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The Affiliative Role of Empathy in Everyday Interpersonal Interactions

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Abstract

Empathy theoretically serves an affiliative interpersonal function by satisfying motives for intimacy and union with others. Accordingly, empathy is expected to vary depending on the situation. Inconsistent empirical support for empathy's affiliative role may be because of methodology focused on individual differences in empathy or differences between controlled experimental conditions, which fail to capture its dynamic and interpersonal nature. To address these shortcomings, we used ecological momentary assessment to establish typical patterns of empathy across everyday interactions. Associations among empathy, affect, and interpersonal behaviour of self and interaction partner were examined in a student sample (N = 330), then replicated in a preregistered community sample (N = 279). Multilevel structural equation modelling was used to distinguish individual differences in empathy from interaction-level effects. Results show that people are more empathetic during positively valenced interactions with others perceived as warm and when expressing warmth. By confirming the typically affiliative role of empathy, existing research to the contrary can be best understood as exceptions to the norm.

Keywords

social and personal relationships; social interaction; personality and situations; ecological momentary assessment

INTRODUCTION

Empathy is a form of social cognition that is fundamental for developing and maintaining interpersonal relationships, and navigating everyday interactions (Plutchik, 1987). Although empathy eludes a consensus definition, there is widespread agreement that it involves correlated but distinct cognitive and affective facets (Davis, 1983; Hall & Schwartz, 2018). These facets refer to individual differences in the tendency to consider another's perspective (cognitive empathy) and share another's emotions (affective empathy). However, contemporary theories underscore the dynamic, functional attributes of empathy suggesting

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individuals are more or less motivated to empathize depending on the given situation (Bird & Viding, 2014; de Vignemont & Singer, 2006; Zaki, 2014). Thus, although there are individual differences in average empathy, people also show meaningful, systematic variation in their level of empathy across contexts that is not captured by dispositional measures.

EMPATHY AND AFFECT

Within an interaction, it is generally assumed that one's perception of a target (i.e. the 'other' with whom one is empathizing), empathic and affective responses, and behaviours are all reciprocally influential in producing social outcomes (Back et al., 2011). In addition to differences between people in average empathy, contextual variation is operationalized in terms of target characteristics, as well as its behavioural and emotional antecedents or outcomes. However, a rapidly growing literature in this area has generated conflicting results. Empathy tends to be associated with greater emotional satisfaction in relationships and more positive affect in general (Davis & Oathout, 1987; Devlin, Zaki, Ong, & Gruber, 2014). Yet, resonating with the suffering of another can cause distress (Leith & Baumeister, 1998), predict poorer relationship outcomes (Gottman, Gottman, Greendorfer, & Wahbe, 2014), and trait empathy is associated with neuroticism (Eysenck & McGurk, 1980; Mooradian, Davis, & Matzler, 2011; Sheldon, 1996). Some research finds that positive *and* negative affect at sufficiently high levels of arousal will increase empathy (Nezlek, Feist, Wilson, & Plesko, 2001), whereas others suggest that emotional arousal depletes cognitive-affective resources and will therefore decrease empathy (Nelson, Klein, & Irvin, 2003)

EMPATHY AND INTERPERSONAL BEHAVIOUR

The social functions of empathy may be an even more important factor than affect. To the extent interpersonal behaviour is goal-directed (Horowitz et al., 2006), research showing associations between empathy and interpersonal behaviour reveals an individual's motives within an interaction. Consistent pairing of empathy and motives, in turn, is suggestive of its interpersonal function. A substantial literature has linked superordinate motives for affiliation (i.e. strivings for intimacy, union, and solidarity with others) and agency (i.e. strivings for power, mastery, and differentiation from others) with two, broad dimensions of warm (to cold) and dominant (to submissive) interpersonal behaviour, respectively (Bakan, 1966; Grosse-Holtforth, Thomas, & Caspar, 2011; Wiggins, 1991). These behavioural and motivational dimensions are not isomorphic; however, their tight interrelationship is useful for interpreting general patterns

One of the most consistent findings is that empathy is linked to affiliative motives resulting in an array of warm, prosocial behaviours (e.g. altruism, cooperation, trust, and support; Batson, 1991; de Wall, 2008; Devoldre, Davis, Verhofstadt, & Buysse, 2010; Eisenberg & Miller, 1987; Klimecki, Mayer, Justye, Scheeff, & Schonenberg, 2016; Verhofstadt et al., 2016). However, the emotional cost of empathizing can lead to interpersonal distance (Cameron, Harris, & Payne, 2016; Hodges & Klein, 2001; Singer & Klimecki, 2014), and individuals are less likely to empathize with outgroup members (Eisenberg & Miller, 1987;

Hoffman, 2000). Empathy may also serve agentic functions such as when used to manipulate others and to achieve self-serving goals (Batson & Shaw, 1991; Harpending & Sobus, 1987; Smith, 2006). Individuals attenuate empathy if it would interfere with competition (Cikara, Bruneau, Van Bavel, & Saxe, 2014), but it has also been found that individuals are motivated to understand more powerful others to gain status (Anderson & Keltner, 2002).

MATCHING METHOD TO CONSTRUCT

In sum, empathy is associated with positive *and* negative affect as well as affiliative *and* agentic motives. These mixed findings are due in part to the complexity of the construct, but may also be the product of methodological limitations. The influence of context on empathic behaviour and feelings is often examined experimentally. Work comparing group differences in empathy between a small number of highly controlled situations can only indirectly support models of typical empathic processes. Some research has balanced experimental control with ecological validity using observational studies of empathic behaviour between strangers or real-life romantic couples to yield insight into how empathic accuracy differs across contexts (Blanke, Rauers & Riediger, 2015; Hinnekens, Vanhee, De Schryver, Ickes, & Verhofstadt, 2016; Simpson, Orina, & Ickes, 2003). Although accuracy ratings and overt behaviours provide a valuable vantage point, an individual's subjective *perception* of the situation and their empathic responses are key components that cannot be directly observed (Zaki & Ochsner, 2011). Additionally, the types of situations individuals tend to self-select into affects how often they are motivated to empathize; thus, the distribution of situations individuals naturally encounter from day-to-day is an inherent part of empathy's role in interpersonal functioning. Observable behaviour as well as the perspective of the empathizer and influence of self-selection into situations is necessary for a comprehensive understanding of how empathy impacts the formation and quality of personal relationships.

A small number of studies have used ecological momentary assessment (EMA) to overcome these shortcomings by examining patterns of within-person fluctuations of empathy across daily life contexts. In one dyadic EMA study of romantic partners, it was found that the effect of a target's physical presence on empathic accuracy depends on the perceiver's age (Rauers, Blanke, & Riediger, 2013). This research shows that empathic accuracy varies outside of the laboratory, but it does not account for subjective perceptions of the situation and empathic responses in these processes. Two EMA studies that did evaluate subjective appraisals found that the level of empathy reported at the end of the day is related to the number of positive social events recalled during the same day (Nezlek et al., 2001; Nezlek, Schütz, Lopes, & Smith, 2007), but this method could not directly link empathy to a given situation. The few other existing EMA studies have focused on associations between empathy and affect to the exclusion of interpersonal context (Gilchrist, Conroy, Pincus, & Ram, 2019; Roche, Jacobson, & Pincus, 2016; Toomey & Rudolph, 2018).

This emphasis on affect is in line with an overall disproportionate empirical focus on *intra*personal processes (e.g. empathy as emotion regulation or identifying neurobiological correlates) that has led some to urge greater attention to the fundamentally *inter*personal aspects of empathy (Anderson & Keltner, 2002; Main, Walle, Kho, & Halpern, 2017; Zaki & Williams, 2013). Indeed, although empathy certainly involves intrapersonal operations, it

is ultimately enacted within interpersonal interactions. Despite the theoretical importance of understanding how empathic processes unfold outside of the lab in real interactions across the topography of social relationships, this has gone relatively unexamined.

CURRENT STUDY

In this study, we sought to more closely match method with construct in order to clarify inconsistencies in the existing empathy research. To accomplish this, we characterized typical patterns of empathy in everyday interpersonal interactions. EMA was used to examine relationships between interpersonal perception, behaviour, affect, and empathy across 17 814 interactions in two samples. Exploratory analyses were conducted in a student sample, then followed with a preregistered replication in a community sample. In addition to measuring cognitive and affective empathy, affect (positive and negative) and self and other interpersonal behaviour (operationalized using dimensions of warmth vs coldness and dominance vs submissiveness) were rated during each interaction. Multilevel structural equation modelling (MSEM) was used to distinguish the effects of individual differences in empathy from interaction-level effects. This enabled us to evaluate the extent to which the perceptual, behavioural, and affective features of interpersonal interactions associate with empathy in daily life, providing insight into situations characteristic of greater empathy.

Theoretically, empathy primarily facilitates social affiliation, but many studies suggest it serves other functions. We aimed to clarify empathy's generally affiliative role by measuring it with ecologically valid methodology. Our principal hypothesis was that empathy will tend to be elevated during interactions in which others are perceived as warm, when responding with warmth, and when experiencing more positive affect than usual. To investigate individual differences in empathic processes, exploratory analyses were also conducted to evaluate relationships between a person's average level of empathy, affect, interpersonal behaviour, and perception with situation-level associations.

METHODS

Two samples with nearly identical protocols were used for this study. Analyses conducted in a student sample were then preregistered and replicated in a community sample. Nearly direct replication in distinct samples enabled greater confidence in the reliability and generalizability of our results, which is important for establishing a foundational claim such as the normative interpersonal trends in empathy. The preregistration document can be found on the Open Science Framework (https://osf.io/pc2xg/) along with all data used for our analyses and other supporting information.

Both datasets were intended to serve as resources that can be interrogated to answer many questions expected to range in effect size rather than to test any specific effect. It was anticipated that most analyses would be based on covariance/correlation matrices (e.g. structural equation modelling and multilevel modelling). Accordingly, sample size selection was most strongly influenced by a desire to arrive at stable estimates of effects, as opposed to having the power to detect any specific effect size in the population, as well as a desire to be able to detect small effects that are consistent with the average effect in

the published personality and social psychological literature. Recent work has suggested that correlation estimates of this size begin to stabilize (+.10 or −.10 with probability = .80) when sample sizes approach $N = 250$ (Schönbrodt & Perugini, 2013). Therefore, for our most conservative tests, which would be between-person associations given the hierarchical structure of the data (observations and days nested within persons), we sought a minimum sample size of $N = 250$. However, given that not all participants that complete baseline procedures also adequately participate in the ambulatory assessment protocols, we over-sampled with a target of $N > 300$.

PARTICIPANTS

Student sample

Undergraduate students ($N = 330$) from introductory psychology courses at the University of Pittsburgh were recruited for the initial, exploratory sample. To increase the statistical reliability of our EMA measurements, participants with fewer than 10 reported interactions were excluded (i.e. our preregistered threshold of minimum observations per person needed to obtain reliable estimates of each individual's interaction patterns; $n = 36$).[1] Because we included gender as a covariate in every model, we had to exclude two individuals who identified their gender as nonbinary as we could not statistically account for a category that small. As a result, the final sample size was 292. The sample was mostly Caucasian (86%) and majority were female (62%), with a mean age of 18 ($SD = 0.96$). Participants received course credit for completing the baseline questionnaires and EMA protocol. Full credit was awarded to individuals who completed 60% or more of surveys.

Community sample

Community members ($N = 342$) were recruited through posted flyers and online postings for a study of personality and daily life. Because of administrative oversight, the empathy items were not added until 13 days into the study. After excluding participants that did not receive these items ($n = 29$), those with fewer than 10 reported interactions ($n = 34$), and individuals who identified their gender as non-binary, the final sample size was 277. The sample was mostly Caucasian (89%) and balanced on gender (female = 52%), with a mean age of 27 ($SD = 4.9$). For inclusion, participants had to be between 18 and 40 years of age. This age restriction was informed by the parent study's aim of studying narcissism. Given the normative developmental trend of increasing trait agreeableness (i.e. decreasing narcissism-related traits; Roberts & Mroczek, 2008) after age 40, this age range was selected to ensure the sample was enriched with personality traits of interest. Participants also had to be users of a smartphone running iOS or Android software. To recruit a distinct community sample, individuals were not eligible if they were enrolled in a full-time undergraduate programme. Participants who complete baseline questionnaires were entered into prize drawings for $75 Amazon gift cards. Participants could then elect to participate in the EMA portion of the study following the baseline questionnaires. If participants completed 90% or greater of the total surveys administered during the study period, they received $100 an Amazon gift card.

[1]Results from analyses repeated with all participants were nearly identical to analyses excluding participants with fewer than 10 reported interactions. These results can be found in Data S1.

Gift cards of prorated value (e.g. $75 was given for 75% participation) were given to those who completed less than 90% of surveys.

All community participants were prescreened to ensure a gender-balanced sample as well as adequate representation of personality traits of interest for the larger study of narcissism. Namely, modesty was assessed in the prescreen using the NEO Personality Inventory-Revised (Costa, 1992). Low modesty, a core feature of narcissism, was oversampled such that a 2:1:1 ratio of low, moderate, and high levels of modesty within each gender was recruited.

Procedure

In both samples, participants completed baseline questionnaires and a 10-day EMA protocol. Study orientation and participation were conducted entirely online without direct contact with study staff. Baseline questionnaires included a demographic questionnaire and a battery of assessments related to psychological and interpersonal functioning and personality as part of a larger project. None of these assessments were used in the current study, so it will not be described further.

When participants were elected into the EMA protocol following the baseline questionnaires, they viewed a video training presentation explaining the EMA procedures and instructions for downloading the MetricWire smartphone application. A short comprehension quiz was given following the training to check for understanding. Failure to show adequate comprehension leads to exclusion from further participation. In the student sample, 91 individuals were excluded because of failing the comprehension quiz, and 148 were excluded from the community sample. Note that these individuals were not counted in the final sample sizes reported above, so all 277 community participants and 292 students completed the EMA protocol. In post-hoc analyses, we examined whether the excluded individuals were significantly different from the included participants on a range of demographic and personality variables available in the baseline assessments. These results are available in Data S1. Participants who failed the quiz in the community sample were less likely to have completed higher education (years of education: $\chi^2[3, 148] = 14.83$, $p = .002$; highest degree completed: $\chi^2 [3, 148] = 11.85$, $p = .001$) than those that passed, and those who failed the quiz in the student sample were higher in trait disinhibition than participants who passed ($t[119.3] = -3.01$, $p = .003$) Participants in the community sample that failed the quiz were also slightly higher in trait detachment ($t[266.25] = -2.01$, $p = .045$). However, after correcting for multiple comparisons, only years of education and highest degree completed were significantly different between groups.

The EMA protocol began within a few days of the baseline questionnaires. Surveys were delivered on a randomly initiated schedule between 9:00 AM and 9 PM, with a minimum of 90 minutes between surveys. Participants in the student sample received five surveys per day, and those in the community sample received seven surveys per day. This sampling schedule was chosen to balance maximizing the amount of data gathered over the course of a day with participant burden. Out of the 10 intended assessment days, participants completed EMA surveys for 8.5 days on average in the student sample and 8.7 in the community sample. The average number of surveys completed per day across all participants (i.e.

including those with fewer than 10 interactions) was 4.1 in the student sample and 6.1 in the community sample for compliance rates of 82% and 86%, respectively. A total of 7636 interactions were reported in the student sample, and 10 174 interactions were reported in the community sample.

Push notifications alerted participants to answer each survey, which were then completed using the MetricWire smartphone application. Participants could answer each survey for up to 30 minutes after the initial push notification. After completing a set of items administered with every EMA survey regarding current feelings and thoughts, participants were asked if a social interaction had occurred since the last survey. Social interactions were defined as real-time, direct conversations between the participant and one or more other individuals that lasted for at least 5 minutes. This could include in-person, voice, video, and text-based conversations. If participants indicated an interaction occurred, they were instructed to report on behaviour of one interactant along with features of the situation. If participants indicated an interaction did not occur, they answered a different set of questions. Only data reported from the interaction condition will be used in this study.

Measures

Empathy—Empathy was measured using two items corresponding to cognitive empathy (‘I considered what the person I interacted with was thinking’ and ‘I considered what the person I interacted with was feeling’) and one item corresponding to affective empathy (‘When the person I interacted with showed emotions, I felt their emotions inside of me’). Each item was rated on a slider scale from 0 (*not at all*) to 100 (*extremely*). The means of the three items were used in this study.

There are currently no established measures of momentary empathy, and we find that using an instrument validated for trait empathy to assess state empathy fails to appreciate the differences between trait and state constructs. Thus, given the lack of precedence or available instruments, our aim in developing the momentary empathy items was to use common language that reflects how empathy is experienced in the moment. In a student sample collected after the samples used in this study, we administered the Toronto Empathy Questionnaire (Spreng, McKinnon, Mar, & Levine, 2009), a cross-sectional measure of trait cognitive and affective empathy, at baseline to compare with the same three-item EMA empathy ratings. In that sample, participant’s average momentary empathy was significantly correlated with their Toronto Empathy Questionnaire score ($r = .28$, $p < .001$). To contextualize this effect size, the correlation between state and trait empathy is comparable with other cross-method, cross-construct associations in the same the sample such as average momentary negative affect and baseline depression ($r = .26$, $p < .001$) or anxiety ($r = .26$, $p < .001$) measured by the Depression Anxiety Stress Scales (Lovibond & Lovibond, 1995).

In addition to showing preliminary validity, this scale had good reliability in both samples used in this study (student sample; community sample): $\omega_{\text{within-person}} = .85; .81$; $\omega_{\text{between-person}} = .88; .88$.

Interpersonal behaviour—Participants rated their own behaviour and the behaviour of their interaction partner in terms of dominance or warmth. Ratings were made using 101-point slider scales. The dominance scale was a single item with the anchors 'Accommodating/Submissive/Timid' on one end and 'Assertive/Dominant/Controlling' on the other end. The single-item warmth scale ranged from 'Cold/Distant/Hostile' to 'Warm/Friendly/Caring'. These items were developed to reflect day-to-day behavioural manifestations of affiliative and agentic motives described by interpersonal theory (Kiesler, 1996; Wiggins, 1991) and have shown good construct validity in several samples (Woods et al., 2020).

Affect—Participants also rated the degree to which they felt three positive emotions and three negative emotions derived from the Positive and Negative Affect Schedule (Watson, Clark & Tellegen, 1988). Items were reworded in the EMA surveys to read 'How ADJECTIVE did you feel during the interaction?' Ratings were made on a slider scale from 0 (*not at all*) to 100 (*extremely*) for each adjective. Happy, excited, and relaxed were adjectives used for positive affect (ωwithin-person = .78; .80; ωbetween-person = .87; .84). Nervous, sad, and angry were adjectives used for negative affect (ωwithin-person = .70; .68; ωbetween-person = .94; .91).

Analytic plan

Because of the hierarchical structure of the data (i.e. interactions nested within people), MSEM was used to test the study hypotheses. Total variance in all of the observed variables were decomposed into within-person and between-person latent variables using latent decomposition. This provides an estimate of an individual's average for each observed variable at the between-person level (i.e. random intercepts), and within-person variance reflects the variable's deviation from an individual's average during a given interaction. In MSEM, complex path models including multiple predictors and outcomes can be estimated, along with random effects that allow intercepts and slopes to vary across individuals (Sadikaj, Wright, Dunkley, Zuroff, & Moskowitz, in press). In this study, MSEM was used to model associations among individual differences in empathy, interpersonal behaviour, and affect at the between-person level and associations among these same variables during each interaction at the within-person level.

Figure 1 depicts the models used in this study. At the between-person level, perception and behaviour were regressed on empathy and affect, which were allowed to correlate. Given the aim of the current investigation, adjusting for the correlation between empathy and affect permitted evaluation of uniquely interpersonal associations with empathy (i.e. adjusting for covariation with affect). This portion of the model is comparable with what is measured in cross-sectional studies, and represents the association between how empathic a person tends to be with how they typically behave and perceive others as behaving during interactions.

At the within-person level, a basic interaction process was modelled in which perceived behaviour of the other is associated with affect and empathy, each of which is independently associated with interpersonal behaviour. Our modelling approach was guided by our goal to provide the most conservative estimate of associations with empathy with interpersonal

behaviours by adjusting for other situational factors (i.e. perceived behaviour of the other and affect) expected to relate to both empathy and interpersonal behaviour. Because all variables were measured contemporaneously and it is assumed that perception, empathy, affect, and behaviour are reciprocally influential within an interaction, our goal was not to model causality or the temporal ordering of the variables. Instead, the paths included in the models reflect this study's emphasis on evaluating the unique effects of empathy on interpersonal behaviour.

All regression paths were estimated as random slopes, which account for individual differences in the strength of association between variables across interactions. The fixed effects of these slopes represent the average effect, and at the between-person level, random effects can be understood as a between-person variable that represents individual differences in the extent to which those situational features typically co-occur across participants.

Four models were estimated with empathy along with permutations of interpersonal behaviour, perception, and affect. Determination of which interpersonal behaviour variables to include in each model were informed by interpersonal theory, which predicts that, on average, interactions involve complementarity on dimensions of affiliation and agency, but not across dimensions (Sadler, Ethier, & Woody, 2011). For this reason, models examine associations between warmth of self and other or between dominance of self and other, along with either negative or positive affect, and empathy.

In the student sample, we examined whether there were substantial differences in associations with cognitive versus affective empathy. All analyses were run with either cognitive empathy (indexed as the mean of the two corresponding items) or affective empathy (single item). These results can be found in Data S1. Results from both models were nearly identical to one another at the within-person level. There were some notable differences at the between-person level, consistent with previous cross-sectional work. However, the focus of this study is on within-person associations, so we chose to use total empathy in our analysis for purposes of construct coverage and measurement reliability.

Random slopes and intercepts were adjusted for the effect of age and gender at the between-person level. The age variable was centred on the sample mean, and gender was effects coded with −1 representing female and 1 representing male. Additionally, to account for differences in patterns of behaviour and affect on the weekend versus weekdays, within-person variables were adjusted for the day of week an interaction occurred on. Day of week was coded as a binary variable with zero representing weekdays and one representing weekends. To account potential anchoring or fatigue effects, time in study was also included as a covariate of all interaction-level variables. Time in study was indexed by average hours spent in study (24 hours × 10 days) and centred at the mid-point of the study. Thus, the random intercept estimate reflected the average level of the interaction-level variables for each individual on weekdays.

RESULTS

Descriptive statistics are shown in Table 1, and bivariate correlations are in Table 2. Intraclass correlations (ICCs) are also presented in Table 1 indicating the proportion of between-person variance in each observed variable. Taking 1.0 minus the ICC for a variable provides the within-person variance. Put another way, ICCs estimate the amount of trait variance and can be used to estimate the amount of state variance a construct has. Empathy had approximately equal between-person and within-person variance. To put this figure in perspective, ICCs for empathy were most comparable with negative affect, whereas positive affect, interpersonal behaviour, and interpersonal perception had slightly more within-person variability than empathy on average. Effects reported below have 95% credibility intervals that do not contain zero unless stated otherwise.

Preregistered analyses

Results for the primary analysis in the exploratory student sample and confirmatory community sample are presented in Table 3. There were few major discrepancies in results across samples, with ~73% of the standardized effects differing between .00 and .06. Of those effects that differed over .06, all were at the between-person level. This indicates that there was some variability in individual differences between samples, but the situation-level effects were remarkably consistent. Furthermore, despite these effect size differences, the overall pattern of between-person associations was commensurate between samples. Thus, results from both samples will be considered simultaneously.

In the first model, associations between perceived warmth, positive affect, empathy, and warm behaviour were examined. At the within-person level, all fixed effects were positive. After adjusting for the effect of perceived warmth on positive affect, perceived warmth was independently associated with greater empathy. Greater empathy was associated with behaving more warmly, over and above the effect of perceived warmth and positive affect. All random effects were significant, indicating that individuals differed in the strength of these associations (see Data S1 for complete results including variances). All regression paths and estimated correlations at the between-person level were also positive. Higher average empathy was associated with perceiving more warmth and behaving more warmly on average after accounting for covariation between empathy and positive affect. Higher average positive affect was also associated with perceiving more warmth and behaving more warmly on average.

The second model examined associations between perceived warmth, empathy, and warm behaviour, but included negative instead of positive affect. In terms of the fixed effects, perceived warmth was negatively associated with negative affect at the within-person level. Negative affect, in turn, was negatively associated with behaving warmly. There was no clear relationship between negative affect and empathy, as the credibility interval for this path estimate included zero. As with the warmth/positive affect model, all random effects were significant. Compared with warmth/positive affect model, associations between empathy and warmth of self and other were larger in the warmth/negative affect model because shared variance with positive affect was not adjusted for, but they were interpretively identical. At the between-person level, higher average negative affect was associated with perceiving less

warmth and behaving less warmly on average. Average empathy was positively correlated with average negative affect in the community sample (r = .16), but was uncorrelated in the student sample (i.e. credibility interval for the estimate included zero).

Next, perceived dominance and dominant behaviour were examined as parts of these same processes. In the dominance/positive affect model, at the within-person level, the fixed effect for the association of perceived dominance with experiencing positive affect was negative, but perceived dominance was not associated with empathy. In exploratory analyses, we tested whether there were curvilinear associations between perceived dominance and empathy, but these effects were not significant. These results are available in Data S1. Only perceived dominance was consistently associated with behaving dominantly. At the between-person level, there were few clear relationships between any of the variables as credibility intervals for most regression paths contained zero. The only exceptions were the positive association between average dominance and positive affect, positive correlation between average perceived dominance and dominant behaviour, and the previously noted correlation between empathy and positive affect.

In the final model, associations between perceived dominance, dominant behaviour, and negative affect were examined. Consistent with other within-person models in this study, the fixed effect for empathy's association with negative affect was negative, but empathy was not significantly related to acting dominantly. Unlike in the warmth/negative affect model, perceived dominance was modestly negatively associated with empathy. Exploratory analyses showed that there was also a curvilinear association with empathy suggesting that individuals report more empathy when the target is perceived as submissive and become increasingly less empathetic the more dominant the other is. Because both the linear and curvilinear associations became nonsignificant when shared variance between empathy and positive affect is accounted for (i.e. in dominance/positive affect model), it appears that these small effects are not unique to empathy. Empathy was slightly positively associated with acting dominantly in the student sample, but not in the community sample. Negative affect was positively associated with dominance in the community sample, but was nonsignificant in the student sample. Similar to the dominance/positive affect model, there were few clear associations at the between-person level except for the previously noted correlations between negative affect and empathy in the community sample.

Overall, during interactions with others perceived as warmer than average, individuals were more empathetic than their usual. When individuals experienced more positive affect than their usual during an interaction, they also tended to be more empathetic. During interactions that individuals were more empathetic, they tended to express more warmth than is typical for them. Interacting with others perceived as more or less dominant than average was not associated with empathy, and empathy was not associated with dominant behaviour, on average. The amount of negative affect experienced during an interaction was also not consistently related to being more or less empathic.

Individuals who were more empathic on average tend to perceive more warmth in others, behave more warmly, and experience more overall positive affect across interactions. In the community sample, but not the student sample, more empathetic individuals also

experienced more overall negative affect. How empathetic an individual tends to be was not clearly related to perceiving dominance or behaving dominantly across interactions.

EXPLORATORY ANALYSES

At the request of reviewers, we conducted exploratory analyses to probe the relationship between an individual's disposition and features of the social situation. To model this, we examined associations between an individual's average levels of empathy, affect, and interpersonal behaviour (i.e. random intercepts) and the average strength of the association between situational variables across interactions (i.e. the random slopes for empathy, affect, and interpersonal behaviour of self and other). A diagram of these models can be found in Data S1.

Because of the exploratory nature of these analyses, we estimated a single model for each sample including every interpersonal behaviour and affect variables along with empathy. This allowed us to evaluate all possible combinations of intercept and slope correlations included in the main analyses. The within-person models were setup like the preregistered models with perceived behaviour (warmth and dominance) predicting affect (positive and negative), empathy, and self-behaviours (warmth and dominance). Empathy was also regressed on affect (positive and negative). Finally, self-behaviours (warmth and dominance) were regressed on affect and empathy. Associations between positive and negative affect, perceived warmth and dominance, and warm and dominant behaviour were not specified in the preregistered models because they were not central to the aims of this study; thus, we did not estimate them as random slopes in the exploratory models. Models allowing all of these variables to correlate did not converge. This is because estimating 26 random effects and over a hundred variances and covariances at the between-person level is quite difficult. However, we were able to include the correlation between dominant and warm behaviour residual variances.

Like with the main analyses, within-person variables were adjusted for the effect of weekday and time of study. At the between-person level, each of the random slopes was correlated with the random intercepts for each of the interpersonal variables (i.e. empathy, affect, and behaviour). Age and gender were included as covariates, just as in the preregistered models.

To preserve the focus of this study, and given the large number of results, we only report parameter estimates including empathy as an individual difference or as part of an interaction-level process. Full results are available in Data S1. In addition to examining correlations among random effects, these analyses enabled us to compare results from the preregistered models with these even more conservative, exploratory models with effects adjusted for all interaction variables. The pattern of associations was essentially unchanged with the additional covariates. The only exception was that instead of empathy being negatively or nonsignificantly associated with negative affect at the within-person level, empathy was slightly positively associated with negative affect in the exploratory models (βs = .08 in the student sample and .12 in the community sample). Considering the negative within-person correlation between negative and positive affect (see Table 2) and given empathy's strong association with positive affect was practically unchanged when

accounting for negative affect (βs = .34 in both samples), it appears that positive affect is driving these effects.

Turning to random intercept and slope associations (shown in Table 4), three of the significant correlations replicated across samples. The more dominant behaviour individuals reported on average, the stronger was the association between momentary self-reported empathy and more pronounced dominant behaviour. Additionally, individuals who reported more positive affect on average tended to report a stronger association between momentary empathy and positive affect. To reduce the likelihood of Type I errors because of the number of exploratory associations tested, we did not interpret nonreplicated effects but present them for completeness. Figures comparing the dominance/empathy slopes at different levels of dominance and positive affect/empathy slopes at different levels of positive affect can be found in Data S1.

DISCUSSION

Empathy theoretically serves to facilitate affiliation, yet a growing literature implicates it in a number of nonaffiliative processes. One reason for these discrepancies is dependence on methodology focused on differences between persons or between situations with limited ecological validity that fail to capture empathy's dynamic and interpersonal nature. This study resolves these inconsistencies by more closely matching method to construct and substantiates empathy's fundamentally affiliative role in everyday life.

Role of empathy in affiliation

Most research on empathy has relied on cross-sectional and experimental methods that are not designed to identify the normative, cross-situational patterns needed to establish empathy's primary function. In this study, we found a robust pattern across hundreds of people, and thousands of interactions that unambiguously show more empathy is typically reported in interpersonal situations perceived as warm and positively valenced. Our findings do not undermine existing research; rather, they help reconcile discrepancies and clarify how to interpret results from this burgeoning body of work. The pattern we found suggests that instances of empathy causing distress or being used to manipulate others, for instance, are best understood as exceptions to the norm or byproducts of its central function.

In this study, we also explicated the interpersonal processes by which empathy may impact social relationships and emotional well-being. When interpersonal motives are satisfied in an interaction, the individual experiences positive affect (Sullivan, 1953). Our study shows that empathy is not only implicated in interactions motivated by a desire for affiliation (i.e. situations in which more warmth of self and other are perceived), it is involved in interactions, which are perceived to *satisfy* that motive. In contrast, empathy was not generally associated with agentic motives (i.e. dominant behaviour) or frustrated needs (i.e. negative affect). We also found that warmer individuals tend to interact with others perceived as warm and more dominant individuals tend to interact with others perceived as dominant, which could be indicative of situation selection processes that play into empathy's role in affiliation. That is, individuals may differ in the extent to which they are motivated to seek out affiliative interactions (i.e. interactions that satisfy needs for intimacy or union) in the

first place, thereby differing in how much empathy is needed to fulfil their interpersonal needs. By measuring these processes across diverse daily interactions, our results are consistent with theoretical accounts that emphasize the adaptive, affiliative function of empathy and help enrich interpretation of previous cross-sectional and experimental work that has shown that empathy predicts prosocial behaviour and relationship satisfaction.

Although there was a clear relationship between empathy and affiliative interactions across all individuals, there was meaningful variance in these associations indicating differences between people in empathic processes. That is, people vary in the degree to which perceived warmth elicits empathy, and the degree to which being empathetic leads to behaving warmly. Likewise, even though there were no significant average effects, some individuals tend to respond to perceived dominance with shifts in empathy and behave in a more or less dominant manner when they report being empathic. This implies variance between individuals in the interpersonal motives underlying empathy, and variance in the extent to which empathy is linked to satisfying those motives (i.e. their affective state).

Linking traits to outcomes with empathic processes

Characteristic interpersonal patterns give rise to dispositional differences between people. Investigating moment-to-moment processes that link dispositions to social outcomes can be used to move beyond description towards developing explanatory models of individual differences in empathic motives, functions, and phenomenology (Back et al., 2011; Bowers, 1973; Hopwood, Pincus, & Wright, 2019). Our exploratory analyses provide some insight into this complex interplay between interpersonal traits (i.e. an individual's average level of a given variable) and the situational features that tend to elicit shifts in empathy, behaviour, and affect. We found that although on average, empathy is unrelated to dominant behaviour, more dominant individuals tend to report behaving more dominantly when they report being more empathetic. Similarly, individuals who typically perceive more dominance in others also report behaving more dominantly when they report being more empathetic. Additionally, although most people report more empathy during positively valenced interactions, this association is intensified for individuals who tend to experience more positive affect on average. Each of these findings suggests that empathy is expressed and experienced in a trait-consistent manner. Our exploratory results extend previous work aiming to explain how personality affects life outcomes by identifying situational contingencies that provoke trait-relevant behaviour (Bem & Allen, 1974; Fleeson, 2007; Funder, 2001; Snyder & Cantor, 1998; Wilt, Noftle, Fleeson, & Spain, 2012). We show that empathy may be an important variable for understanding personality processes; if it indeed plays a central role in satisfying affiliative motives, variations in empathy will figure prominently into individual differences in social functioning.

For instance, trait agreeableness is related to high trait empathy and prosocial behaviour (Mooradian et al., 2011). Is this because highly agreeable individuals are warmer and more empathetic regardless of how the other is perceived (i.e. attenuated link between perceptions of others and empathy)? Or do they express greater warmth when they are empathetic (i.e. stronger link between empathy and warm behaviour)? Either one of these underlying processes could explain cross-sectional associations between agreeableness and prosociality,

but they have divergent implications for how the trait is conceptualized. Investigating moderators of these momentary links in interpersonal perception, behaviour, and affect is a productive direction for empathy and personality research.

Measuring empathy with more ecologically valid methods expands the range of testable hypotheses and has the potential to make sense of conflicting findings in the experimental literature. For instance, contrary to the association between empathy and prosociality, individuals high in antisocial traits (e.g. manipulative and exploitative) have been found to perform as well as healthy controls on lab-based empathy tasks (Dolan & Fullam, 2004; Richell et al., 2003; Sandvik, Hansen, Johnsen, & Laberg, 2014). This surprising result has been interpreted to suggest that these individuals do not lack ability to empathize, but instead lack normative motivation to empathize in everyday life situations and personal relationships (Keysers & Gazzola, 2013). According to this hypothesis, individuals with antisocial traits can use their intact ability to detect emotions or infer others' thoughts when instructed to do so in the lab, but in their daily lives, they use this ability for self-serving rather than prosocial purposes. This hypothesis could be more comprehensively tested by assessing empathic ability in the lab, then measuring empathic behaviour 'in the wild' using EMA. Furthermore, our study provides a clear, empirical reference for normal empathy processes by which to define abnormalities such as those implicated in antisocial behaviour.

Limitations

Because empathy has rarely been studied using EMA, there are no well-validated momentary measures of empathy. The ad-hoc scale used in this study has face validity and good reliability, but its nomological network must be assessed further to test its construct validity. As more research applies this methodology to empathy, more psychometrically sound scales can be developed. Another limitation to consider is our use of self-report and shared method variance between variables. Self-reporting of empathy and interpersonal behaviour is well-suited to capture subjective perception and aspects of conscious motivation but cannot be used to infer 'objective' features of the situation or empathic ability. Part of the ongoing construct validation process should involve using multimethod measures such as informant reports or experimental methods.

Aspects of our sampling approach may have affected the generalizability of our results. Participation in the studies required understanding an involved protocol; thus, individuals excluded for failing the comprehension quiz may share certain features such as inattentiveness or low IQ. According to post-hoc analyses of differences between those who were excluded for failing the quiz and those who did not, there was some evidence that individuals with less education were not as well-represented in this study. However, we are hesitant to overinterpret these results, and the potential role of demographic or personality factors should be evaluated in more samples. Balancing the value of fine-grained data with the comprehension abilities necessary to participant in EMA studies is an ongoing challenge for dynamic measurement of social processes. It is an empirical question whether different training modalities could improve participant comprehension; more research is needed comparing the relative costs and outcomes of varying types (e.g. in person and self-directed) and amounts of training.

This study empirically tested the theoretical proposition that level of empathy varies between situations depending on the interpersonal motive. By using methodology that captures the core features of empathy, we showed that empathy plays a consistent role in satisfying affiliative interactions.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

REFERENCES

Anderson C, & Keltner D (2002). The role of empathy in the formation and maintenance of social bonds. Behavioral and Brain Sciences, 25, 21–22. 10.1017/S0140525X02230010

Back MD, Baumert A, Denissen JJA, Hartung F, Penke L, Schmukle SC, Schonbrodt FD, … Wrzus C (2011). PERSOC: A unified framework for understanding the dynamic interplay of personality and social relationships. European Journal of Personality, 25, 90–107. 10.1002/per.811

Bakan D (1966). The duality of human existence: Isolation and communion in Western man. Boston: Beacon.

Batson CD (1991). The altruism question: Toward a social-psychological answer. Hillsdale, NJ: Lawrence Erlbaum Associates.

Batson CD, & Shaw LL (1991). Evidence for altruism: Toward a pluralism of prosocial motives. Psychological Inquiry, 2, 107–122. 10.1207/s15327965pli0202_1

Bem DJ, & Allen A (1974). On predicting some of the people some of the time: The search for cross-situational consistencies in behavior. Psychological Review, 81, 506–520. 10.1037/h0037130

Bird G, & Viding E (2014). The self to other model of empathy: Providing a new framework for understanding empathy impairments in psychopathy, autism, and alexithymia. Neuroscience and Biobehavioral Reviews, 47, 520–532. 10.1016/j.neubiorev.2014.09.021 [PubMed: 25454356]

Blanke ES, Rauers A, & Riediger M (2015). Nice to meet you—adult age differences in empathic accuracy for strangers. Psychology and aging, 30(1), 149–159. 10.1037/a0038459 [PubMed: 25436599]

Bowers KS (1973). Situationism in psychology: An analysis and a critique. Psychological Review, 80, 307–336. 10.1037/h0035592 [PubMed: 4585116]

Cameron CD, Harris LT, & Payne BK (2016). The emotional cost of humanity: Anticipated exhaustion motivates dehumanization of stigmatized targets. Social Psychological and Personality Science, 7, 105–112. 10.1177/1948550615604453

Cikara M, Bruneau E, Van Bavel JJ, & Saxe R (2014). Their pain gives us pleasure: How intergroup dynamics shape empathic failures and counter-empathic responses. Journal of Experimental Social Psychology, 55, 110–125. 10.1016/j.jesp.2014.06.007 [PubMed: 25082998]

Davis MH (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. Journal of Personality and Social Psychology, 44, 113–126. 10.1037/0022-3514.44.1.113

Davis MH, & Oathout HA (1987). Maintenance of satisfaction in romantic relationships: Empathy and relational competence. Journal of Personality and Social Psychology, 53, 397–341. 10.1037/0022-3514.53.2.397

de Vignemont F, & Singer T (2006). The empathic brain: How, when and why? Trends in Cognitive Sciences, 10, 435–441. 10.1016/j.tics.2006.08.008 [PubMed: 16949331]

de Wall FBM (2008). Putting altruism back into altruism: The evolution of empathy. Annual Review of Psychology, 59, 279–230. 10.1146/annurev.psych.59.103006.093625

Devlin HC, Zaki J, Ong DC, & Gruber J (2014). Not as good as you think? Trait positive emotion is associated with increased self-reported empathy but decreased empathic performance. PLoS ONE, 9, e110470–e111047. 10.1371/journal.pone.0110470 [PubMed: 25353635]

Devoldre I, Davis MH, Verhofstadt LL, & Buysse A (2010). Empathy and social support provision in couples: Social support and the need to study the underlying processes. The Journal of Psychology, 144, 259–284. 10.1080/00223981003648294 [PubMed: 20461931]

Dolan M, & Fullam R (2004). Theory of mind and mentalizing ability in antisocial personality disorders with and without psychopathy. Psychological Medicine, 34, 1093–1102. 10.1017/S0033291704002028 [PubMed: 15554579]

Eisenberg N, & Miller PA (1987). The relation of empathy to prosocial and related behaviors. Psychological Bulletin, 101, 91–119. 10.1017/S0033291704002028 [PubMed: 3562705]

Eysenck SB, & McGurk BJ (1980). Impulsiveness and venturesomeness in a detention center population. Psychological Reports, 47, 1299–1306. 10.2466/pr0.1980.47.3f.1299 [PubMed: 7220759]

Fleeson W (2007). Situation-based contingencies underlying trait-content manifestation in behavior. Journal of Personality, 75, 825–862. 10.1111/j.1467-6494.2007.00458.x [PubMed: 17576360]

Funder DC (2001). Personality. Annual Review of Psychology, 52, 197–221. 10.1146/annurev.psych.52.1.197

Gilchrist J, Conroy DE, Pincus A, Ram N (2019). Associations between empathy and self-conscious emotions during social interactions. Doi: 10.31219/osf.io/7vdeu

Gottman JM, Gottman JS, Greendorfer A, & Wahbe M (2014). An empirically based approach to couples' conflict. In Coleman PT, Deutsch M, & Marcus EC (Eds.), The handbook of conflict resolution: Theory and practice (3rd ed., pp. 898–920). San Francisco, CA: Jossey- Bass.

Grosse-Holtforth M, Thomas A, & Caspar F (2011). Interpersonal motivation. In Horowitz LM, & Strack S (Eds.), Handbook of interpersonal psychology (pp. 107–122). New York: Wiley.

Hall JA, & Schwartz R (2018). Empathy present and future. The Journal of Social Psychology, 159, 225–243. 10.1080/00224545.2018.1477442 [PubMed: 29781776]

Harpending HC, & Sobus J (1987). Sociopathy as an adaptation. Ethology and Sociobiology, 8, 63–72. 10.1016/0162-3095(87)90019-7

Hinnekens C, Vanhee G, De Schryver M, Ickes W, & Verhofstadt LL (2016). Empathic accuracy and observed demand behavior in couples. Frontiers in Psychology, 156, 437–443. 10.3389/fpsyg.2016.01370

Hodges SD, & Klein KJK (2001). Regulating the costs of empathy: The price of being human. The Journal of Socio-Economics, 30, 437–452. 10.1016/S1053-5357(01)00112-3

Hoffman ML (2000). Empathy and moral development: Implications for caring and justice. Cambridge: University Press. 10.1017/CBO9780511805851

Hopwood CJ, Pincus AL, & Wright AGC (2019). The interpersonal situation: Integrating clinical assessment, formulation, and intervention. In Samuel D, & Lynam D (Eds.), Using basic personality research to inform personality pathology. New York, NY: Oxford University Press.

Horowitz LM, Wilson KR, Turan B, Zolotsev P, Constantino MJ, & Henderson L (2006). How interpersonal motives clarify the meaning of interpersonal behavior: A revised circumplex model. Personality and Social Psychology Review, 10, 67–86. 10.1207/s15327957pspr1001_4 [PubMed: 16430329]

Keysers C, & Gazzola V (2013). Dissociating the ability and propensity for empathy. Trends in Cognitive Sciences, 18, 163–166. 10.1016/j.tics.2013.12.011

Kiesler DJ (1996). Contemporary interpersonal theory and research: Personality, psychopathology, and psychotherapy. New York: John Wiley & Sons.

Klimecki O, Mayer SV, Justye A, Scheeff J, & Schonenberg M (2016). Empathy promotes altruistic behavior in economic interactions. Scientific Reports, 6. 10.1038/srep31961

Leith KP, & Baumeister RF (1998). Empathy, shame, guilt, and narratives of interpersonal conflicts: Guilt-prone people are better at perspective taking.. Journal of Personality, 66(1), 1–37. 10.1111/1467-6494.0000

Lovibond PF, & Lovibond SH (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the Beck depression and anxiety inventories. Behaviour Research and Therapy, 33, 335–343. 10.1016/0005-7967(94)00075-U [PubMed: 7726811]

Main A, Walle EA, Kho C, & Halpern J (2017). The Interpersonal Functions of Empathy: A Relational Perspective. Emotion Review, 9(4), 358–366. 10.1177/1754073916669440

Mooradian TA, Davis M, & Matzler K (2011). Dispositional empathy and the hierarchical structure of personality. The American Journal of Psychology, 124, 99–109. 10.5406/amerjpsyc.124.1.0099 [PubMed: 21506454]

Nelson DW, Klein CTF, & Irvin JE (2003). Motivational antecedents of empathy: Inhibiting effects of fatigue. Basic and Applied Social Psychology, 25, 37–35. 10.1207/S15324834BASP2501_3

Nezlek JB, Feist GJ, Wilson FC, & Plesko RM (2001). Day-to-day variability in empathy as a function of daily events and mood. Journal of Research in Personality, 35, 401–423. 10.1006/jrpe.2001.2332

Nezlek JB, Schütz A, Lopes P, Smith CV (2007). Naturally occurring variability in state empathy. In Farrow TFD & Woodruff PWR (Eds.) Empathy in mental illness and health (pp. 187–200). Cambridge: Cambridge University Press, DOI: 10.1017/CBO9780511543753.012

Plutchik R (1987). Evolutionary bases of empathy. In Eisenberg N, & Strayer (Eds.), Empathy and its development (pp. 38–46). Cambridge, England: Cambridge University Press.

Rauers A, Blanke E, & Riediger M (2013). Everyday empathic accuracy in younger and older couples: Do you need to see your partner to know his or her feelings? Psychological Science, 24, 2210–2217. 10.1177/0956797613490747 [PubMed: 24013188]

Richell RA, Mitchell DGV, Newman C, Leonard A, Baron-Cohen S, & Blair RJR (2003). Theory of mind and psychopathy: Can psychopathic individuals read the ‘language of the eyes’? Neuropsychologia, 41, 523–526. 10.1016/S0028-3932(02)00175-6 [PubMed: 12559146]

Roberts BW, & Mroczek D (2008). Personality trait change in adulthood. Current Directions in Psychological Science, 17, 31–35. 10.1111/j.1467-8721.2008.00543.x [PubMed: 19756219]

Roche MJ, Jacobson NC, & Pincus AL (2016). Using repeated daily assessments to uncover oscillating patterns and temporally-dynamic triggers in structures of psychopathology: Applications to the DSM-5 alternative model of personality disorders. Journal of Abnormal Psychology, 125, 1090–1102. 10.1037/abn0000177 [PubMed: 27819470]

Sadikaj G, Wright AGC, Dunkley D, Zuroff D, & Moskowitz DS (in press). Multilevel structural equation modeling for intensive longitudinal data: A practical guide for personality researchers. In Rauthmann JF (Ed.), Handbook of personality dynamics and processes. New York, NY: Elsevier.

Sadler P, Ethier N, & Woody E (2011). Interpersonal complementarity. In Horowitz LM, & Strack S (Eds.), Handbook of interpersonal psychology: Theory, research, assessment, and therapeutic interventions (pp. 123–142). Hoboken, NJ: John Wiley & Sons.

Sandvik AM, Hansen AL, Johnsen BH, & Laberg JC (2014). Psychopathy and the ability to read the “language of the eyes”: Divergence in the psychopathy construct. Scandinavian Journal of Psychology, 55, 585–592. 10.1111/sjop.12138 [PubMed: 24954681]

Schönbrodt FD, & Perugini M (2013). At what sample size do correlations stabilize? Journal of Research in Personality, 47, 609–612. 10.1016/j.jrp.2013.05.009

Sheldon KM (1996). The social awareness inventory: Development and applications. Personality and Social Psychology Bulletin, 22, 620–634. 10.1177/0146167296226007

Simpson JA, Orina MM, & Ickes W (2003). When accuracy hurts, and when it helps: A test of the empathic accuracy model in marital interactions. Journal of Personality and Social Psychology, 85, 881–893. 10.1037/0022-3514.85.5.881 [PubMed: 14599251]

Singer T, & Klimecki OM (2014). Empathy and compassion. Current Biology, 24, 875–878. 10.1016/j.cub.2014.06.054 [PubMed: 24704073]

Smith A (2006). Cognitive empathy and emotional empathy in human behavior and evolution. The Psychological Record, 56, 3–21. 10.1007/BF03395534

Snyder M, & Cantor N (1998). Understanding personality and social behavior: A functionalist strategy. In Gilbert DT, Fiske ST, & Lindzey G (Eds.), The handbook of social psychology (pp. 635–679). New York, NY: McGraw-Hill.

Spreng RN, McKinnon MC, Mar RA, & Levine B (2009). The Toronto empathy questionnaire: Scale development and initial validation of a factor-analytic solution to multiple empathy measures. Journal of Personality Assessment, 91, 62–71. 10.1080/00223890802484381 [PubMed: 19085285]

Sullivan HS (1953). The interpersonal theory of psychiatry. New York, NY: Norton.

Toomey EC, & Rudolph CW (2018). Age-conditional effects in the affective arousal, empathy, and emotional labor linkage: Within-person evidence from an experience sampling study. Work, Aging and Retirement, 4, 145–116. 10.1093/workar/wax018

Verhofstadt L, Devoldre I, Buysse A, Stevens M, Hinnekens C, Ickes W, & Davis M (2016). The role of cognitive and affective empathy in spouses' support interactions: An observational study. PLoS ONE, 11, e0149944. 10.1371/journal.pone.0149944 [PubMed: 26910769]

Watson D, Clark LA, & Tellegen A (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. Journal of Personality and Social Psychology, 54(6), 1063–1070. 10.1037/0022-3514.54.6.1063 [PubMed: 3397865]

Wiggins JS (1991). Agency and communion as conceptual coordinates for the understanding and measurement of interpersonal behavior. In Cicchetti D, & Grove WM (Eds.), Thinking clearly about psychology: Essays in honor of Paul E. Meehl, Vol. 2: Personality and psychopathology (pp. 89–113). Minneapolis, MN: University of Minnesota Press.

Wilt J, Noftle EE, Fleeson W, & Spain JS (2012). The dynamic role of personality states in mediating the relationship between extraversion and positive affect. Journal of Personality, 80, 1205–1236. 10.1111/j.1467-6494.2011.00756.x [PubMed: 22092066]

Woods WC, Edershile EA, Ringwald WR, Sharpe BM, Himmelstein PH, Newman MG, Wilson SJ, Levy KN, Pincus AL, Creswell JD, Wright AGC (2020) Psychometric evaluation of a visual interpersonal analogue scale. Manuscript in preparation.

Zaki J (2014). Empathy: A motivated account. Psychological Bulletin, 140, 1608–1647. 10.1037/a0037679 [PubMed: 25347133]

Zaki J, & Ochsner K (2011). Reintegrating the study of accuracy into social cognition research. Psychological Inquiry, 22, 159–182. 10.1080/1047840X.2011.551743

Zaki J, & Williams WC (2013). Interpersonal emotion regulation. Emotion, 13, 803–810. 10.1037/a0033839 [PubMed: 24098929]

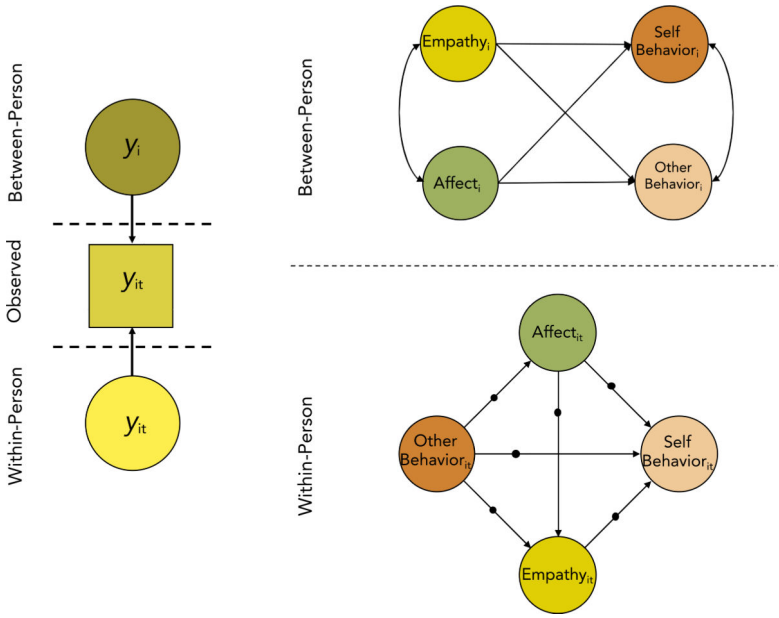

Figure 1.

Multilevel structural equation model for empathy, interpersonal behaviour, and affect. *Note*. The left panel depicts the latent decomposition of observed variables into within-person (y_{it}) and between-person (y_i) variance for individual *i* during interaction *t*. The right panel shows the model used for all analyses. Single-headed arrows indicate regression paths; double-headed arrows indicate correlations. Filled-in dots represent random slopes. Circles indicate latent variables, and squares are observed variables.

Table 1.

Means, standard deviations, and intraclass correlations (ICCs) of study variables

Variable	Mean (student/community)	Standard deviation (student/community)	ICCs (student/community)
Empathy	59.9/56.1	23.7/24.5	.53/.45
Warmth (self)	26.7/28.0	19.5/19.4	.40/.28
Warmth (other)	25.6/27.3	20.5/20.6	.37/.24
Dominance (self)	−1.0/−2.0	18.4/21.2	.35/.31
Dominance (other)	−1.4/−2.5	18.6/21.6	.32/.29
Positive affect	58.7/53.3	21.0/22.3	.33/.29
Negative affect	15.8/10.9	17.7/14.9	.50/.37

Note: The first coefficient is from the student sample; the second coefficient is from the community sample. Empathy, positive affect, and negative affect range from 0 to 100; dominance and warmth of self and other range from −50 to 50.

Table 2.

Correlations among study variables at within-person and between-person levels in each (student/community) sample

	Empathy	Warmth (self)	Warmth (other)	Dominance (self)	Dominance (other)	Positive affect	Negative affect
Within-person (student/community)							
Empathy Warmth (self)	**.33/.36**						
Warmth (other)	**.28/.31**	**.65/.66**					
Dominance (self)	**.03**/.01	**−.04/−.14**	−.02/**−.10**				
Dominance (other)	**−.06/−.07**	**−.14/−.20**	**−.22/−.28**	**−.15/−.13**			
Positive affect	**.39/.41**	**.46/.53**	**.46/.53**	**.07**/.00	**−.10/−.17**		
Negative affect	**−.12/−.14**	**−.36/−.42**	**−.38/−.45**	.00/**.05**	**.15/.22**	**−.41**/−.49	
Between-person (student/community)							
Empathy Warmth (self)	**.42/.45**						
Warmth (other)	**.39/.40**	**.97/.96**					
Dominance (self)	.02/.05	−.06/−.01	−.08/−.05				
Dominance (other)	.06/**.17**	.05/.03	.06/−.01	**.74/.76**			
Positive affect	**.43/.29**	**.57/.40**	**.54/.37**	.15/**.20**	.07/**.14**		
Negative affect	− .08/.11	**−.60/−.32**	**−.61/−.30**	−.03/−.08	− .04/−.01	**−.35**/−.03	

Note: Bolded values indicate that the credibility interval does not contain zero.

Table 3.

Parameter estimates from multilevel structural equation models showing associations among empathy, interpersonal behaviour, and perception of others during interactions

	Student sample		Community sample	
	Estimate	***p* value**	**Estimate**	***p* value**
Warmth/positive affect				
Within-person parameters				
Warmth other → empathy	**.11 (.09, .14)**	<.001	**.13 (.10, .15)**	<.001
Warmth other → PA	**.45 (.42, .47)**	<.001	**.51 (.48, .52)**	<.001
Warmth other → warmth	**.51 (.46, .53)**	<.001	**.50 (.47, .52)**	<.001
PA → empathy	**.32 (.28, .34)**	<.001	**.32 (.28, .34)**	<.001
PA → warmth	**.17 (.14, .19)**	<.001	**.23 (.20, .24)**	<.001
Empathy → warmth	**.10 (.08, .12)**	<.001	**.12 (.09, .14)**	<.001
Between-person parameters				
Empathy → warmth other	**.13 (.05, .27)**	<.001	**.26 (.13, .34)**	<.001
Empathy → warmth	**.16 (.07, .28)**	<.001	**.31 (.21, .40)**	<.001
PA → warmth	**.49 (.37, .58)**	<.001	**.34 (.21, .40)**	<.001
PA → warmth other	**.48 (.38, .58)**	<.001	**.33 (.22, .43)**	<.001
PA ↔ empathy	**.45 (.33, .50)**	<.001	**.30 (.15, .42)**	<.001
Warm ↔ warmth other	**.97 (.95, .98)**	<.001	**.95 (.93, .96)**	<.001
Warmth/negative affect				
Within-person parameters				
Warmth other → empathy	**.26 (.23, .28)**	<.001	**.30 (.27, .32)**	<.001
Warmth other → NA	**−.33 (−.35, −.30)**	<.001	**−.38 (−.40, −.35)**	<.001
Warmth other → warmth	**.54 (.51, .56)**	<.001	**.54 (.51, .55)**	<.001
NA → empathy	− .02 (−.05, .01)	.080	.00 (−.04, .02)	.360
NA → warmth	**−.13 (−.14, −.10)**	<.001	**−.15 (−.18, −.13)**	<.001
Empathy → warmth	**.15 (.12, .17)**	<.001	**.17 (.15, .19)**	<.001
Between-person parameters				
Empathy → warmth other	**.33 (.24, .41)**	<.001	**.41 (.31, .50)**	<.001

	Student sample		Community sample	
	Estimate	***p* value**	**Estimate**	***p* value**
Empathy → warmth	**.35 (.27, .44)**	<.001	**.47 (.36, .57)**	<.001
NA → warmth	**−.56 (−.63, −.50)**	<.001	**−.36 (−.44, −.27)**	<.001
NA → warmth other	**−.59 (−.65, −.51)**	<.001	**−.35 (−.45, −.26)**	<.001
NA ↔ empathy	−.07 (−.20, .04)	.100	**.17 (.04, .29)**	<.001
Warmth ↔ warmth other	**.95 (.93, .97)**	<.001	**.95 (.93, .96)**	<.001
Dominance/positive affect				
Within-person parameters				
Dominance other → empathy	−.02 (−.05, .00)	.018	−.01 (−.04, .02)	.195
Dominance other → PA	**−.11 (−.13, −.08)**	<.001	**−.16 (−.19, −.14)**	<.001
Dominance other → dominance	**−.11 (−.14, −.09)**	<.001	**−.11 (−.13, −.09)**	<.001
PA → empathy	**.36 (.34, .39)**	<.001	**.38 (.35, .40)**	<.001
PA → dominance	**.05 (.02, .07)**	<.001	−.02 (−.04, .01)	.070
Empathy → dominance	.01 (−.01, .04)	.173	.00 (−.02, .03)	.445
Between-person parameters				
Empathy → dominance other	.01 (−.12, .15)	.460	.08 (−.05, .21)	.100
Empathy → dominance	−.06 (−.19, .07)	.197	−.04 (−.17, .09)	.230
PA → dominance	**.17 (.02, .28)**	.010	**.21 (.10, .31)**	<.001
PA → dominance other	.08 (−.06, .22)	.153	.13 (−.02, .27)	.040
PA ↔ empathy	**.44 (.34, .54)**	<.001	**.30 (.17, .39)**	<.001
Dominance ↔ dominance other	**.76 (.69, .82)**	<.001	**.79 (.72, .84)**	<.001
Dominance/negative affect				
Within-person parameters				
Dominance other → empathy	**−.04 (−.07, −.02)**	<.001	**−.05 (−.07, −.02)**	.002
Dominance other → NA	**.16 (.13, .18)**	<.001	**.19 (.16, .21)**	<.001
Dominance other → dominance	**−.12 (−.15, −.09)**	<.001	**−.12 (−.15, −.10)**	<.001
NA → empathy	**−.11 (−.14, −.08)**	<.001	**−.13 (−.16, −.11)**	<.001
NA → dominance	.01 (−.02, .03)	.290	**.05 (.02, .07)**	<.001
Empathy → dominance	**.03 (.01, .05)**	.001	.00 (−.02, .03)	.380
Between-person parameters				

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	Student sample		Community sample	
	Estimate	***p* value**	**Estimate**	***p* value**
Empathy → dominance other	.04 (−.09, .16)	.265	.12 (−.01, .25)	.033
Empathy → dominance	.01 (−.12, .13)	.425	.02 (−.11, .15)	.367
NA → dominance	−.01 (−.15, .13)	.430	−.06 (−.19, .06)	.200
NA → dominance other	−.04 (−.17, .10)	.255	−.03 (−.16, .10)	.340
NA ↔ empathy	−.08 (−.22, .06)	.125	**.16 (.04, .28)**	.010
Dominance ↔ dominance other	**.77 (.71, .83)**	<.001	**.80 (.74, .85)**	<.001

Note: → indicates regression where X → Y; ↔ indicates correlation between variables. All parameter estimates are standardized; 95% credibility intervals are in parentheses. Bolded values indicate that the credibility interval does not contain zero. *p* Values are one tailed. Warmth/dominance = participants' own behaviour, warmth/dominance other = perceived behaviour of the other, NA, negative affect; PA, positive affect.

Table 4.

Correlations between random intercepts and random slopes at the between-person level in each (student/community) sample

	Random intercepts						
Random slopes	**Empathy**	**Dominance (other)**	**Warmth (other)**	**Dominance**	**Warmth**	**NA**	**PA**
Dominance other → empathy	−.07/−.03	. 12/.05	−.04/−.12	.07/.05	−.05/−.09	.10/−.09	.00/.07
Warmth other → empathy	**.34**/.17	−.02/−.01	.11/−.07	−.08/.02	.10/−.09	.02/−.03	−.01/−.06
NA → empathy	−.16/−.31	−.06/−.08	.18/−.02	−.12/.02	.16/−.01	**−.22**/−.16	.04/−.07
PA → empathy	−.03/.00	−.04/.00	.13/.11	−.06/−.04	.10/.07	−.16/−.08	**.23/.17**
Empathy → dominance	.14/. 02	**.30/.28**	.12/−.12	**.20/.25**	.12/−.06	−.16/.02	.17/−.15
Empathy → warmth	**.22**/. 18	.03/.07	−.11/**−.23**	.09/.12	−.10/**−.26**	**.19**/18	−.09/−.07

Note: → indicates regression where X → Y. Bolded values indicate that the 95% credibility interval does not include zero. Outlined associations are effects that were significant in both samples. NA, negative affect; PA, positive affect