was .92; inter-item reliabilities for the subscales were .88, .84, and .84 for cognitive empathy, affective empathy, and associative empathy, respectively. Higher scores indicate greater state empathy. Test-retest reliability of this scale was reported at .92 (Shen, 2010).

Manipulation Check—To ensure that participants followed the instructional sets for empathic understanding strategies, they were asked to choose one response from a list regarding what action they completed during the study (e.g., “I imagined myself as Jessica,” “I imagined myself as Jessica’s friend,” “I recreated Jessica’s facial expressions,” “I only watched Jessica’s facial expression while I listened.”).

Procedure

Participants completed the study in groups. Upon arrival to the lab, participants were asked to take a seat at a computer station. Each station was equipped with headphones and blocked from the view of the other stations with dividers to allow the participants privacy when evaluating the video. After choosing a seat, the participants were asked to read and respond to the consent form on the computer. Participants were told that the study would be examining how people form first impressions of others. Then, the participants, having been randomly assigned into one of the three groups through the survey software, were asked to follow the link on the screen that took them to the experiment. To begin, participants completed a demographic survey, then a measure of trait empathy (Interpersonal Reactivity Scale). This was followed by a distractor task (YouTube video of animals) to decrease priming effects of the trait empathy measure. During the video, participants were asked to count how many animals they saw during the video. Then, participants were asked to read through the instructions (perspective-taking, facial mimicry, or control) and watch the target

video presentation. Immediately after the video presentation, participants were asked to complete the following questionnaires: Self-Other Overlap, State Empathy Scale, and the manipulation check, in this order. Upon completion, a message appeared asking the participant to sit quietly and wait for the other participants to finish. Participants were then debriefed and thanked for their participation.

Results

Analytic Plan

Descriptive statistics for group differences across conditions can be found in Table 1; correlations can be found in Table 2. To test the first and second hypotheses, the 2 (perspective-taking and mimicry) versus 1 (objective) planned contrast ANCOVAs were conducted to compare the two strategies against the control group on the dependent measures of state empathy and self-other overlap (controlling for trait empathy). The third hypothesis was assessed using regression analyses to test the potential mediation of self-other overlap on the association between instructional sets and state empathy.

State Empathy

As shown in Table 3, the 2 (perspective-taking and mimicry) vs. 1 (control) a priori planned comparison indicated a significant difference in participants' state empathy in the perspective-taking and mimicry conditions versus the control condition (for descriptives, see Table 2). As predicted, participants in the two empathic understanding conditions reported higher state empathy than those in the control condition. To further explore the instructional sets' effect on state empathy, an ANCOVA was conducted, with trait empathy as the covariate. Table 4 shows a significant effect of the covariate and condition for state empathy. Follow-up pairwise comparisons indicated that those who engaged in perspective-taking were significantly higher than those who engaged in both mimicry ($p = .008$) or the control instructional set ($p = .001$) in self-reported state empathy, when controlling for trait empathy.

Self-Other Overlap

As shown in Table 3, a 2 (perspective-taking and mimicry) vs. 1 (control) a priori planned comparison supported the prediction that individuals in the two empathic understanding conditions reported higher self-other overlap than those in the control condition (see Table 4). Additionally, the ANCOVA across conditions, including trait empathy as a covariate, revealed a significant effect of the covariate and of condition for self-other overlap (see Table 4). Finally, post hoc tests indicated that both perspective-taking ($p = .006$) and mimicry ($p = .031$) instructions each resulted in higher reports of self-other overlap than the control group.

Mediating Effect of Self-Other Overlap

To test the mediating effects for both the perspective-taking and mimicry instructions, two mediational analyses were conducted.

Perspective-Taking—Perspective-taking was significantly correlated with both state empathy ($r_{pb} = .62, p = .001$) and self-other overlap ($r_{pb} = .54, p = .004$), and self-other

overlap and state empathy were significantly correlated ($r = .85, p < .001$). The mediational analysis showed that the perspective-taking instruction was a significant predictor for overall state empathy ($\beta = .62, p = .002$). Additionally, this association was mediated by self-other overlap ($\beta = .73, p < .001$). Results from a follow-up Sobel test (1982) indicated that self-other overlap significantly ($t = 2.59, p = .009$) mediated the association between perspective-taking and state empathy (see Figure 1). Interestingly, not only did self-other overlap mediate the association between perspective-taking and empathy, but it was also a unique predictor of state empathy.

Mimicry—Mimicry was not significantly correlated with state empathy ($r_{pb} = .20, p = .168$) but was significantly correlated with self-other overlap ($r_{pb} = .45, p = .012$), and self-other overlap and state empathy were significantly correlated ($r = .73, p < .001$). The mediational analysis showed that the mimicry instruction alone was not a significant predictor for overall state empathy ($\beta = .20, p = .337$). However, this association was mediated by self-other overlap ($\beta = .81, p < .001$). Results from a follow-up Sobel test (1982) indicated that self-other overlap significantly ($t = 2.19, p = .028$) mediated the relationship between mimicry and state empathy (see Figure 2). Like perspective-taking, self-other overlap mediated the relationship between mimicry and was also a unique predictor of state empathy.

Discussion

The current study supports the notion that empathic responding is enhanced when participants actively engaged in the instructional sets of either perspective-taking or facial mimicry. That is, individuals who enacted these strategies while listening to the account of an individual expressing remorse for an interpersonal transgression reported greater state empathy than those who did not receive an instructional strategy. Such findings are consistent with previous research showing that interpersonal understanding and other-oriented cognitions (e.g., Ashton-James, van Baaren, Chartrand, Decety, & Karremans, 2007; Batson et al., 1997; Galinsky et al., 2005; Goldstein et al., 2014) increase under the influence of cognitive directives aimed at placing oneself in the position of another (perspective-taking) or physical re-enactment of another's facial movements (mimicry), and directly replicate the findings of Galinsky et al. (2005). What's more, the enhancement of empathic responsiveness to the target goes beyond an individuals' level of trait empathy. This suggests that individuals may use multiple strategies to make interpersonal connections with others, which can include cognitive elements as well as bodily actions. Such tactics may aid in the interpretation and simulation of the emotions of others (e.g., see Niedenthal, 2007; Wicker et al., 2003).

Furthermore, evidence of the benefits of active empathic understanding strategies extended to perceiving greater overlap between the self and the target. According to the self-expansion theory (Aron et al., 2013), humans are motivated to experience new perspectives in order to acquire self-growth through incorporating others' "perspective and identities" (p. 91). This expansion of self, is gained through an awareness that others have motivations and perspectives that must be discerned – some similar, some unique to the self - for coordinated social interactions to occur and relational bonds to be encouraged (e.g., Cialdini et al., 1997; Galinsky et al., 2005; Neuberg et al., 1997). We found evidence that conscious nonverbal

mimicry might facilitate ways of expanding the self to experience new viewpoints of a given situation (as suggested by Galinsky et al., 2005). Interestingly, in addition to being a significant predictor of state empathy, self-other overlap also mediated the relationship between empathic understanding strategies and state empathy. Alternative forms of empathic understanding such as facial mimicry, thus, may be a means of achieving understanding of another in tandem with cognitive processes like active perspective-taking.

It is important to note that perspective-taking instructions exacted a more overt influence on reported empathy than instructions to mimic the target's facial expressions. However, its association with self-other overlap did afford an empathic benefit to recipients as revealed by the mediational analysis. Facial mimicry presumably initiates a motivation to better comprehend the emotional state of another, and a desire to come to know that person better (Hess & Fischer, 2014). The achievement of empathic concern for that person, however, may only be exerted through a felt rapport with the target, and a recognition that there is mutual convergence of experiences (i.e., an overlap between the selves). It may be that the association between mimicry and empathy only exists if an individual is motivated, intrinsically or extrinsically (Hess, Blaison, & Dandeneau, 2016), to see commonality between themselves and the target. This may be why the predominance of facial mimicry literature utilizes procedures examining spontaneous mimicry rather than experimentally-induced procedures. Dyadic behavioral mirroring of facial and body expression is a fluid process that may be stilted to some degree if the conveyor does not receive a reaction from the target, potentially minimizing the ability to fully achieve empathy when using this type of paradigm.

Although the findings for those who correctly identified their respective instructions are promising, the majority of the participants were not able to identify by the study's conclusion which instructional set they had followed (and attrition was roughly equal across the instructional conditions). Indeed, fewer than 40% answered the manipulation check correctly. Perhaps this finding is revealing to researchers in the field of nonverbal communication. Previous research has demonstrated that attempting to understand both verbal and nonverbal behaviors simultaneously is cognitively taxing and attentionally demanding (e.g., Phillips, Tunstall, & Channon, 2007), and this may be particularly the case when attending to a transgression with important social consequences. This could account for some participants' difficulties in interpreting and completing the instructions. For example, in the perspective-taking condition more than 60 percent of the participants reported that the instructions in the experiment were to *take another's perspective*, however, half took the perspective of the *victim* instead of the target, as was instructed. Despite differences in interpreting or remembering the strategies used to understand the interpersonal interaction, participants who did or did not follow directions had similar levels of trait empathy. This suggests that prior to watching the interpersonal interaction there were no systematic differences in participants' self-reported ability to empathize with others.

These instructions were adapted from prior studies (Batson et al., 1997; Stel et al., 2009). Batson et al. (1997) used a manipulation check much like the one used in this study that asked the participants to identify which action they had completed (perspective-taking: imagine-self, imagine-other, or remain objective). Interestingly, Batson et al.'s participants,

as in the current study, had difficulty differentiating between which perspectives to take. Greater attention to participants' understanding of the perspective-taking instructions seems warranted for future studies. In addition, Stel et al. (2009) used video to record participants' facial expressions to assess the accuracy of their reciprocity with the target's facial expressions. Due to limitations in equipment availability, we could not videotape each participant to check for facial movement synchrony, an important means of determining compliance with the mimicry instructions.

Future directions

We found support for facial mimicry's role in interpersonal understanding. However, the association between facial mimicry and state empathy was only found when self-other overlap was considered. This could account for the inability in another study to detect the effects that mimicry has on one's understanding of another (Blairy et al., 1999). Perhaps there is "sweet spot" for facial mimicry where individuals are truly other-focused rather than self-aware when following the instructions set forth by the investigators. When truly mirroring the facial expressions of the targets in a non-artificial way, individuals may achieve the level of self-other overlap needed to experience heightened empathy for that individual, but this may only occur based on a person's idiosyncratic skills for mimicry and his/her ability to understand and enact the strategy in the experimental setting. Future research should evaluate nuances of facial mimicry instructions that either enhance or detract from their use in research settings.

As previously described, research on perspective-taking and facial mimicry would benefit from improving procedures designed to test their utility and benefits for enhancing mutual empathic understanding. The current research demonstrates the importance of including a manipulation check to assess compliance with and understanding of instructions, but more immediate responding rather than placement at the study's conclusion may be helpful. In other words, it is unclear whether participants did not follow directions, or did not remember which strategy was instructed. Additionally, the wording of the manipulation check should be carefully considered to ensure that it is easily understood by participants. Ideally, updating the instructions would decrease the amount of confusion and thereby increase the sample size.

Finally, future research should seek to expand the current study's findings to both males and more diverse samples. Previous research using perspective-taking and mimicry instructions have included females and males and reported no significant differences between the two (e.g., Shih, Wu, Bucher, & Stotzer, 2009). Therefore, we would expect the current study's findings to generalize to males.

Conclusions

Interpersonal communication plays a vital role in everyday experiences and can be achieved through both verbal and nonverbal communication. While entire fields of study have been devoted to understanding and training individuals on verbal communication (i.e., speech pathology), less research has been devoted to understanding the underlying skills that surround nonverbal communication. The current study sought to address this issue by

identifying two strategies that individuals can use to achieve empathic understanding of another: perspective-taking and facial mimicry. Preliminarily, despite challenges illuminated by the manipulation check, our findings suggest that active inducement of perspective-taking and facial mimicry might have benefits for enhancing empathic bonds with others. What's more, these strategies were beneficial for bolstering empathic responding when a person had behaved badly. Though studies have examined the positive role that empathic understanding strategies play in perceptions of outgroup members, and the fact that its effects generalize to other members of the same group (Shih et al., 2009), we are not aware of the use of these specific strategies in studies that present an outgroup member committing some sort of interpersonal transgression. Additionally, it is important to note that the current study assessed one's empathy toward a transgressor, not actions resulting from this empathy. Amidst a political and cultural climate of high discord between and blaming of outgroups, this study offers a promising direction for future study.

Acknowledgments

Funding: National Institute of Child Health and Human Development (T32-HD07376)

References

- Adelmann PK, Zajonc RB. Facial efference and the experience of emotion. *Annual Review of Psychology*. 1989; 40:249–280. DOI: 10.1146/annurev.ps.40.020189.001341
- Aron, A., Aron, EN., Norman, C. Self-expansion model of motivation and cognition in close relationships and beyond. In: Fletcher, GJO., Clark, MS., editors. *Blackwell Handbook of Social Psychology: Interpersonal Processes*. Malden, MA: Blackwell; 2001. p. 478-501.
- Aron, A., Lewandowski, GW., Jr, Mashek, D., Aron, EN. The self-expansion model of motivation and cognition in close relationships. In: Simpson, JA., Campbell, L., editors. *The Oxford Handbook of Close Relationships*. New York, NY: Oxford University Press; 2013. p. 90-115.
- Ashton-James C, van Baaren RB, Chartrand TL, Decety J, Karremans J. Mimicry and me: The impact of mimicry on self-construal. *Social Cognition*. 2007; 25:518–535. DOI: 10.1521/soco.2007.25.4.518
- Batson CD. Self-other merging and the empathy-altruism hypothesis: Reply to Neuberg et al. (1997). *Journal of Personality and Social Psychology*. 1997; 73:517–52. DOI: 10.1037/0022-3514.73.3.517
- Batson CD, Early S, Salvarani G. Perspective taking: Imagining how another feels versus imagining how you would feel. *Personality and Social Psychology Bulletin*. 1997; 23:751–758. DOI: 10.1177/0146167297237008
- Batson CD, Lishner DA, Carpenter A, Dulin L, Harjusola-Webb S, Stocks EL, Sampat B. "... As you Would have Them Do Unto You": Does Imagining Yourself in the Other's Place Stimulate Moral Action? *Personality and Social Psychology Bulletin*. 2003; 29:1190–1201. DOI: 10.1177/0146167203254600 [PubMed: 15189613]
- Batson CD, Polycarpou MP, Harmon-Jones E, Imhoff HJ, Mitcheener EC, Bednar LL, Highberger L. Empathy and attitudes: Can feeling for a member of a stigmatized group improve feelings toward the group? *Journal of Personality and Social Psychology*. 1997; 72:105–118. DOI: 10.1037/0022-3514.72.1.105 [PubMed: 9008376]
- Batson CD, Sager K, Garst E, Kang M, Rubchinsky K, Dawson K. Is empathy-induced helping due to self-other merging? *Journal of Personality and Social Psychology*. 1997; 73:495–509. DOI: 10.1037/0022-3514.73.3.495
- Bavelas JB, Black A, Lemery CR, Mullett J. 'I show how you feel': Motor mimicry as a communicative act. *Journal of Personality and Social Psychology*. 1986; 50:322–329. DOI: 10.1037/0022-3514.50.2.322

- Blairy S, Herrera P, Hess U. Mimicry and the judgment of emotional facial expressions. *Journal of Nonverbal Behavior*. 1999; 23:5–41. DOI: 10.1023/A:1021370825283
- Carton JS, Kessler EA, Pape CL. Nonverbal decoding skills and relationship well-being in adults. *Journal of Nonverbal Behavior*. 1999; 23:91–100. DOI: 10.1023/A:1021339410262
- Chartrand TL, Bargh JA. The chameleon effect: The perception-behavior link and social interaction. *Journal of Personality and Social Psychology*. 1999; 76:893–910. DOI: 10.1037/0022-3514.76.6.893 [PubMed: 10402679]
- Chen HJ, Yates BT, McGinnies E. Effects of involvement on observers' estimates of consensus, distinctiveness, and consistency. *Personality and Social Psychology Bulletin*. 1988; 14:468–478. DOI: 10.1177/0146167288143005
- Cheung EO, Slotter EB, Gardner WL. Are you feeling what I'm feeling? The role of facial mimicry in facilitating reconnection following social exclusion. *Motivation and Emotion*. 2015; 39:613–630. DOI: 10.1007/s11031-015-9479-9
- Cialdini RB, Brown SL, Lewis BP, Luce C, Neuberg SL. Reinterpreting the empathy-altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology*. 1997; 73:481–494. DOI: 10.1037/0022-3514.73.3.481 [PubMed: 9294898]
- Darwin, C. *The expression of emotions in man and animals*. London, England: Murray; 1872.
- Davis MH. A multidimensional approach to individual difference in empathy. *Journal Supplemental Abstract Service: Catalog of Select Documents in Psychology*. 1980; 10:85–103.
- Davis MH. Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*. 1983; 44:113–126. DOI: 10.1037/0022-3514.44.1.113
- Davis MH, Conklin L, Smith A, Luce C. Effect of perspective-taking on the cognitive representation of persons: A merging of self and other. *Journal of Personality and Social Psychology*. 1996; 70:713–726. DOI: 10.1037/0022-3514.70.4.713 [PubMed: 8636894]
- Davis JR, Gold GJ. An examination of emotional empathy, attributions of stability, and the link between perceived remorse and forgiveness. *Personality and Individual Differences*. 2011; 50:392–397. DOI: 10.1016/j.paid.2010.10.031
- Decety J, Jackson P. A social neuroscience perspective on empathy. *Current Directions in Psychological Science*. 2006; 15:54–58. DOI: 10.1111/j.0963-7214.2006.00406.x
- Decety J, Lamm C. Human empathy through the lens of social neuroscience. *The Scientific World Journal*. 2006; 6:1146–1163. DOI: 10.1100/tsw.2006.221 [PubMed: 16998603]
- Dimberg U, Thunberg M, Elmehed K. Unconscious facial reactions to emotional facial expressions. *Psychological Science*. 2000; 11:86–89. DOI: 10.1111/1467-9280.00221 [PubMed: 11228851]
- Galinsky AD, Ku G, Wang CS. Perspective-taking and self-other overlap: Fostering social bonds and facilitating social coordination. *Group Processes & Intergroup Relations*. 2005; 8:109–124. doi: 10.1177/1268430205051060.
- Galinsky AD, Maddux WW, Gilin D, White JB. Why it pays to get inside the head of your opponent: The differential effects of perspective taking and empathy in negotiations. *Psychological Science*. 2008; 19:378–384. DOI: 10.1111/j.1467-9280.2008.02096.x [PubMed: 18399891]
- Galinsky AD, Moskowitz GB. Perspective-taking: Decreasing stereotype expression, stereotype accessibility, and in-group favoritism. *Journal of Personality and Social Psychology*. 2000; 78:708–724. DOI: 10.1037/0022-3514.78.4.708 [PubMed: 10794375]
- Galinsky AD, Wang CS, Ku G. Perspective-takers behave more stereotypically. *Journal of Personality and Social Psychology*. 2008; 95:404–419. DOI: 10.1037/0022-3514.95.2.404 [PubMed: 18665710]
- Goldstein NJ, Vezich IS, Shapiro JR. Perceived perspective taking: When others walk in our shoes. *Journal of Personality and Social Psychology*. 2014; 106:941–960. DOI: 10.1037/a0036395 [PubMed: 24841098]
- Halberstadt AG, Denham SA, Dunsmore JC. Affective social competence. *Social Development*. 2001; 10:79–119. DOI: 10.1111/1467-9507.00150
- Hess U, Blaison C, Dandreneau S. The impact of rewards on empathic accuracy and emotional mimicry. *Motivation and Emotion*. 2016; 41:107–112. DOI: 10.1007/s11031-016-9590-6

- Hess U, Fischer A. Emotional mimicry: Why and when we mimic emotions. *Social and Personality Psychology Compass*. 2014; 8:45–57. DOI: 10.1111/spc3.12083
- Hess U, Kappas A, McHugo GJ, Lanzetta JT, Kleck RE. The facilitative effect of facial expression on the self-generation of emotion. *International Journal of Psychophysiology*. 1992; 12:251–265. DOI: 10.1016/0167-8760(92)90064-I [PubMed: 1639672]
- Hoffman, ML. *Empathy and moral development: Implications for caring and justice*. Cambridge, U.K.; New York: Cambridge University Press; 2000.
- James W. What is emotion? *Mind*. 1884; 19:188–205.
- Lamm C, Porges EC, Cacioppo JT, Decety J. Perspective taking is associated with specific facial responses during empathy for pain. *Brain Research*. 2008; 1227:153–161. DOI: 10.1016/j.brainres.2008.06.066 [PubMed: 18619426]
- Lipps T. Das wissen von fremden Ichen. *Psychologische untersuchungen*. 1907; 1:694–722.
- McIntosh DN. Facial feedback hypotheses: Evidence, implications, and directions. *Motivation and Emotion*. 1996; 20:121–147. DOI: 10.1007/BF02253868
- Meltzoff AN, Moore MK. Imitation of facial and manual gestures by human neonates. *Science*. 1977; 198:75–78. [PubMed: 17741897]
- Meltzoff AN, Moore MK. Newborn infants imitate adult facial gestures. *Child Development*. 1983; 54:702–709. DOI: 10.2307/1130058 [PubMed: 6851717]
- Meyer ML, Masten CL, Ma Y, Wang C, Shi Z, Eisenberger NI, Han S. Empathy for the social suffering of friends and strangers recruits distinct patterns of brain activation. *Social Cognition and Affective Neuroscience*. 2013; 8:446–454. DOI: 10.1093/scan/nss019
- Myers MW, Hodges SD. The structure of self-other overlaps and its relationship to perspective taking. *Personal Relationships*. 2011; 19:663–679. DOI: 10.1111/j.1475-6811.2011.01382.x
- Myers MW, Laurent SM, Hodges SD. Perspective taking instructions and self-other overlap: Different motives for helping. *Motivation and Emotion*. 2014; 38:224–234. DOI: 10.1007/s11031-013-9377-y
- Neale MA, Bazerman MH. The effects of perspective taking ability under alternate forms of arbitration on the negotiation process. *Industrial and Labor Relations Review*. 1983; 36:378–388. DOI: 10.2307/2523017
- Neuberg SL, Cialdini RB, Brown SL, Luce C, Sagarin BJ. Does empathy lead to anything more than superficial helping? Comment on Batson et al. (1997). *Journal of Personality and Social Psychology*. 1997; 73:510–516. DOI: 10.1037/0022-3514.73.3.510
- Niedenthal PM. Embodying emotion. *Science*. 2007; 316:1002–1005. DOI: 10.1126/science.1136930 [PubMed: 17510358]
- Nowicki S Jr, Duke MP. The association of children's nonverbal decoding abilities with their popularity, locus of control, and academic achievement. *The Journal of Genetic Psychology*. 1992; 153:385–393. DOI: 10.1080/00221325.1992.10753734
- Oberman LM, Winkielman P, Ramachandran VS. Face to face: Blocking facial mimicry can selectively impair recognition of emotional expressions. *Social Neuroscience*. 2007; 2:167–178. DOI: 10.1080/17470910701391943 [PubMed: 18633815]
- O'Brien TB, DeLongis A, Pomaki G, Puterman E, Zwicker A. Couples coping with stress: The role of empathic responding. *European Psychologist*. 2009; 14:18–28. DOI: 10.1027/1016-9040.14.1.18
- Phillips LH, Tunstall M, Channon S. Exploring the role of working memory in dynamic social cue decoding using dual task methodology. *Journal of Nonverbal Behavior*. 2007; 31:137–152. DOI: 10.1007/s10919-007-0026-6
- Ponari M, Conson M, D'Amico NP, Grossi D, Trojano L. Mapping correspondence between facial mimicry and emotion recognition in healthy subjects. *Emotion*. 2012; 12:1398–1403. DOI: 10.1037/a002858 [PubMed: 22642357]
- Rymarczyk K, urawski Ł, Jankowiak-Siuda K, Szatkowska I. Emotional empathy and facial mimicry for static and dynamic facial expressions of fear and disgust. *Frontiers in Psychology*. 2016; 7:1853.doi: 10.3389/fpsyg.2016.01853 [PubMed: 27933022]
- Shen L. On a scale of state empathy during message processing. *Western Journal of Communication*. 2010; 74:504–524. DOI: 10.1080/10570314.2010.512278

- Schneider KG, Hempel RJ, Lynch TR. That “poker face” just might lose you the game! The impact of expressive suppression and mimicry on sensitivity to facial expressions of emotion. *Emotion*. 2013; 13:852–866. DOI: 10.1037/a0032847 [PubMed: 23795586]
- Shih M, Wu E, Bucher AT, Stotzer R. Perspective taking: Reducing prejudice towards general outgroups and specific individuals. *Group Processes & Intergroup Relation*. 2009; 12:565–577. DOI: 10.1177/1368430209337463
- Sobel ME. Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*. 1982; 13:290–312.
- Sonnby-Borgström M. Automatic mimicry reactions as related to differences in emotional empathy. *Scandinavian Journal of Psychology*. 2002; 43:433–443. DOI: 10.1111/1467-9450.00312 [PubMed: 12500783]
- Sonnby-Borgström M, Jönsson P, Svensson O. Emotional empathy as related to mimicry reactions at different levels of information processing. *Journal of Nonverbal behavior*. 2003; 27:3–23. DOI: 10.1023/A:1023608506243
- Stel M, van den Heuvel C, Smeets RC. Facial feedback mechanisms in autistic spectrum disorders. *Journal of Autism and Developmental Disorders*. 2008; 38:1250–1258. DOI: 10.1007/s10803-007-0505-y [PubMed: 18293075]
- Stel M, van Dijk E, Olivier E. You want to know the truth? Then don’t mimic! *Psychological Science*. 2009; 20:693–699. DOI: 10.1111/j.1467-9280.2009.02350.x [PubMed: 19422628]
- Stel M, Vonk R. Mimicry in social interaction: Benefits for mimickers, mimickees, and their interaction. *British Journal of Psychology*. 2010; 101:311–323. DOI: 10.1348/000712609X465424 [PubMed: 19646328]
- Van Boven, L., Loewenstein, G., Dunning, D., Nordgren, LF. Changing places: A dual judgment model of empathy gaps in emotional perspective taking. In: Olson, JM., Zanna, MP., editors. *Advances in experimental social psychology*. Vol. 48. Burlington, MA: Academic Press; 2013. p. 117-171.
- Vigil JM. Asymmetries in the friendship preferences and social styles of men and women. *Human Nature*. 2007; 18:143–161. DOI: 10.1007/s12110-007-9003-3 [PubMed: 26181847]
- Wallbott HG. Recognition of emotion from facial expression via imitation? Some indirect evidence for an old theory. *British Journal of Social Psychology*. 1991; 30:207–219. DOI: 10.1111/j.2044-8309.1991.tb00939.x [PubMed: 1933146]
- Wicker B, Keysers C, Plailly J, Royet JP, Gallese V, Rizzolatti G. Both of us disgusted in my insula: The common neural basis of seeing and feeling disgust. *Neuron*. 2003; 40:655–664. DOI: 10.1016/S0896-6273(03)00679-2 [PubMed: 14642287]

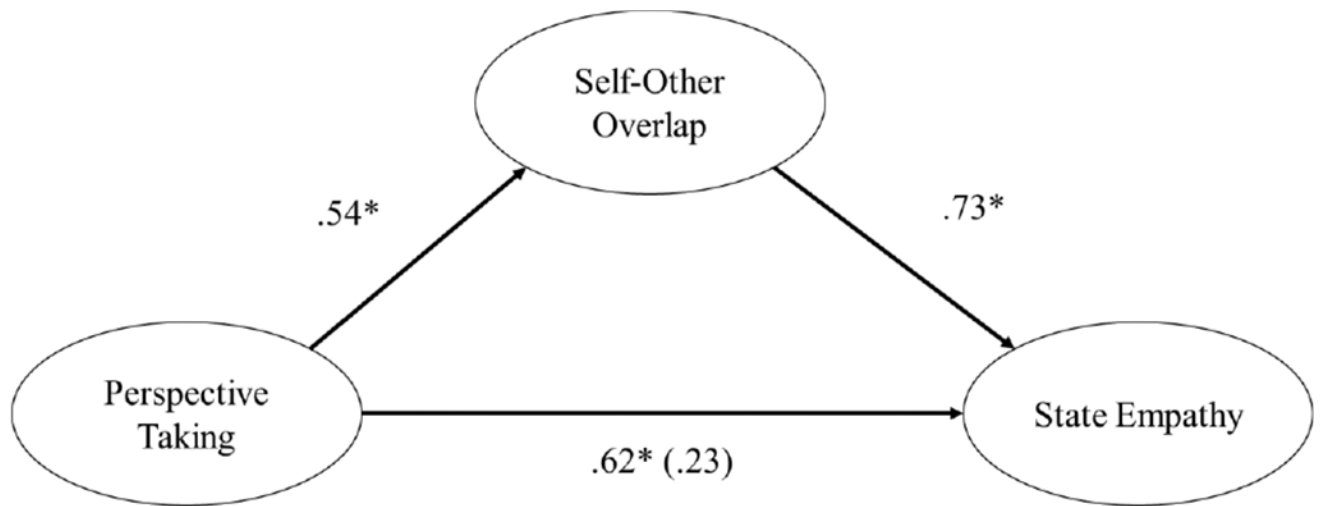


Figure 1. Self-other overlap mediating the relationship between perspective-taking and state empathy. The standardized regression coefficient between empathic understanding strategy usage (perspective-taking vs. control), controlling for self-other overlap is in parentheses. $*p < .05$.

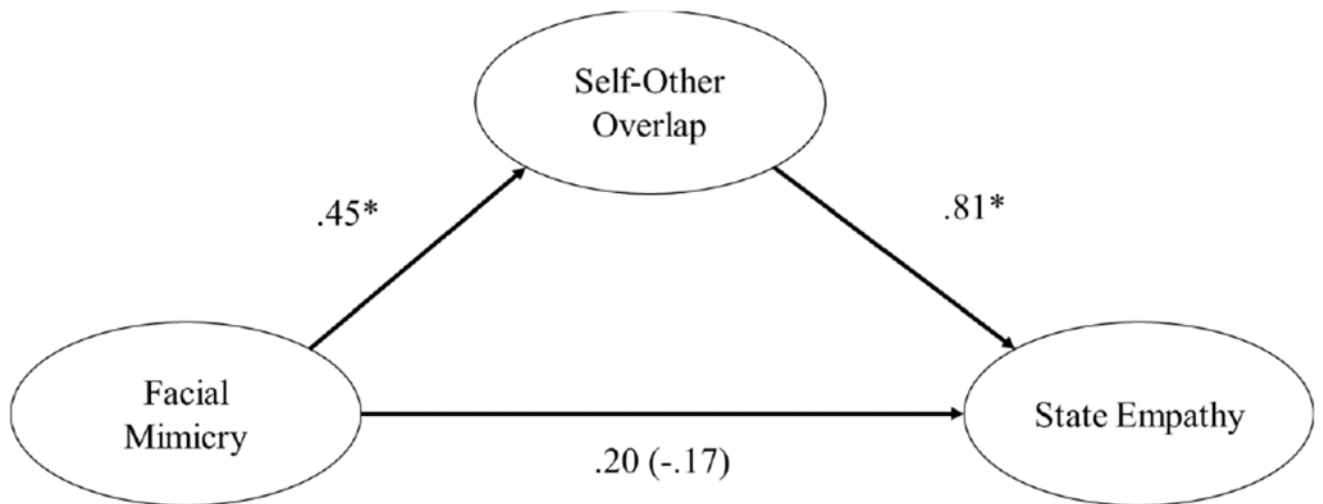


Figure 2. Self-other overlap mediating the relationship between mimicry and state empathy. The standardized regression coefficient between empathic understanding strategy usage (mimicry vs. control), controlling for self-other overlap is in parentheses. $*p < .05$.

Table 1
 Descriptives: Means, Standard Deviations, and Range for Trait Empathy and Dependent Variables

	Perspective-Taking		Mimicry		Control	
	<i>M (SD)</i>	Range	<i>M (SD)</i>	Range	<i>M (SD)</i>	Range
Trait Empathy	3.53 (.39)	3.07–4.18	3.47 (.25)	3.18–4.18	3.43 (.37)	2.57–3.82
State Empathy	3.72 (.76)	2.33–4.75	2.95 (.74)	1.42–4.33	2.67 (.60)	1.83–3.75
Self-Other Overlap	2.92 (.98)	1.33–4.67	2.61 (.78)	1.11–4.00	1.88 (.69)	1.11–2.11

Note. $N=37$

Table 2

Intercorrelations Between Variables, Including Subscales

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Trait Empathy									
2. Fantasy	.78 ^{***}								
3. Perspective-taking	.66 ^{***}	.25							
4. Empathy	.76 ^{***}	.35 [*]	.42 ^{***}						
5. Personal Distress	.30	.18	-.10	.11					
6. State Empathy	.47 ^{***}	.34 [*]	.35 [*]	.39 [*]	.07				
7. Affective	.51 ^{***}	.45 ^{***}	.24	.42 [*]	.13	.86 ^{***}			
8. Cognitive	.37 [*]	.19	.41	.31	-.03	.89 ^{***}	.64 ^{**}		
9. Associative	.36 [*]	.23	.27	.30	.10	.87 ^{***}	.59 ^{***}	.68 ^{***}	
10. Self-Other Overlap	.44 ^{***}	.44 ^{***}	.23	.35 [*]	-.01	.81 ^{***}	.76 ^{***}	.65 ^{***}	.69 ^{***}

Note. N=37;

* $p < .05$,*** $p < .001$

Table 3
 2 (Perspective-Taking and Mimicry) vs. 1(Control) A Priori Planned Comparison ANOVA

	Experimental Groups			<i>t</i>	<i>df</i>	<i>d</i>
	Perspective-Taking	Mimicry	Control			
State Empathy	3.72 (.76)	2.95 (.75)	2.67 (.60)	2.56*	2	.44
Self-Other Overlap	2.92 (.98)	2.61 (.78)	1.89 (.69)	2.96**	2	.51

Note. *N* = 37;

* $p < .05$,

** $p < .01$

Table 4

Analysis of Covariance: State Empathy and Self-Other Overlap Across Conditions (Perspective-Taking, Mimicry, and Control) with Trait Empathy as a Covariate

	MS	F	df	p	partial η^2	α
State Empathy						
Trait Empathy	4.12	10.34	1	.003*	.24	.88
Condition	2.77	6.97	2	.003*	.30	.90
Self-Other Overlap						
Trait Empathy	4.51	7.87	1	.008*	.19	.77
Condition	2.62	4.58	2	.018*	.22	.73

Note. N=37;

* $p < .05$