



## Borderline personality features predict empathy for animals but not for children

Jennifer Vonk and Jacob Pappas

Department of Psychology, Oakland University, Rochester, MI, USA

*Although empathy is not a defining feature of borderline personality disorder, there is a growing body of work suggesting deficits in some components of empathy toward humans. There is no research investigating the link between borderline personality features (BPF) and empathy toward animals, which may be less threatening to individuals that struggle in interpersonal relationships and fear rejection. We examined BPF and self-reported distress and viewing times of photographs depicting dogs and children in twelve adverse circumstances in a college student sample ( $N = 464$ ) with trait empathy as a mediator in Study 1. BPF predicted distress to dog but not child photos. There were significant indirect effects of BPF on distress to dog and child photos through personal distress. In Study 2 ( $N = 524$ ), we further examined the processes underlying these associations by modelling a serial mediation of BPF with distress to dog and child photos through anxious and avoidant attachment to trait empathy toward animals and humans. We replicated the finding that BPF predicted distress to dog but not child photos. BPF predicted both anxious and avoidant attachment styles, which negatively predicted empathy for humans and animals. Empathy for humans mediated the associations with distress for child photos whereas empathy for animals mediated the associations with distress for dog photos. Further research is needed to determine the causal pathways between BPF, attachment, and empathy to animals and humans.*

**Keywords:** empathy, attachment, borderline, animals, distress

Empathy is commonly defined as an ability to understand another's experiences and perspective (cognitive empathy) in addition to the ability to share their emotional experience (affective empathy) (Harari et al., 2010). Empathy can be examined at the trait level, in which case the capacity to empathize is considered as a reasonably stable disposition, or at the situational level, where empathizing may be specific to the context or target. Various personality traits are associated with a reduced capacity for trait empathy, such as psychopathy (Giammarco & Vernon, 2014; Lee & Gibbons, 2017; Wai & Tiliopoloulus, 2012) and narcissism (Giammarco & Vernon, 2014; Ritter et al., 2011). Although reduced trait empathy is not a defining characteristic for borderline personality disorder (BPD), several studies have shown borderline personality features (BPF) in nonclinical samples to be negatively associated with empathy (Dittrich et al., 2020; Dziobek et al., 2011; Grzegorzewski et al., 2019; Salgado et al., 2020; Wang et al., 2021). Some of the variance in associations between aversive personality traits and empathy (e.g., Dinsdale & Crespi, 2013; Fertuck et al., 2009; Jonason & Krause, 2013; Kılıç et al., 2020; Minzenberg et al., 2006; Salgado et al., 2020; Vonk et al., 2013) may be due to differences in affective and cognitive empathy, with individuals high in narcissism, for example, showing deficits in affective but not cognitive empathy (Wai & Tiliopoulos, 2012). Studies have also shown

dissociations of cognitive and affective empathy in patients with BPD as well (Pourmohammad et al., 2022). To date, researchers have focused on the association between aversive personality traits and empathy toward humans with very little research addressing the connection between these traits and empathy for animals (although see Giacomini et al., 2023 for one exception). We were specifically interested in the association between BPF and empathy for animals because individuals high in BPF show a desire for intimacy coupled with an extreme sensitivity to rejection (Beeney et al., 2015; Kılıç et al., 2020; Mikulincer & Shaver, 2007; Zeigler-Hill & Vonk, 2023). This pattern led us to hypothesize that they may benefit from attachments to nonhumans, such as dogs, that provide unconditional affection. We explored the associations between attachment, empathy for humans and animals, and self-reported distress at viewing human children and dogs experiencing similar adverse situations for the first time.

Despite empathy deficits not being a defining feature of BPD, previous findings hint at an important role of empathy in the difficulties that these individuals experience in their relationships with others. For example, individuals with BPD display higher levels of alexithymia – difficulty in recognizing and processing emotional states – compared to controls (Kılıç et al., 2020). The ability to recognize emotional states is an important component of cognitive empathy. Higher levels of alexithymia have predicted lower levels of cognitive empathy in BPD patients (Grzegorzewski et al., 2019). Alexithymia also mediated the impact of early adversity on empathy in a different group of

BPD patients (Flasbeck et al., 2017). Patients with BPD typically experience difficulty in interpreting others' facial expressions, which can lead to their interpersonal difficulties (Conklin et al., 2006; Levine et al., 1997; Savage & Lenzenweger, 2018). BPD patients, but not control subjects, rated psychological pain as more intense in the first-person, but not in the third-person, perspective, suggesting that BPD patients may show impairments in mentalizing only when emotionally aroused (Flasbeck et al., 2017), which is consistent with earlier work (Dziobek et al., 2011; Miano et al., 2017). Interestingly, individuals with BPD recognize facial features of those in distress or fear (Wagner & Linehan, 1999) and detect negative emotions faster and more accurately than more neutral facial expressions. However, due to their misattributions of emotion (Savage & Lenzenweger, 2018), it may be difficult for them to translate these recognitions of emotion into empathy for humans (Meehan et al., 2017). Interpersonal difficulties that stem from these challenges in processing human emotions would presumably not generalize to relationships with companion animals.

Previous research has shown that individuals may redirect their affection from people to pets (Veevers, 2016). We suspect that this may occur in individuals high in BPF because of their dysfunctional attachment to other humans and their intense need for intimacy (Beeney et al., 2015; Kılıç et al., 2020; Mikulincer & Shaver, 2007). It is unknown whether dysfunctional attachment patterns generalize to nonhumans, such as pets. The only study to assess BPF and attachment to pets (Vonk et al., 2016) found that individuals high in BPF showed lower levels of attachment to both traditional and less traditional pets compared to those low in BPF, but this study did not assess specific attachment style. In general, stronger attachments to pet dogs are related to characteristics of anxious attachment and lower levels of trusting and depending upon others (Lass-Hennemann et al., 2022) – both characteristics of BPD. These findings suggest that individuals high in BPF may show distinct patterns of attachment to humans and nonhumans, which may lead to a differential capacity for empathy toward human and nonhuman targets.

It is often implicitly assumed that those with high levels of empathy for humans will show high levels of empathy for animals and vice versa (Eisenberg, 1988; Ingham et al., 2015; Mehrabian & Epstein, 1972; Serpell & Paul, 1994; Signal & Taylor, 2007; Taylor & Signal, 2005). In fact, several studies (e.g., Colombo et al., 2017; Gómez-Leal et al., 2021; Paul, 2000; Poresky, 1990) have shown empathy toward animals and humans to be moderately correlated. There is also a weak positive correlation between the baby schema effect in human infants and infant animals, which reflects a desire to nurture and care for beings with infantile features (Lehmann et al., 2013). Cameron et al. (2022) have suggested that there should be few differences in empathy for animals and humans when they are not placed in conflict (such as when individuals care for animals but consume meat). Empathic concern – a component of affective empathy – for humans is associated with support for animal rights (Brown & McLean, 2015) and positive attitudes toward animals (Taylor & Signal, 2005; although see Paul, 2000). Perspective-taking – a component of cognitive empathy – was

also associated with positive attitudes toward animals in both a community sample and an animal protection group (Signal & Taylor, 2007), further implicating the association between empathy toward humans and empathy toward animals.

In contrast to the supposition that empathy for humans and for animals are highly associated, researchers have long noted anomalies in individuals that show little regard for humans and yet appear to display concern for animal well-being. Some (e.g., Paul, 2000) have noted that this inconsistency may reflect pathology involving empathy deficits. Giacomini et al. (2023) found that individuals high in antagonistic narcissism reported lower levels of attachment and empathy toward pets and humans compared to those low in antagonism whereas neurotic narcissism positively predicted only animal-centered empathy. Individuals high in neurotic narcissism demonstrated typical levels of empathy for humans, but greater levels of empathy toward animals compared to those low in neurotic narcissism. Neuroticism shares with BPF a sensitivity to negative appraisal by other humans, which could encourage a need to seek unconditional approval from pets (Kim, 2019). Indeed, some researchers have shown that pet companionship can help mitigate the psychological distress that stems from social rejection and feelings of loneliness (McConnell et al., 2011; Staats et al., 2008). Graumann and colleagues (2023) found reductions in affective empathy toward humans following social exclusion in women with PBD. Taken together, these studies lend credence to the idea that social rejection may facilitate feelings of affection and empathy toward nonhuman animals.

In addition to pathological personality features showing different associations with empathy for animals and humans, differences in human and animal centered empathy have also been observed in standard samples. For example, participants may express significantly less empathy toward an adult human in comparison to children, adult dogs, or puppies (Levin et al., 2017). Other studies have shown greater empathic responses toward humans compared to animals but with greater empathy also being shown to animals deemed more similar to humans compared to those less similar (Plous, 1993; Westbury & Neumann, 2008). This effect can be partially attributed to the belief that animals more similar to humans have a greater capacity for experiencing pain (Plous, 1993). Paul (2000) provided evidence that factors such as pet ownership and child-rearing have unique associations with empathy for humans and empathy for animals, again suggesting that empathy may vary as a function of the target species. Consistent with this conclusion is the finding that thinking about humans recruits different cognitive and neural processes compared to thinking about animals (Caramazza & Shelton, 1998; Mason et al., 2004). Furthermore, although similar patterns of neural activation were observed in response to viewing pictures of humans and dogs suffering, human suffering gave rise to greater medial prefrontal activation – areas implicated in theory of mind and higher-order perspective taking. In contrast, animal suffering gave rise to greater parietal and inferior frontal activation, which is consistent with semantic and perceptual processing (Franklin et al., 2013). If different cognitive and emotional processes are recruited when empathizing with

humans versus animals, we should acknowledge that individuals high in empathy for humans may not necessarily exhibit a high degree of empathy for animals and vice versa.

Researchers have found similar levels of distress to vignettes describing scenarios involving infants and puppies being abused (Angantyr et al., 2011), although some of these effects are moderated by factors such as gender, pet ownership, and parenthood (Angantyr et al., 2011; Daly et al., 2014; Gómez-Leal et al., 2021; Laner et al., 2001; Levin et al., 2017). For example, Laner et al. (2001) found that participants were more likely to imagine intervening if an adult man was attacking a six-year-old child compared to an adult female or an adult dog, for whom the rates of intervention did not differ. Age of the perceived victim as well as age of the respondent appear to predict different levels of empathy for animals and humans. Children show a stronger inclination to prioritize animals, such as dogs and pigs, over humans compared to adults, which suggests that the tendency to value humans over animals is socially learned over time (Wilks et al., 2021). Effects of age and species of the target may be due to the tendency to demonstrate greater empathy toward those who are considered less responsible for their own suffering (Angantyr et al., 2011; Franklin et al., 2013).

In addition to the moderating effects of factors such as pet ownership, attachment to a companion animal has been shown to significantly mediate the association between pet ownership and emotional responsiveness to animal suffering (Daly et al., 2014), reinforcing the role that contextual factors play in empathy. This complexity suggests that examining empathy at a situational level, rather than merely as a trait, will be informative when attempting to understand whether individuals differ in their empathy toward different species. Furthermore, different components of trait empathy may be related to the way that empathy is expressed in a given context. For example, willingness to intervene to assist an imagined victim was predicted by the affective component of personal distress rather than by the cognitive components of empathy (Daly et al., 2014). Therefore, we examined situational empathy in the form of reported distress to images of children and dogs suffering as a function of the four components of empathy identified by Davis (1983).

## Present study

Given the growing evidence suggesting that empathy for animals may not mirror empathy for humans, we focused on potential differences in empathy toward these two different targets with a specific focus on BPF because of the distinctive attachment styles and relationship difficulties experienced by those high in BPF. We hypothesized that the characteristic sensitivity to criticism and rejection from other humans in individuals high in BPFs coupled with the unconditional acceptance given by nonhumans, such as pet dogs, may predict these individuals showing greater distress for dogs experiencing hardships, compared to humans experiencing the same hardships. We focused on dogs because of familiarity with dogs, because of the tendency to attribute a high degree of intelligence to them (Serpell, 1986), and because most prior research on animal suffering presented dog stimuli (Angantyr et al., 2011; Daly et al., 2014; Franklin et al., 2013; Gómez-Leal et al., 2021; Laner et al., 2001; Levin

et al., 2017). We used images of children, rather than adult humans, because empathy is presumed greater for individuals that are less likely deemed responsible for their own suffering (Angantyr et al., 2011; Franklin et al., 2013) and because we wished to maximize the likelihood of evoking empathy for both dogs and children. We recorded viewing latency as a behavioral measure of distress together with a self-reported level of perceived distress. It was hypothesized that longer viewing time would indicate less distress from viewing the image and thus, lower empathy. Because it is unclear whether any associations between BPF and empathy-related distress would reflect deficits in specifically cognitive or affective empathy, we examined the indirect effects of BPF on distress through the affective and cognitive components of empathy as measured with Davis' (1983) widely used Interpersonal Reactivity Index (IRI) in Study 1.

In Study 2, we used a parallel measure of empathy for animals and humans and focused on only the overall level of trait empathy. We further hypothesized that associations between BPF and trait empathy toward animals and humans may be explained in part by the anxious and avoidant insecure attachment styles typical of individuals high in BPF. We considered anxious and avoidant attachment styles and trait empathy toward animals and humans as serial mediators of the association between BPF and distress for the suffering of dogs and children.

It is important to note that, although we conducted mediation models, it was not our intent to infer causation because of the correlational nature of our data. Rather, we adopted a mediation approach to test hypotheses about which component of a constellation of personality features may contribute to the variance in the outcomes. To be clear, we do not presume that exhibiting various features of PBD causes one to adopt a particular attachment style or to demonstrate a particular level of empathy. It does not make sense to think of a particular personality label or diagnosis as having causal power. Instead, we think of PBF as a complex constellation of features and we hope to better understand the underlying processes that lead to the interpersonal challenges that typify individuals high in these traits by testing the associations between attachment style and trait empathy to humans and dogs and the outcome of perceived distress of other humans and dogs. We recognize the argument for reserving the use of mediation for testing causal models, but we believe it can also be helpful as a statistical tool to account for variance in variables that are non-causal in nature. We argue that BPF predict attachment styles, which may lead to differences in empathy, although we recognize that longitudinal and experimental research designs are needed to test these hypotheses adequately. We also appreciate that other hypothesized relations between the variables are plausible.

### Study 1:

#### Trait empathy mediates distress for dogs and children

## METHOD

### Participants

Participants of this study were 496 students 18 years and older, recruited from the Psychology subject pool of a mid-

Table 1. Bivariate correlations and descriptive statistics for Study 1

	1	2	3	4	5	6	7	8	9
1. BPF	--	--	--	--	--	--	--	--	--
2. Perspective Taking	-.09	--	--	--	--	--	--	--	--
3. Fantasy	.16***	.29***	--	--	--	--	--	--	--
4. Empathic Concern	-.06	.57***	.37***	--	--	--	--	--	--
5. Personal Distress	.49***	-.03	.25***	.12**	--	--	--	--	--
6. Distress for Dogs	.14**	.09	.10*	.22**	.21***	--	--	--	--
7. Distress for Children	-.00	.12**	.04	.22***	.19***	.62***	--	--	--
8. RT Dogs	.06	.13**	.06	.09	.06	-.02	.01	--	--
9. RT Children	.02	.08	.11*	-.01	.01	-.04	-.02	.27***	--
Mean (SD)	1.76 (.45)	2.53 (.70)	2.32 (.74)	2.81 (.67)	1.75 (.65)	3.54 (.71)	3.39 (.87)	4.23 (6.76)	4.16 (4.24)

Note: RT = reaction time; \*  $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

sized midwestern university using the website, SONA. After eliminating participants for incomplete responses, the final sample consisted of 464 participants, (370 females, 79.74%) whose average age was 19.86 ( $SD = 3.07$ ). According to GPower for a regression model with five predictors, a sample size of approximately 250 is recommended. We deliberately oversampled to increase our power to detect indirect effects in our mediation models. In return for completing the study, participants received one research credit for their introductory course in Psychology. This study was approved by the authors' Institutional Review Board (#1136364-1).

**Materials and procedure**

Participants were directed to the secure website, Qualtrics.com, where they provided informed consent, and responded to some demographic questions such as reporting age and gender. Then, they completed the measures described below. All reported alphas are from the present study.

**Personality Assessment Inventory (PAI-BOR)**

The PAI-BOR (Morey, 1991) is a 24-item instrument that measures four common components (six items each) of borderline personality functions: affective instability ( $\alpha = .74$ ), identity problems ( $\alpha = .71$ ), negative relationships ( $\alpha = .60$ ), and self-harm ( $\alpha = .71$ ). A sample item for negative relationships is "People once close to me have let me down." Participants responded on a scale ranging from 0 (false, not at all true) to 3 (very true). Inter-item reliability for the overall measure was very good,  $\alpha = .87$ . We used only the average BPF score for the entire measure for the analyses reported here as we did not have specific hypotheses about the separate components.

**Interpersonal Reactivity Index (IRI)**

The IRI is a 28-item instrument used to measure cognitive and affective empathy. It consists of four subscales, each consisting of 7 items, measuring perspective-taking, empathic concern, personal distress, and fantasy (Davis, 1983). The perspective-taking subscale ( $\alpha = .79$ ) is the positive aspect of cognitive empathy that includes statements such as:

"I sometimes try to understand my friends better by imagining how things look from their perspective." The empathic concern subscale ( $\alpha = .78$ ) captures a positive aspect of affective empathy that is measured using statements such as: "I often have tender, concerned feelings for people less fortunate than me." The personal distress subscale ( $\alpha = .71$ ) captures a negative aspect of affective empathy; for example, "I sometimes feel helpless when I am in the middle of a very emotional situation." Finally, the fantasy subscale ( $\alpha = .71$ ) represents the negative outcome of cognitive empathy and captures the ability of the participant to immerse themselves fully in a character's perspective when reading or viewing media; for example, "I really get involved with the feelings of characters in a novel." Respondents used a 5-point Likert scale to indicate how well the statements described themselves from 0 (doesn't describe me at all) to 4 (describes me very well).

**Distress empathy assessment**

Before completing the standard questionnaires, participants were asked to view potentially distressing images of human children and domestic dogs experiencing 12 categories of adverse events (fallen through frozen ice, bleeding, amputation, trapped in fence, blind, in a burning building, being yelled at, fighting, being threatened with physical violence, sick, starving, abandoned). A single image appeared on the screen until the participant selected the "Next" button. For each category of aversive event, there was one image that depicted a child and another image that depicted a dog experiencing that type of event for a total of 24 images presented consecutively in the same random order for each participant. Each image presented a unique individual. Dog images included mostly adult dogs ( $N = 9$ ) of various breeds, with most being of mixed breed. Human children represented various ethnicities (7 White and 5 BIPOC) and mostly boys ( $N = 9$ ). Photos were non-copyrighted, freely available images obtained from an internet search.

Latency to advance to the next page (reaction time, or RT) after viewing the image was recorded by Qualtrics. After advancing past the image, participants were asked to rate their level of distress from viewing the previous image on a scale of 1 (not at all distressing) to 5 (very distressing). We calculated average scores for distress and latencies across

Table 2. Study 1: Results of the parallel multiple mediation analyses

	Distress to Dogs			Distress to Children		
	<i>b</i>	<i>t/z</i>	<i>p</i>	<i>b</i>	<i>t/z</i>	<i>p</i>
<i>1. Associations of BPF with Mediators</i>						
BPF → Fantasy	.16	3.57	<.001			
BPF → Personal Distress	.49	12.16	<.001			
BPF → Empathic Concern	-.06	-1.23	.218			
BPF → Perspective Taking	-.08	-1.82	.069			
<i>2. Associations with Distress</i>						
BPF (*Total effects) → Distress	.10	3.12	<.002	-.00	-.03	.973
BPF (*Direct effects) → Distress	.06	1.67	.097	-.08	-1.67	.095
Fantasy → Distress	-.02	-0.60	.548	-.08	-1.79	.074
Personal Distress → Distress	.11	2.79	.005	.20	4.35	<.001
Empathic Concern → Distress	.16	3.87	<.001	.17	3.47	<.001
Perspective Taking → Distress	-.01	-0.32	.747	.03	0.55	.583
<i>3. Indirect Effects with Distress</i>						
BPF → Fantasy → Distress	-.00	-0.57	.567	-.01	-1.56	.120
BPF → Personal Distress → Distress	.05	2.71	.007	.10	4.08	<.001
BPF → Empathic Concern → Distress	-.01	-1.14	.254	-.01	-1.07	.283
BPF → Perspective Taking → Distress	.00	0.28	.780	-.00	-0.46	.643

Note: \* Total effects refers to the association of BPF with distress if the mediators were not included in the model. Direct effects refer to the association of BPF with distress with the mediators controlled.

all twelve categories separately for dog (Distress to dog) and child images (Distress to child).

## RESULTS

All data and syntax can be accessed at the following link: <https://osf.io/rzcus>. Descriptive statistics and zero order correlations for the predictors and outcomes appear in Table 1.

Response latencies (RT) for dog and child photos correlated with each other but not with distress to either set of photos. Distress to dog photos correlated with distress to child photos. BPF correlated significantly with distress to the dog, but not the child photos. BPF positively correlated with the two negative components of the IRI: personal distress and fantasy. Perspective taking from the IRI correlated with distress to the child photos and response latencies for the dog photos. Fantasy correlated with response latencies to the child photos and distress to the dog photos. Empathic concern and personal distress correlated with distress to both the dog and child photos.

Because the response latencies did not correlate with reported distress or any of the other predictors except for perspective taking, we focused only on the distress measures for the subsequent analyses. We conducted mediation analyses using Hayes' (2018) Process model 4 using SPSS v. 29 for each outcome (distress to dog photos and distress to child photos) (see Table 2). The BPF subscales highly correlated with each other ( $r_s > .56$ ) and analyzing the models with each subscale yielded the same pattern of results. Therefore, all analyses were reported with the overall BPF score. We included standardized estimates of the BPF as the predictor and the four subscales of Davis' IRI (1983) as mediators, similar to the approach taken by Lee and Gibbons (2017). We used the seed command to link the models.

When examining the total effects of the predictor, BPF, on the outcomes of distress (in the second section of Table 2), BPF was significantly associated with the outcome of distress to dog photos, but not with distress to child photos. However, the direct effects of BPF on distress, indicating the association when the mediators are controlled in the model, only approaches significance. In assessing the associations between BPF and the mediators, (in the first section of Table 2), BPF was significantly associated with the two negative components of empathy from the IRI, namely fantasy and personal distress, but not with the more positive components, namely empathic concern or perspective taking. In examining the associations between the mediators and the outcomes (in the second section of Table 2), the two affective components of personal distress and empathic concern, but not the two cognitive components of fantasy or perspective taking, were significantly associated with distress to both dog and child photos. In assessing whether there was significant mediation of the association between BPF and distress through the components of empathy (in the third section of Table 2), we found that there were indirect effects of BPF on distress to both dog and child photos through personal distress.

## DISCUSSION

Our measures of viewing time did not associate with self-reported distress and appeared relatively unconnected to our predictors. Therefore, we focused on the outcome of self-reported distress. Our primary finding was that BPF were positively associated with distress to dog but not child photos. This result was consistent with our hypothesis. However, it is important to note that this effect disappeared when controlling for gender and trait empathy components (direct

Table 3. Descriptive statistics and correlations for Study 2

	1	2	3	4	5	6	7	8	9
1. BPF	--	--	--	--	--	--	--	--	--
2. Avoidant	.27***	--	--	--	--	--	--	--	--
3. Anxious	.58***	.42***	--	--	--	--	--	--	--
4. Animal Empathy	.10*	-.28***	.05	--	--	--	--	--	--
5. Human Empathy	.03	-.33***	.00	.63***	--	--	--	--	--
6. Distress for Dogs	.15***	-.06	.08	.39***	.25***	--	--	--	--
7. Distress for Children	.05	-.05	.01	.16**	.31***	.72***	--	--	--
8. RT Dogs	-.01	.06	.03	-.11*	.10*	-.18***	-.12***	--	--
9. RT Children	-.01	-.02	-.06	-.10*	-.09*	-.04	-.03	.29**	--
Mean (SD)	1.84 (.46)	2.98 (1.12)	3.83 (1.27)	5.62 (1.06)	5.55 (.82)	3.52 (.73)	3.34 (.71)	3.95 (4.15)	4.09 (4.47)

Note: RT = reaction time, \*  $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

effects). BPF were also significantly positively associated with fantasy and personal distress scores from the IRI – sometimes considered the negative components of cognitive and affective empathy respectively. This finding is interesting because others (Grzegorzewski et al., 2019; Pourmohammad et al., 2022) have found that BPD patients had cognitive but not affective deficits compared to control participants, and others have found deficits in both cognitive and affective empathy (Wang et al., 2021) but our findings do not suggest deficits in either perspective taking or empathic concern in individuals high in BPF.

Both affective components of empathy (empathic concern and personal distress) were associated with higher levels of distress for the photos of dogs and children. The finding that empathic concern was a significant predictor of distress for the dog photos is consistent with previous findings linking empathic concern to empathy for animals (e.g., Furnham et al., 2003; Gómez-Leal et al., 2021), and attitudes toward animal welfare (Taylor & Signal, 2005). However, empathic concern did not mediate the association between BPF and distress for dog photos. Individuals high in BPF show inconsistent general deficits in trait empathy, so the fact that there were no indirect effects of BPF on distress through empathic concern was not entirely surprising.

Given the positive associations between PBF and both negative aspects of empathy – fantasy and personal distress – it seemed reasonable to assume that these associations might account for the association between PBF and distress to viewing suffering dogs and children. Personal distress was positively associated with distress to the photos for both dogs and children. This finding is consistent with previous research showing that personal distress predicted attitudes toward animal suffering (Daly et al., 2014). Therefore, we conducted mediation analyses to test for indirect effects. We found significant indirect effects on empathy for both dog and child photos through personal distress. It is important to note that we do not take these findings to suggest that BPF cause personal distress, which in turn causes increased distress to viewing images of others in distress. Rather, we interpret these findings to show that it is the trait component of personal distress, which is one of many aspects of BP, that uniquely explains the variance shared between individuals high in BPF and their self-reported distress to viewing upsetting imagery. This finding is also unsurprising given the somewhat circular nature of the association between trait

level personal distress and reported distress to viewing a particular set of stimuli.

Rather than merely replicating these findings, we wished to extend our study further to explore the association between BPF, attachment style, trait empathy, and distress to viewing the same images as in Study 1. We conducted a second study where we focused on two specific forms of insecure attachment – anxious and avoidant attachment style – given that dysfunctional attachment to humans is a widely recognized characteristic of individuals high in BPF (Mikulincer & Shaver, 2007). Little is known about the association between BPF and attachment to pets (Vonk et al., 2016) or empathy toward animals. In Study 2, we employed various measures of empathy, but we focused our analyses on a measure of empathy that included items that could be applied to humans and to animals so that we could obtain separate but parallel measures of trait empathy for humans and for animals, which we had not done in Study 1. We included these separate measures of trait empathy, as well as measures of attachment style to more closely test our ideas about how difficulties in attachment to humans might underlie feelings of empathy toward companion animals. Once again, we recognize that we are unable to speculate about causal processes given the cross-sectional and correlational nature of our data (Cole & Maxwell, 2003; O’Laughlin, et al., 2018), but our goal was to test the associations between BPF and attachment, attachment and trait empathy, and attachment and trait empathy and distress to viewing the images of dogs and children in distress, which the serial mediation available using Process allowed us to do. We acknowledge that we are not testing the causal links between these quasi variables and that it is quite possible to test other conceptual models of the associations between these variables.

## Study 2:

### The mediating role of attachment style

## METHOD

### Participants and procedure

We recruited 645 college students from a mid-sized mid-western university using the SONA participant recruitment

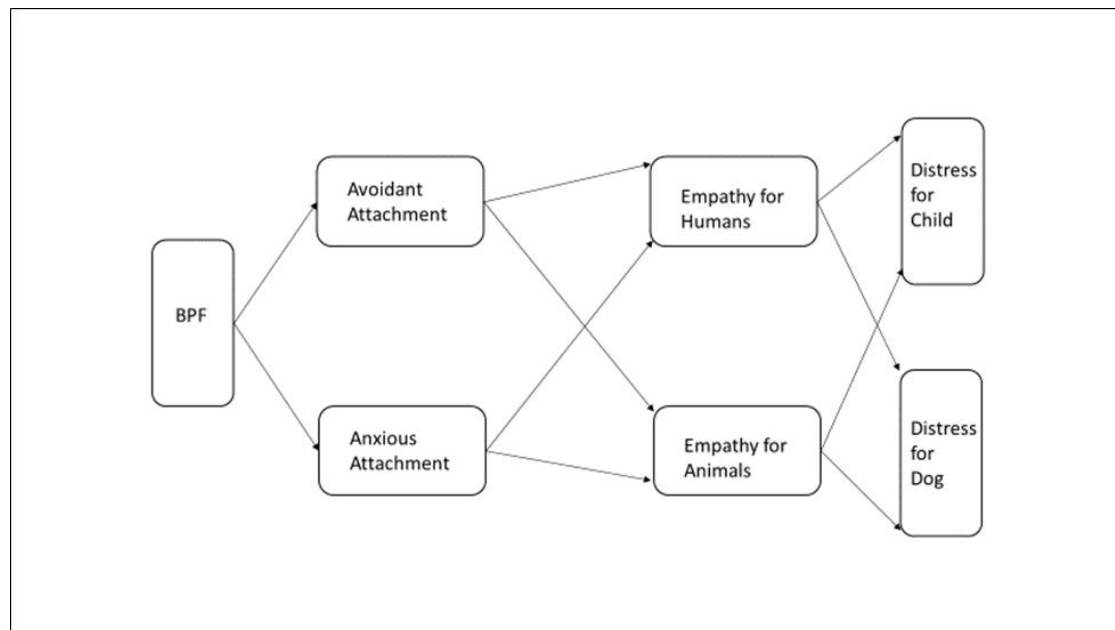


Figure 1. Conceptual model for Study 2

system. After removing incomplete data, we analyzed data from 524 (Females = 411, 78.4%) participants whose average age was 20.58 years with a *SD* of 4.53. According to GPower for a regression model with five predictors, a sample size of approximately 250 is recommended. We deliberately oversampled to increase our power to detect indirect effects in our mediation models. Participants completed the study for course credit on the secure website, Qualtrics.com. This study was approved by the authors' Institutional Review Board (#1136364-1).

## Materials

Participants completed the PAI Borderline scale to measure BPF as in Study 1 (all alpha values are from Study 2; overall scale,  $\alpha = .88$ , affective instability,  $\alpha = .72$ , identity,  $\alpha = .72$ , negative relationships,  $\alpha = .66$ , self-harm,  $\alpha = .72$ ). Moreover, participants viewed the same 24 images of dogs and children suffering, and, as in Study 1, reported their distress on a 5-point Likert scale after viewing each image. As before, we took the average distress rating for dog and child images separately as our measures of distress. In addition, participants completed the following new measures.

### *Multi-Dimensional Emotional Empathy Scale (MDEES)*

We adapted the MDEES (Alloway et al, 2016; Caruso & Mayer, 1998) to assess affective empathy for humans and animals. We retained only the 16 items from the original 30 items that could apply to both. We asked participants to respond to these statements concerning the extent to which they are affected by the suffering of humans and animals in two separate 16-item scales. For example, "The suffering of people/animals deeply disturbs me." They responded on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). Internal consistency was high for both empathy for humans ( $\alpha = .90$ ) and empathy for animals ( $\alpha = .94$ ).

### *Experience in Close Relationships Scale*

This 36-item scale (Brennan et al., 1998) includes two 18 item subscales of avoidant ( $\alpha = .92$ ) and anxious attachment ( $\alpha = .94$ ). Participants responded on a 7-point Likert scale from disagree strongly to agree strongly regarding their typical feelings within romantic relationships; for example, "I'm afraid that I will lose my partner's love."

## RESULTS

All data can be accessed at the following link: <https://osf.io/rzcus>. Descriptive statistics and zero order correlations for the predictors and outcomes appear in Table 3. As in Study 1, the BPF subscales correlated highly ( $r_s > .52$ ) and analyzing the models with each subscale yielded the same pattern of results. Therefore, all analyses were conducted with the overall BPF score. BPF correlated significantly with distress to the dog, but not to the child photos. Human and animal trait empathy correlated with both distress to the dog and to child photos. BPF also positively correlated with both avoidant and anxious attachment. Response times to dog and child photos correlated with empathy toward both animals and humans, but only response times to dog photos correlated with self-reported distress.

The conceptual model for the serial mediation appears in Figure 1. We do not intend to imply causality because we recognize that this cannot be determined using purely correlational and cross-sectional data (Cole & Maxwell, 2003; O'Laughlin, et al., 2018). However, we employed a serial mediation procedure to assess the individual associations between key variables in our model, recognizing that other directional and causal effects are possible. We analyzed the data using serial mediation with the Process (Hayes, 2020) procedure for SPSS version 3.5.3. The models used a bootstrap resampling method repeated 10000 times to generate a 95% percentile bootstrap confidence interval (CI) for the di-

Table 4, Study 2: Results of the serial mediation analyses

	<i>b</i>	<i>t/z</i>	<i>p</i>
<i>1. Associations of PBF with Attachment</i>			
BPF → Avoidant Attachment	.27	6.39	<.001
BPF → Anxious Attachment	.58	16.28	<.001
<i>2. Associations with Empathy for Animals</i>			
BPF → Empathy for Animals	.12	2.38	.018
Avoidant Attachment → Empathy for Animals	-.37	-8.05	<.001
Anxious Attachment → Empathy for Animals	-.13	2.45	.015
<i>3. Associations with Empathy for Humans</i>			
BPF → Empathy for Humans	.07	1.34	.182
Avoidant Attachment → Empathy for Humans	-.41	-9.09	<.001
Anxious Attachment → Empathy for Humans	-.14	2.54	.031
<i>4. Associations with Distress to Dogs</i>			
BPF (*Total Effects) → Distress to Dogs	.15	3.58	<.001
BPF (*Direct Effects) → Distress to Dogs	.13	2.54	.011
Avoidant Attachment → Distress to Dogs	.03	0.72	.473
Anxious Attachment → Distress to Dogs	-.03	-0.59	.553
Empathy for Animals → Distress to Dogs	.38	7.19	<.001
Empathy for Humans → Distress to Dogs	.02	0.45	.651
<i>5. Indirect Effects on Distress to Dog</i>			
BPF → Avoidant → Distress to Dogs	.01		
BPF → Anxious → Distress to Dogs	-.02		
BPF → Empathy for Animals → Distress to Dogs	.05		
BPF → Empathy for Humans → Distress to Dogs	.00		
BPF → Avoidant→Empathy for Animals → Distress to Dogs	-.04		
BPF → Avoidant→Empathy for Humans → Distress to Dogs	-.00		
BPF → Anxious→Empathy for Animals → Distress to Dogs	.03		
BPF → Anxious→Empathy for Humans → Distress to Dogs	.00		
<i>6. Associations with Distress to Children</i>			
BPF (Total) → Distress to Children	.05	1.06	.289
BPF (Direct) → Distress to Children	.05	0.92	.359
Avoidant Attachment → Distress to Children	.06	1.11	.268
Anxious Attachment → Distress to Children	-.04	-1.74	.462
Empathy for Animals → Distress to Children	-.05	-1.92	.360
Empathy for Humans → Distress to Children	.36	6.45	<.001
<i>7. Indirect Effects on Distress to Children</i>			
BPF → Avoidant → Distress to Children	.01		
BPF → Anxious → Distress to Children	-.02		
BPF → Empathy for Animals → Distress to Children	-.01		
BPF → Empathy for Humans → Distress to Children	.02		
BPF → Avoidant→Empathy for Animals → Distress to Child	.00		
BPF → Avoidant→Empathy for Humans → Distress to Child	-.04		
BPF → Anxious→Empathy for Animals → Distress to Child	-.00		
BPF → Anxious→Empathy for Humans → Distress to Child	.03		

Note. \* Total effects refers to the association of BPF with distress if the mediators were not included in the model. Direct effects refer to the association of BPF with distress with the mediators controlled.

rect and indirect associations. We ran four models with BPF as the predictor and anxious and avoidant attachment styles predicting empathy for humans and animals, which then predicted a) feelings of distress for dogs and b) children and response times for viewing images of c) dogs and d) children. We used the seed command to link the models. When examining Table 4, Section 1 shows the associations of BPF with avoidant and anxious attachment (the first set of medi-

ators). Sections 2 and 3 show the associations between BPF and attachment styles with empathy for animals and humans (respectively). Section 4 shows the associations with BPF (both total effects when the mediators are not included in the model and direct effects when mediators are controlled) and both sets of mediators on the outcome of distress to dog photos. Section 6 shows these associations with the outcomes of distress to child photos. Sections 5 (dog) and 7 (child)



show the indirect or mediation effects of BPF through the first (attachment) and second (empathy) set of mediators to distress separately, and then through the serial mediation of attachment to empathy.

There were no direct or indirect effects of borderline traits on response times for either dog or child photos. Thus, we focus our discussion on the results for the analyses with self-reported distress. Only BPF and empathy for animals significantly predicted distress for the dog photos (Section 4 of Table 4). However, there were indirect effects of BPF on distress for the dog photos through empathy for animals and through the serial mediation of empathy to animals through both avoidant and anxious attachment (Section 5 of Table 4). In contrast, only empathy for humans significantly predicted distress for the child photos (Section 6 of Table 4). In addition, there were indirect effects of BPF on distress for the child photos through the serial mediation of empathy to humans through both avoidant and anxious attachment (Section 7 of Table 4).

## DISCUSSION

As in Study 1, our viewing time measure was not consistent in characterizing distress at viewing the photos, so we again focused on self-reported distress. We replicated the finding that individuals high in BPF reported feeling more distress at viewing dog, but not child photos, compared to those low in BPF. BPF also predicted trait empathy for animals but not for humans. This study corroborates the finding from Study 1 that individuals high in BPF do not necessarily show deficits in empathy toward humans, but may show increased empathy for nonhumans. This is despite the fact that empathy for animals and humans highly correlated. Importantly, these unique associations between BPF and empathy for animals remained when we controlled for gender, suggesting that they could not be attributed to the greater tendency of females to be high in BPF and previously observed gender differences in empathy toward animals (Angantyr et al., 2011; Daly et al., 2014; Gómez-Leal et al., 2021; Levin et al., 2017). Importantly, we replicated the main finding of Study 1 using a different measure of trait empathy here that could be applied to both humans and nonhumans.

We also extended the findings of Study 1 to show that the higher levels of avoidant and anxious attachment style in those high versus low in BPF predicted lower levels of empathy for both animals and humans, which, in turn, predicted distress to dog and human photos respectively. Notably, trait empathy for animals predicted only distress to dog photos whereas trait empathy for humans predicted only distress to child photos. This pattern affirms our use of self-reported distress to photos as indicative of empathy. Our findings suggest that associations between BPF and empathy may be at least partially explained by their unique and customarily dysfunctional attachment styles (Beeney et al., 2015; Kılıç et al., 2020; Mikulincer & Shaver, 2007), with both anxious and avoidant attachment patterns predicting lower trait empathy. We should reiterate here that we are not implying that BPFs cause dysfunctional attachments, which cause differential empathy. Rather, we think it is likely that dysfunctional attachments play a causal role in the expression of BPF. Our data do not allow us to differentiate causal

explanations. However, we wished to show that both avoidant and anxious attachment styles were associated with BPFs, and that these attachment styles could provide one route through which one might shift attachment from humans to potentially less threatening attachment figures, such as companion animals (Kim, 2019). It is difficult to test causal associations developmentally as researchers will never have the ability to experimentally manipulate variables such as attachment and personality, but longitudinal studies will be necessary to provide more clarity on the underlying processes. It is our hope that our initial, admittedly imperfect, tests of these novel hypotheses inspire further work of that nature.

## GENERAL DISCUSSION

Recently, there has been a growing interest in the association between empathy for humans and empathy for animals (Giacomin et al., 2023). We attempted to extend previous findings by using a behavioral measure of viewing time in conjunction with self-reported distress for images of dogs and human children experiencing twelve unique and matched adverse scenarios. Previous studies (Angantyr et al., 2011; Daly et al., 2014; Levin et al., 2017) compared distress to dogs and humans in scenarios where they were described as victims of abuse, but these prior studies did not display multiple images of different dogs and humans experiencing diverse adverse conditions. Westbury and Neumann (2008) did present a smaller number of participants (73) with films of various animals in adverse situations. They also measured skin conductance as a physiological measure of distress, which corroborated the self-reported distress assessments. We found that, similar to previous studies showing modest correlations for animal and human empathy (Colombo et al., 2017; Gómez-Leal et al., 2021; Paul, 2000; Poresky, 1990), trait empathy for animals and humans were significantly correlated. We found a somewhat higher correlation here ( $r = .63$ ) compared to previous studies, likely due to the fact that we presented the same items on both empathy scales in Study 2, varying only the target. In addition, we found that self-reported distress scores for images of dogs and human children experiencing negative events were also highly correlated ( $r = .62$  and  $.72$  in Studies One and Two). However, also similar to previous studies that showed different predictors for animal and human empathy (Giacomin et al., 2023; Paul, 2000), we found that BPF predicted distress for animal but not human targets.

The current literature presents a somewhat disjointed view of whether there is a singular empathy trait, or whether empathy toward humans and animals may represent distinct facets. One approach to clarify the findings is to examine potential predictors of differences in empathy to animals and humans. However, only a single study has examined how human personality features might predict empathy toward humans and animals, and that study focused on narcissism – a personality type associated with deficits in empathy (Giacomin et al., 2023). Here, we present the first data (to our knowledge) on the association between BPF and empathy for animals and humans. We focused on BPF because of the known interpersonal difficulties in individuals with BPF (Beeney et al., 2015; Kılıç et al., 2020; Mikulincer &

Shaver, 2007; Zeigler-Hill & Vonk, 2023), and the suggestion that bonds with companion animals can mitigate the negative psychological effects of loneliness and social rejection (Kim, 2019; McConnell et al., 2011; Staats et al., 2008). Despite the intriguing hypothesis that individuals who struggle with human intimacy may redirect their need for affection to animal companions, there is a lack of data on those with aversive personality features and their relationships with animals. To our knowledge, only a single study has examined BPF in particular and relationships with companion animals (Vonk et al., 2016). We examined the mediating roles of trait empathy and attachment style to further attempt to predict empathy toward animals and humans. Across two studies, we found that BPF predicted greater distress for the suffering of dogs, but not human children. These effects were mediated by the personal distress component of affective empathy in Study 1 and through anxious and avoidant attachment and empathy for animals in Study 2.

These findings make sense given the known dysfunctional attachments experienced by individuals with BPFs (Beeney et al., 2015; Kılıç et al., 2020; Mikulincer & Shaver, 2007) and the inconsistent results concerning their empathy for humans (Dziobek et al., 2011; Grzegorzewski et al., 2019; Salgado et al., 2020). Interestingly, whereas BPF predicted more anxious and avoidant attachment, and these dysfunctional attachment patterns were negatively associated with empathy to animals and humans, BPF still predicted greater distress only for dogs. It is possible that the association between BPF and empathy for animals may be explained by transfer of attachment from humans to animals. Here, we assessed only attachment styles toward humans. We did not specifically assess attachment to animals (in part because our participants were not limited to pet owners), although we did separately measure empathy for humans and animals. We found that both avoidant and anxious attachment were uniquely negatively associated with both empathy for animals and for humans (although it is of note that zero-order correlations do not show an association between anxious attachment and empathy). In an unrelated study (Vonk et al., 2023), we found animal and human attachment styles were moderately correlated ( $r = .34$  and  $r = .48$  for avoidant and anxious styles, respectively). Future work should examine how attachment to humans is associated with attachment to animals in individuals high in BPF in particular.

Given the mediating role of personal distress in Study 1, it is possible that the greater degree of personal distress experienced by those high in BPFs is the best explanation for their experienced distress at viewing the photos displayed here. We do not think this association is restricted to empathy under conditions of distress, however, because BPF also predicted trait empathy for animals but not humans in Study 2. It is notable that BPF in Study 1 were associated with the two negative components of empathy; personal distress and fantasy rather than the more commonly studied positive components of cognitive and affective empathy; perspective-taking and empathic concern. Personal distress is commonly reported in the literature as being significantly higher in individuals high in BPF compared to those low in BPF (Dittrich et al., 2020; Pourmohammad et al., 2022; Salgado et al., 2020). Thus, our findings do not uniquely implicate

affective rather than cognitive empathy deficits in individuals high in BPF. However, the negative affective component of personal distress may be the primary factor underlying observed deficits in empathy toward humans.

In Study 2, we focused on the insecure attachment styles of avoidant and anxious attachment rather than trait empathy components as mediators of the association between BPF and distress for the suffering of others. Richman et al. (2015) found that avoidant attachment was negatively associated with willingness to donate to both human and animal charities, and this association was mediated by empathic concern. However, when the authors used a “mood-freeze condition” manipulation, ostensibly to mitigate the perceived emotional costs of closeness, they found that individuals high in avoidant attachment did not help less than those low in avoidant attachment. Avoidant attachment has also been negatively associated with emotional responses to human infant photographs. However, anxious and avoidant attachment styles were not associated with baby schema effects – a measure of the desire to nurture – with either infant human and animal photos (Lehmann et al., 2013). Thus, further work is needed to clarify the role of avoidant attachment and empathic responses. The current work suggests that both anxious and avoidant attachment styles may contribute to lower levels of empathy for animal and human targets, but that individuals experiencing these forms of attachment to humans may nonetheless feel empathy for animals. It is important to note that mediation analyses cannot be taken to determine causality when used with correlational data, as was done here.

### Limitations and future directions

Although much of the previous work on borderline personality and empathy focused on clinical patients, our participants were not diagnosed with BPD. Both of our samples were predominantly female and females are significantly more likely to have BPF. Thus, our results may not generalize to clinical BPD patients or to males. Our participants were also college students so our results may not generalize to older adults, who are more likely to have engaged in significant caretaking. We did not examine participants' prior experience with pets or animals in a caretaking capacity, which should be included in future studies considering the moderating effects of these variables in prior studies (Gómez-Leal et al., 2021; Paul, 2000).

Previous work has examined the age and inferred vulnerability of ostensive animal and human victims (Levin et al., 2017). It would be of interest to determine whether perceived vulnerability is a factor that impacts the empathy of individuals with BPF. We assessed participants' responses to children but not to adult humans, and our dog photos included photos of adult dogs as well as puppies, so we did not control for the age of the dog. We were not worried about focusing solely on juvenile dogs as all animals may be perceived as less responsible for their circumstances under human care, compared to human adults (Angantyr et al., 2011). Consistent with this assumption, prior studies found age effects on empathy only for human targets, and not for animal targets (Laner et al., 2001; Levin et al., 2017). Furthermore, studies of neural activation in response to images of suffering dogs and humans showed no effects of age of

the dogs or humans depicted (Franklin et al., 2013). Westbury and Neumann (2008) presented participants with film clips of a more diverse group of animals (birds, quadruped companion mammals, quadruped utilitarian mammals, and nonhuman primates) and found the highest rates of empathy for companion mammals, suggesting that pet dogs were appropriate comparison animals against human children. A prior study also showed similar rates of empathy for dogs and cats (Angantyr et al., 2011), suggesting the results may generalize to other companion animals. Our results provide the strongest test case of the hypotheses concerning empathy toward companion animals because we did not restrict our stimuli to the respondents' pets, or even require them to be pet owners. However, future studies should use a measure of attachment and empathy toward a specific companion animal.

Although we tried to measure distress by determining viewing time of the disturbing images for the first time, our viewing time measure did not appear valid as it did not correlate with the self-reported distress or empathy measures. Thus, we were left with a self-report measure of distress but we cannot verify that this would relate to participants' actual behaviors toward dogs and children in need. Westbury and Neumann (2008) showed that self-reported distress and physiological indicators of distress were correlated, and were also associated with trait empathy scores, which helps to validate the use of self-report distress and trait empathy measures.

## Conclusions

We demonstrate, for the first time, that individuals high in BPF may show greater empathy for animals relative to those low in BPF. In contrast, BPF are not associated with empathy for human children, except indirectly through personal distress. This mediating effect may be partly due to our measurement of empathy, which focused on self-reported distress to distressing images of dogs and human children. However, we also observed unique associations with BPF and trait empathy for animals, but not humans. We corroborated previous research in showing that individuals higher in BPF showed higher levels of both avoidant and anxious attachment, which were negatively associated with empathy for both humans and animals. However, BPF were still positively associated with empathy to animals – both at the trait level and when measured as specific distress to images of several dogs experiencing adverse conditions. The current results cannot speak to the causal mechanisms underlying the association between BPF and empathy for animals but we suspect that some individuals may reassign empathy from humans to companion animals when they experience fear or rejection and distrust with other humans. Future work should investigate these intriguing hypotheses and the extent to which empathy toward companion animals, like dogs, may extend to animals more broadly.

## ACCOUNTS

All data and associated syntax are available at <https://osf.io/rzruc>

Conflict of Interest Disclosure: none to report

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Both studies were approved by the IRB # 1136364-1.

## Acknowledgements

We wish to thank Virgil Zeigler-Hill for statistical advice and helpful discussions.

## REFERENCES

- Alloway, T. P., Copello, E., Loesch, M., Soares, C., Watkins, J., Miller, D., ... & Ray, S. (2016). Investigating the reliability and validity of the Multidimensional Emotional Empathy Scale. *Measurement*, *90*, 438-442. <https://doi.org/10.1016/j.measurement.2016.05.014>
- Angantyr, M., Eklund, J., & Hansen, E. M. (2011). A comparison of empathy for humans and empathy for animals. *Anthrozoös*, *24*, 369-377. <https://doi.org/10.2752/175303711X13159027359764>
- Beene, J. E., Stepp, S. D., Hallquist, M. N., Scott, L. N., Wright, A. G. C., Ellison, W. D., ... Pilkonis, P. A. (2015). Attachment and social cognition in borderline personality disorder: Specificity in relation to antisocial and avoidant personality disorders. *Personality Disorders: Theory, Research, and Treatment*, *6*, 207-215. <https://doi.org/10.1037/per0000110>
- Brennan, K. A., Clark, C. L. and Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In Simpson, J. A. and Rholes, W. S. (Eds.) *Attachment theory and close relationships* (pp. 46–76). New York: Guilford.
- Brown, C. M., & McLean, J. L. (2015). Anthropomorphizing dogs: Projecting one's own personality and consequences for supporting animal rights. *Anthrozoös*, *28*, 73-86. <https://doi.org/10.2752/089279315X14129350721975>
- Cameron, C. D., Lengieza, M. L., Hadjiandreou, E., Swim, J. K., & Chiles, R. M. (2022). Empathic choices for animals versus humans: the role of choice context and perceived cost. *The Journal of Social Psychology*, *162*, 161-177. <https://doi.org/10.1080/00224545.2021.1997890>
- Caramazza, A., & Shelton, J. R. (1998). Domain-specific knowledge systems in the brain: The animate–inanimate distinction. *Journal of Cognitive Neuroscience*, *10*, 1–34. <https://doi.org/10.1162/089892998563752>
- Caruso, D. R., & Mayer, J. D. (1998). The multidimensional emotional empathy scale (MDEES). [Measurement Instrument]
- Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*, *112*, 558.
- Colombo, E. S., Crippa, F., Calderari, T., & Prato-Previde, E. (2017). Empathy toward animals and people: The role of gender and length of service in a sample of Italian veterinarians. *Journal of Veterinary Behavior*, *17*, 32-37. <https://doi.org/10.1016/j.jveb.2016.10.010>
- Conklin, C. Z., Bradley, R., & Westen, D. (2006). Affect regulation in borderline personality disorder. *The Journal of nervous and mental disease*, *194*, 69-77. <https://doi.org/10.1097/01.nmd.0000198138.41709.4f>
- da Costa, H. P., Vrabel, J. K., Zeigler-Hill, V., & Vonk, J. (2018). DSM-5 pathological personality traits are associated with the ability to understand the emotional states of others. *Journal of Research in Personality*, *75*, 1-11. <https://doi.org/10.1016/j.jrp.2018.05.001>
- Daly, B., Taylor, N., & Signal, T. (2014). Pups and babes: Quantifying sources of difference in emotional and behavioral reactions

- to accounts of human and animal abuse. *Anthrozoös*, 27, 205-217. <https://doi.org/10.2752/175303714X13903827487485>
- Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44, 113-126. <https://doi.org/10.1037/0022-3514.44.1.113>
- Dinsdale, N., & Crespi, B. J. (2013). The borderline empathy paradox: evidence and conceptual models for empathic enhancements in borderline personality disorder. *J Pers Disord*, 27, 172-95. <https://doi.org/10.1521/pedi.2013.27.2.172>
- Dittrich, K., Bermpohl, F., Kluczniok, D., Attar, C. H., Jaite, C., Fuchs, A., ... & Boedeker, K. (2020). Alterations of empathy in mothers with a history of early life maltreatment, depression, and borderline personality disorder and their effects on child psychopathology. *Psychological Medicine*, 50, 1182-1190. <https://doi.org/10.1017/S0033291719001107>
- Dziobek, I., Preißler, S., Grozdanovic, Z., Heuser, I., Heekeren, H. R., & Roepke, S. (2011). Neuronal correlates of altered empathy and social cognition in borderline personality disorder. *NeuroImage*, 57, 539-548. <https://doi.org/10.1016/j.neuroimage.2011.05.005>
- Eisenberg, N. (1988). Empathy and sympathy: A brief review of the concepts and empirical literature. *Anthrozoös*, 2, 15-17. <https://doi.org/10.2752/089279389787058226>
- Fertuck, E.A., Jekal, A., Song, I., Wyman, B., Morris, M.C., Wilson, S.T., Brodsky, B.S., Stanley, B. (2009) Enhanced reading the mind in the eyes in borderline personality disorder compared to healthy controls. *Psychological Medicine*, 39, 1979-1988. <https://doi.org/10.1017/S003329170900600X>
- Flasbeck, V., Enzi, B., & Brüne, M. (2017). Altered empathy for psychological and physical pain in borderline personality disorder. *Journal of personality disorders*, 31, 689-708. <https://doi.org/10.1521/pedi201731276>
- Franklin Jr, R. G., Nelson, A. J., Baker, M., Beeney, J. E., Vescio, T. K., Lenz-Watson, A., & Adams Jr, R. B. (2013). Neural responses to perceiving suffering in humans and animals. *Social neuroscience*, 8, 217-227. <https://doi.org/10.1080/17470919.2013.763852>
- Furnham, A., McManus, C., & Scott, D. (2003). Personality, empathy and attitudes to animal welfare. *Anthrozoös*, 16, 135-146. <https://doi.org/10.2752/089279303786992260>
- Giacomin, M., Johnston, E.E., & Legge, E. (2023). Exploring narcissism and human- and animal-centered empathy in pet owners. *Frontiers in Psychology*, 14, 1087049.
- Giammarco, E. A., & Vernon, P. A. (2014). Vengeance and the dark triad: The role of empathy and perspective taking in trait forgiveness. *Personality and Individual Differences*, 67, 23-29. <https://doi.org/10.1016/j.paid.2014.02.010>
- Gómez-Leal, R., Costa, A., Megías-Robles, A., Fernández-Berrocá, P., & Faria, L. (2021). Relationship between emotional intelligence and empathy towards humans and animals. *PeerJ*, 9, e11274. <https://doi.org/10.7717/peerj.11274>
- Graumann, L., Cho, A. B., Kulakova, E., Deuter, C. E., Wolf, O. T., Roepke, S., ... & Wingenfeld, K. (2023). Impact of social exclusion on empathy in women with borderline personality disorder. *European Archives of Psychiatry and Clinical Neuroscience*, 273, 865-874.
- Grzegorzewski, P., Kulesza, M., Pluta, A., Iqbal, Z., & Kucharska, K. (2019). Assessing self-reported empathy and altruism in patients suffering from enduring borderline personality disorder. *Psychiatry Research*, 273, 798-807. <https://doi.org/10.1016/j.psychres.2018.12.109>
- Harari, H., Shamay-Tsoory, S. G., Ravid, M., & Levkovitz, Y. (2010). Double dissociation between cognitive and affective empathy in borderline personality disorder. *Psychiatry Research*, 175, 277-279. <https://doi.org/10.1016/j.psychres.2009.03.002>
- Holt, R., Upadhyay, J., Smith, P., Allison, C., Baron-Cohen, S., & Chakrabarti, B. (2018). The Cambridge sympathy test: Self-reported sympathy and distress in autism. *PLoS ONE*, 13, 13. <https://doi.org/10.1371/journal.pone.0198273>
- Ingham, H. R. W., Neumann, D. L., & Waters, A. M. (2015). Empathy-related ratings to still images of human and nonhuman animal groups in negative contexts graded for phylogenetic similarity. *Anthrozoös*, 28, 113-130. <https://doi.org/10.2752/089279315X14129350722136>
- Jonason, P. K., & Krause, L. (2013). The emotional deficits associated with the dark triad traits: Cognitive empathy, affective empathy, and alexithymia. *Personality and Individual Differences*, 55, 532-537. <https://doi.org/10.1016/j.paid.2013.04.027>
- Kılıç, F., Demirdaş, A., Işık, Ü., Akkuş, M., Atay, İ. M., & Kuzugüdenlioğlu, D. (2020). Empathy, alexithymia, and theory of mind in borderline personality disorder. *Journal of Nervous and Mental Disease*, 208, 736-741. <https://doi.org/10.1097/NMD.0000000000001196>
- Kim, S. J. (2020). *Canine-assisted therapy for borderline personality disorder* (Doctoral dissertation, Alliant International University).
- Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2012). Initial construction of a maladaptive personality trait model and inventory for DSM-5. *Psychological Medicine*, 42, 1879-1890. <https://doi.org/10.1017/S0033291711002674>
- Laner, M., Benin, M., & Ventrone, N. (2001). Bystander attitudes toward victims of violence: Who's worth helping? *Deviant Behavior*, 22, 23-42. <https://doi.org/10.1080/016396201750065793>
- Lass-Hennemann, J., Schäfer, S. K., Sopp, M. R., & Michael, T. (2022). The relationship between attachment to pets and mental health: the shared link via attachment to humans. *BMC psychiatry*, 22, 1-9. <https://doi.org/10.1186/s12888-022-04199-1>
- Lee, S. A., & Gibbons, J. A. (2017). The Dark Triad and compassion: Psychopathy and narcissism's unique connections to observed suffering. *Personality and Individual Differences*, 116, 336-342. <https://doi.org/10.1016/j.paid.2017.05.010>
- Lehmann, V., Huis in't Veld, Elisabeth M. J., & Vingerhoets, A. J. M. (2013). The human and animal baby schema effect: Correlates of individual differences. *Behavioural Processes*, 94, 99-108. <https://doi.org/10.1016/j.beproc.2013.01.001>
- Levin, J., Arluke, A., & Irvine, L. (2017). Are people more disturbed by dog or human suffering?: Influence of victim's species and age. *Society & Animals*, 25, 1-16. <https://doi.org/10.1163/15685306-12341440>
- Levine, D., Marziali, E., & Hood, J. (1997). Emotion processing in borderline personality disorders. *The Journal of Nervous and Mental Disease*, 185, 240-246. <https://doi.org/10.1097/00005053-199704000-00004>
- Mason, M. F., Banfield, J. F., & Macrae, C. N. (2004). Thinking about actions: The neural substrates of person knowledge. *Cerebral Cortex*, 14, 209-214. <https://doi.org/10.1093/cercor/bhg120>
- McConnell, A. R., Brown, C. M., Shoda, T. M., Stayton, L. E., & Martin, C. E. (2011). Friends with benefits: on the positive consequences of pet ownership. *Journal of Personality and Social Psychology*, 101, 1239. <https://doi.org/10.1037/a0024506>
- Meehan, K. B., Panfilis, C. D., Cain, N. M., Antonucci, C., Soliani, A., Clarkin, J. F., & Sambataro, F. (2017). Facial emotion recognition and borderline personality pathology. *Psychiatry Research*, 255, 347-354. <https://doi.org/10.1016/j.psychres.2017.05.042>
- Mehrabian, A. and Epstein, N. (1972). A measure of emotional empathy. *Journal of Personality*, 4, 525-543. <https://doi.org/10.1111/j.1467-6494.1972.tb00078.x>

- Miano, A., Dziobek, I., & Roepke, S. (2017). Understanding interpersonal dysfunction in borderline personality disorder: A naturalistic dyadic study reveals absence of relationship-protective empathic inaccuracy. *Clinical Psychological Science*, 5, 355-366. <https://doi.org/10.1177/2167702616683505>
- Mikulincer, M., & Shaver, P. R. (2010). *Attachment in adulthood: Structure, dynamics, and change*. Guilford Publications.
- Minzenberg, M. J., Poole, J. H., & Vinogradov, S. (2006). Social-emotion recognition in borderline personality disorder. *Comprehensive psychiatry*, 47, 468-474. <https://doi.org/10.1016/j.comppsy.2006.03.005>
- Morey, L. C., (1991). *Personality Assessment Inventory: Professional manual*. Odessa, FL: Psychological Assessment Resources.
- O'Laughlin, K. D., Martin, M. J., & Ferrer, E. (2018). Cross-sectional analysis of longitudinal mediation processes. *Multivariate Behavioral Research*, 53, 375-402.
- Paul, E. S. (2000). Empathy with animals and with humans: Are they linked? *Anthrozoös*, 13, 194-202. <https://doi.org/10.2752/089279300786999699>
- Plous, S. (1993). Psychological mechanisms in the human use of animals. *Journal of Social Issues*, 49, 11-52. <https://doi.org/10.1111/j.1540-4560.1993.tb00907.x>
- Poresky, R. H. (1990). The young children's empathy measure: Reliability, validity and effects of companion animal bonding. *Psychological Reports*, 66, 931-936. <https://doi.org/10.2466/pr0.1990.66.3.9>
- Pourmohammad, P., Imani, M., & Goodarzi, M. A. (2022). Personal distress mediates the relationship between childhood trauma and interpersonal vulnerabilities in individuals with borderline personality disorder. *Current Psychology*, 1-12.
- Reevy, G. M., & Delgado, M. M. (2015). Are emotionally attached companion animal caregivers conscientious and neurotic? Factors that affect the human-companion animal relationship. *Journal of Applied Animal Welfare Science*, 18, 239-258. <https://doi.org/10.1080/10888705.2014.988333>
- Richman, S. B., DeWall, C. N., & Wolff, M. N. (2015). Avoiding affection, avoiding altruism: Why is avoidant attachment related to less helping? *Personality and Individual Differences*, 76, 193-197. <https://doi.org/10.1016/j.paid.2014.12.018>
- Ritter, K., Dziobek, I., Preißler, S., Rüter, A., Vater, A., Fydrich, T., Lammers, C., Heekeren, H. R., Roepke, S. (2011). Lack of empathy in patients with narcissistic personality disorder. *Psychiatry Research*, 187, 241-247. <https://doi.org/10.1016/j.psychres.2010.09.013>
- Salgado, R. M., Pedrosa, R., & Bastos-Leite, A. J. (2020). Dysfunction of empathy and related processes in borderline personality disorder: a systematic review. *Harvard Review of Psychiatry*, 28, 238. <https://doi.org/10.1097/HRP.0000000000000260>
- Savage, M., & Lenzenweger, M. F. (2018). The impact of social exclusion on "Reading the Mind in the Eyes" performance in relation to borderline personality disorder features. *Journal of personality disorders*, 32, 109-130. [https://doi.org/10.1521/pedi\\_2017\\_31\\_293](https://doi.org/10.1521/pedi_2017_31_293)
- Serpell, J. (1986). *In the company of animals*. Oxford: Basil Blackwell.
- Serpell, J. A. and Paul, E. S. (1994). Pets and the development of positive attitudes to animals. In A. Manning and J. Serpell. (Eds). *Animals and Human Society: Changing Perspectives*, 127-144. London: Routledge. <https://doi.org/10.4324/9780203421444>
- Signal, T. D., & Taylor, N. (2007). Attitude to animals and empathy: Comparing animal protection and general community samples. *Anthrozoös*, 20, 125-130. <https://doi.org/10.2752/175303707X207918>
- Staats, S., Wallace, H., & Anderson, T. (2008). Reasons for companion animal guardianship (pet ownership) from two populations. *Society & Animals*, 16, 279-291. <https://doi.org/10.1163/156853008X323411>
- Taylor, N., & Signal, T. D. (2005). Empathy and attitudes to animals. *Anthrozoös*, 18, 18-27. <https://doi.org/10.2752/089279305785594342>
- Veevers, J. E. (2016). The social meanings of pets: Alternative roles for companion animals. In *Pets and the Family* (pp. 11-30). Routledge. <https://doi.org/10.4324/9781315784656-3>
- Vonk, J., Khalid, A., Johnson, A., Cameron, P., & Eddie Lee, K. T. (2023). Avoidant attachment mediates cultural differences in likelihood to surrender pets. *Anthrozoös*, 1-21.
- Vonk, J., Patton, C., & Galvan, M. (2016). Not so cold-blooded: narcissistic and borderline personality traits predict attachment to traditional and non-traditional pets. *Anthrozoös*, 29, 627-637. <https://doi.org/10.1080/08927936.2016.1228762>
- Vonk, J., Zeigler-Hill, V., Mayhew, P., & Mercer, S. (2013). Mirror, mirror on the wall, which form of narcissist knows self and others best of all? *Personality and Individual Differences*, 54, 396-401. <https://doi.org/10.1016/j.paid.2012.10.010>
- Wagner, A. W., & Linehan, M. M. (1999). Facial expression recognition ability among women with borderline personality disorder: Implications for emotion regulation? *Journal of Personality Disorders*, 13, 329-344. <https://doi.org/10.1521/pedi.1999.13.4.329>
- Wai, M., & Tiliopoulos, N. (2012). The affective and cognitive empathic nature of the dark triad of personality. *Personality and Individual Differences*, 52, 794-799. <https://doi.org/10.1016/j.paid.2012.01.008>
- Wilks, M., Caviola, L., Kahane, G., & Bloom, P. (2021). Children prioritize humans over animals less than adults do. *Psychological Science*, 32, 27-38. <https://doi.org/10.1177/09567976209603>
- Westbury, H. R., & Neumann, D. L. (2008). Empathy-related responses to moving film stimuli depicting human and non-human animal targets in negative circumstances. *Biological psychology*, 78, 66-74. <https://doi.org/10.1016/j.biopsycho.2007.12.009>
- Zeigler-Hill, V., & Vonk, J. (2023). Borderline personality features and mate retention behaviors: The mediating roles of suspicious and reactive jealousy. *Sexes*, 4, 507-521.

Received July 5, 2023  
Accepted November 8, 2023