

## The Relationship Between Humane Interactions with Animals, Empathy, and Prosocial Behavior among Children

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We investigated the relationship between empathy, prosocial behavior, and frequency of humane interactions with animals among 3<sup>rd</sup> grade children ( $n = 158$ ). We measured the frequency of humane interactions with animals via the Children's Treatment of Animals Questionnaire (Thompson & Gullone, 2003), empathy via the Bryant Index of Empathy for Children and Adolescents (Bryant, 1982), and prosocial behavior via teachers' evaluations of children's helpfulness towards others in the classroom. Results showed that children who had more frequent interactions with animals that involved a strong element of companionship reported greater empathy, and that this, in turn, related positively to prosocial behavior (measured by teacher's report). A mediational model in which empathy accounts for the effect of positive interactions with animals on prosocial behavior provides consistent, if not conclusive, support for the relationship between interacting with animals and socio-emotional development.

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A growing body of research suggests that interacting with animals is associated with the development of empathy in children (Poresky, 1990; Ascione, 1992) and empathy has long been shown to predict prosocial behavior (Eisenberg & Fabes, 1990; Eisenberg, Eggum, & Di Giunta, 2010; Eisenberg & Miller, 1987; for review see Castano, 2012; Castano & Kidd, 2018). It is plausible that a relationship also exists between human-animal interaction and prosocial behavior. In the current

investigation we explore this question by looking at the association between the frequency of elementary school children's interactions with animals, their dispositional empathy, and their prosocial behavior. Although no strong causal conclusion can be drawn from correlational data, we specifically hypothesize a mediating role of empathy in the effect of interactions with animals on prosocial behavior. Additionally, we explore the different qualities of humane interactions with animals and their

relationship to both empathy and prosocial behavior in order to understand what specific types of interactions might have a particularly strong association with the social outcomes of interest.

### *Development of Empathy and Prosocial Behavior*

Empathy involves the capacity to understand and emotionally respond to the feelings of another individual (e.g., Eisenberg & Strayer, 1987). This capacity has been theorized to be a fundamental aspect of how humans form connections with one another, with such connections acting as a kind of “social glue” (Hoffman, 2000, p. 3). Empathy is understood as having both cognitive and affective components (Davis, 1981; Batson, 2011). The cognitive component of empathy involves the capacity to comprehend another person’s experience and emotional state through taking their perspective. In contrast, the affective component of empathy concerns how one responds emotionally to the understanding of another person’s experience. Though the latter is conceptually similar to the emotion of sympathy, some theorists have made a distinction between the two stressing that sympathy entails an emotional reaction that may not be identical to the emotions being experienced by the other person (Miller & Eisenberg, 1988; Castano, 2012).

The propensity to feel empathy is often viewed as desirable due to its association with prosocial behavior, defined as voluntary actions that benefit other individuals or groups, or society as a whole

(Batson et al., 1991; Davis, 1983; Eisenberg & Fabes, 1990; Eisenberg, Eggum, & Di Giunta, 2010; Eisenberg & Miller, 1987). Empathy, for instance, has been associated with numerous measures of prosociality, including volunteerism, charitable donations (Davis, 1983), self-reported prosocial tendencies (Lockwood, Seara-Cardoso, & Viding, 2014), and helping behavior (Batson, 1991). Empathy has also been shown to be negatively related to aggression and positively related to the quality of intergroup relations (Eisenberg, Eggum, & Di Giunta, 2010; Cehajic, Brown, & Castano, 2008). Beyond correlational studies, research has also shown that experimentally inducing empathy leads to increased helping behavior, suggesting a causal role of empathy in motivating prosocial action (e.g., Batson, 1991; for a review see Castano, 2012).

A specific focus of research on empathy has been its development in young children and the role of genetic (Zahn-Waxler et al., 1992b; Knafo et al., 2008) and environmental influences (e.g., Robinson, 1994). Among the latter, interactions with other people, such as parents or peers, have been shown to be key to empathy development (e.g., Zhou et al., 2002). Parent-child synchrony of behavior (Feldman, 2007), attachment security (Kestenbaum & Sroufe, 1989), and the encouragement of perspective taking (Farant, Devine, Maybery, & Fletcher, 2011) are all thought to facilitate empathy development in children. Interactions between humans and animals have also been proposed to affect the development of empathy.

*Human-Animal Interactions and Empathy*

The link between interactions with animals and empathy has long been proposed from an evolutionary psychology perspective (Humphrey, 1984). This proposition is congruent with a growing body of empirical studies (though for an exception, see Daly & Morton, 2003). Research, for example, has shown that college students who owned pets reported higher empathy than those who did not (Hyde, Kurdek, & Larson, 1983), and a relationship between animal-directed empathy and human-directed empathy has been observed (Paul, 200). Also, among adults who owned a pet in the past, interaction with dogs has been shown to increase oxytocin levels (Curry, Donaldson, Vercoe, Filippo, & Zak, 2015), and oxytocin is a hormone that has been linked to expression of empathy (e.g., Shamon-Tsoory, Abu-Akel, Palgi, Sulieman, Fisher-Shofty, Levkovitz, & Decety, 2013).

Interactions with non-human animals, such as pets, may play a particularly important role in empathy development among young children. Spending time with animals may in fact provide young children with an early opportunity to care for another living being. Because young children are primarily the recipients of care, this role-reversal may train the development of prosocial emotions, such as empathy.

A growing body of research largely supports the link between humane interactions with animals and empathy in children. Research has shown that, though children with companion animals did not differ in terms of empathy relative to children

who did not, children who reported having strong bonds with their pets also showed more empathy than children who did not have a companion animal (Poresky, 1990). While these studies are correlational in nature, they are consistent with quasi-experimental work that has tackled similar processes, such as research using interventions designed to promote the humane treatment of animals. Ascione (1992) found that elementary school children who participated in a humane education program showed higher levels of empathy relative to children who did not. School classrooms were randomly assigned to a control condition or to an experimental condition in which the class participated in a year-long humane education program based on NAHEE (National Association for Humane and Environmental Education) curriculum guidelines. Among older children (those in 4<sup>th</sup> and 5<sup>th</sup> grade), generalized empathy was greater in the experimental condition.

While considerable attention has been given to the relationship between animal interactions and empathy, surprisingly little attention has been given to how such interactions might relate to actual prosocial behavior among children. One exception is a study conducted by Vidovic, Stetic and Bratko (1999), which assessed an array of social development outcomes among a group of young children, including both self-reported empathy and prosocial orientation. These authors found that children with dogs reported higher empathy and a higher prosocial orientation than children who did not own pets. Additionally, children who showed higher than average attachment to

their pets reported higher empathy and a greater prosocial orientation than children with low attachment or those who did not own pets.

Vidovic et al.'s (1999) findings provide some initial support for the relationship between animal interactions, empathy and prosocial behavior. However, several questions remain to be explored. First, it is unclear how exactly these variables relate to one another. Based on the association between empathy and prosocial behavior, it is plausible that pet interactions predict prosocial behavior indirectly through their relationship with empathy. Empathy would thus mediate the relationship between humane animal interactions and prosocial behavior. Second, it is unclear which aspects of interacting with an animal may lead to empathy and prosocial behavior. Does caring for an animal (e.g., feeding the animal and regularly taking it for walks) lead to increased empathy and prosocial behavior? Or are more intimate forms of companionship (e.g., talking with a pet) required for the generalization of these social benefits? Finally, using self-report measures for both empathy and prosocial behavior, albeit often necessary, may conflate the relationship between these two variables, both because of shared-method common variance and because of social desirability creating or inflating such shared variance.

In the current investigation, we addressed these limitations through assessing the relationship between the frequency of children's humane interactions with animals, empathy, and children's prosocial behavior as evaluated by a third party (teachers). We

predicted that the frequency of children's humane interactions with pets, which has been shown to correlate with empathy (Thompson & Gallone, 2003), would be positively related to empathy and to prosocial behavior. We also hypothesize, cautiously, given the correlational nature of this study, a mediating role of empathy in the relationship between interactions with pets and prosocial behavior. Additionally, we explored which specific types of animal interactions might be driving the predicted relationship.

## Method

### *Participants*

We recruited ( $n = 158$ ) 3<sup>rd</sup> grade children (boys = 66, girls = 92), ranging in age from 9 to 11 years ( $M = 10.63$ ,  $SD = .36$ ) from six public elementary schools in the Sacramento area of California, as part of a larger series of studies investigating socio-cognitive development. We also obtained background information from the children's parents. This population was ethnically diverse, with 36.9% of children's parents identifying as White, 7% as Black, 20.4% as Asian, 29.9% as Hispanic, 1.3% as Pacific Islander, and 4.5% as Other. The sample was also diverse with regard to socioeconomic status, with the highest level of education being some high school for 10.1% of parents, a high school diploma or GED for 49.3%, an undergraduate college degree (bachelor's, associate's or vocational) for 17.1%, and a graduate degree for 15.8%.

### *Measures and Procedure*

Children completed the animal interaction and empathy measures during class. The study received Institutional Review Board approval, and prior to the study being administered, we received permission from parents, teachers, and school principals. Additionally, students provided their assent before completing any of the measures. Students received a small gift (a children's book titled "Buddy Unchained") as compensation for their participation in the study; teachers received an Amazon gift card.

Animal interaction was measured via The Children's Treatment of Animals Questionnaire (CTAQ; Thompson & Gullone, 2003), which included 12 items assessing the frequency of children's interactions with a specific companion animal. The animal selected could have been a household pet, or if the child did not have a pet, they responded to the pet of a close friend or family member. The majority of children who specified the type of companion animal answered in reference to a dog (76.4%). Children rated the frequency ("not at all," "sometimes," or "a lot") with which they engaged in specific humane behaviors with the animal (e.g. "pat" or "play with"). Children also completed a shortened version of the Bryant Index of Empathy for Children and Adolescents (BIECA; Bryant, 1982). The BIECA includes items tapping children's trait empathy, such as "It makes me sad to see someone who can't find anyone to play with," and "I get upset when I see someone being hurt."

Ratings for each child's prosocial behavior were obtained from their teachers,

using a scale developed by Eisenberg et al. (1987). Teachers, who were blind to the study hypothesis, rated the degree to which children engaged in prosocial behaviors on five items ("help peers when they need assistance with a task or activity," "share materials or food with classmates," "play cooperatively with peers," "comfort a peer in distress," and "help or share with an adult") using a 6-point scale ranging from 1 = "much less than average" to 6 = "much more than average."

## Results

The descriptive statistics for the BIECA, CTAQ, teacher-reported prosocial behavior, and age are reported in Table 1. Preliminary analysis exploring the internal consistency of the CTAQ revealed that of the 12 items, one item (i.e., "Yell at"), despite being reverse scored due to its negative content, showed a small and negative item-total correlation (-.143). Removing this item from scale increased the Cronbach's alpha to 0.842 (alpha if item kept in scale = 0.817).

**Table 1.** Descriptive Statistics

Variable			<i>M</i>	<i>SD</i>
<b>BIECA (Empathy)</b>	Total		11.58	3.23
	Boys		10.67	3.34
	Girls		12.18	3.03
<b>CTAQ (Animal Interactions)</b>	Total		13.26	4.93
	Boys		12.91	4.81
	Girls		13.48	5.00
<b>Prosocial Behavior</b>	Total		23.00	5.60
	Boys		21.29	6.01
	Girls		24.17	5.00
<b>Age</b>	Total		10.63	.356
	Boys		10.66	.384
	Girls		10.61	.335

Preliminary analysis looking at the effects of gender using a between-subjects ANOVA revealed, in line with past research, a significant effect of gender on empathy ( $F(1, 111) = 6.20, p = .014, \eta^2 = .053$ ) and prosocial behavior ( $F(1, 109) = 7.51, p = .007, \eta^2 = .064$ ). Girls ( $M = 12.18, SD = 3.03$ ) scored higher than boys on empathy ( $M = 10.67, SD = 3.34$ ) and were also rated by teachers as more prosocial ( $M = 24.17, SD = 5.00$ ) than were boys ( $M = 21.29, SD = 6.01$ ). Gender, however, was not related to frequency of interactions with animals ( $F(1, 115) = .365, p = .547$ ). Because gender did not interact with empathy in predicting prosocial behavior ( $b = .231, \text{BCa } 95\% \text{ CI } [-.436, .897], p = .494$ ) or with frequency of humane interactions with animals in predicting empathy ( $b = -.087, \text{BCa } 95\% \text{ CI } [-.317, .142], p = .452$ ), we did not include gender as a covariate in further analysis.

We also examined whether differences existed in empathy or prosocial behavior between children who had pets in their household and those who did not. ANOVA analyses revealed that children who had pets did not differ from those who did not in terms of their empathy ( $M_{\text{diff}} = .250, p = .694$ ) or prosocial behavior ( $M_{\text{diff}} = 1.74, p = .118$ ).

As predicted, the frequency of humane interactions with animals was significantly positively correlated with empathy ( $r(108) = .420, p < .001$ , (correlations between the variables are reported in Table 2). Empathy was positively correlated with prosocial behavior ( $r(105) = .305, p = .045$ ). Frequency of humane interactions with animals was not correlated with prosocial behavior ( $r(108) = -.025, p = .792$ ). Nonetheless, it is possible that animal interactions have an *indirect* effect on prosocial behavior via

**Table 2.** Correlations

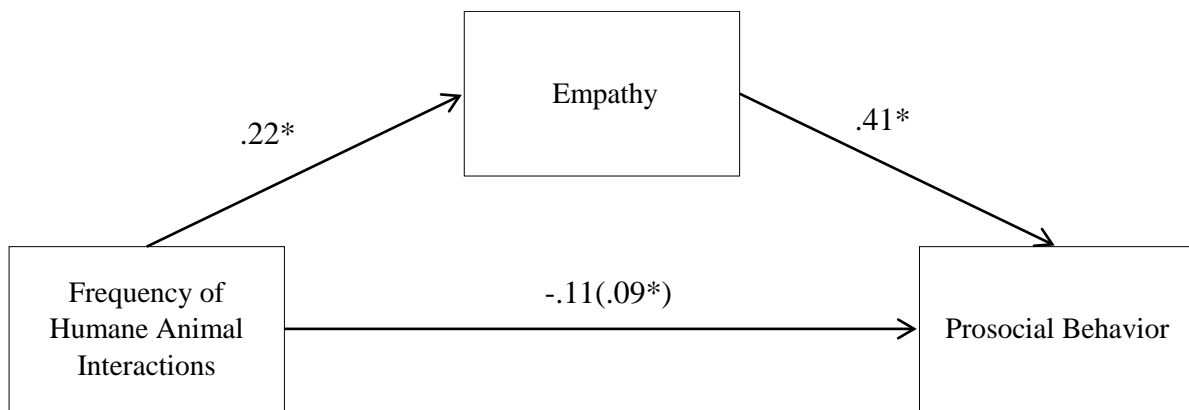
	<b>BIEC</b>	<b>CTAQ</b>	<b>Prosocial</b>	<b>Age</b>
<b>BIEC (Empathy)</b>	–			
<b>CTAQ (Animal Interactions)</b>	.389**	–		
<b>Prosocial Behavior</b>	.205*	-.025	–	
<b>Age</b>	-.072	.043	-.060	–

Note: \* indicates significance at the .05 level. \*\* indicates significance at the .01 level. Cronbach's alphas for BIEC (empathy), CTAQ (animal interaction scale), and the ratings of prosocial behavior are .500, .841, and .922, respectively.

empathy (Hayes, 2009). We thus used the Preacher and Hayes's bootstrapping method (5,000 bootstrapped iterations) of mediation analysis (Preacher & Hayes, 2004) to test for this effect. As hypothesized, the analysis revealed a significant indirect effect of the animal interactions on prosocial behavior ( $b = .09$ , BCa 95% CI [.005, .254]). When empathy was included in the model as a mediator, the direct effect of animal

interactions on prosocial behavior was not significant ( $b = -.109$ ,  $t(105) = -.898$ , 95% CI [-.348, .131],  $p = .371$ ), indicating that empathy fully mediated the relationship between animal interactions and prosocial behavior (See Figure 1).

Since the data presented here are correlational, and thus the mediational model presented above may not adequately or correctly represent the causal relation



**Figure 1.** Regression coefficient estimates for the relationship between frequency of pet interactions and prosocial behavior as mediated by empathy (\* $p < .05$ ).

between the variables, we ran an alternative mediational model with empathy as the predictor, animal interactions as the mediator, and prosocial behavior as the outcome. This alternative model, however, showed a weaker and non-significant indirect effect of empathy on prosocial behavior via animal interactions ( $b = -.052$ , BCa 95% CI [-.178, .052]).

In order to better understand which types of animal interactions may predict empathy and prosocial behavior, we also ran a factor analysis on the frequency of humane interactions with animals questionnaire to tease apart the types of animal interactions. The factor analysis met the necessary statistical assumptions: the Kaiser-Meyer Olkin measure verified adequate sample size with  $KMO = .844$ . Bartlett's test of sphericity further confirmed that the correlation between the items was sufficiently large to conduct PCA ( $\chi^2(55) = 397.50$ ,  $p < .001$ ). The factor

analysis using a varimax rotation revealed a model with two components (each with eigenvalues  $> 1$ ; the rotated factor model with item loadings for each factor is presented in Table 3). This model accounted for 51% of the total variance. The two factors that emerged can be described as 1) caretaking interactions and 2) companionship interactions. Caretaking interactions included items that involved basic responsibility, such as "Give food and water" and "groom." Companionship items included behaviors in which the child treated the pet as a companion and thus engaged in more intimate interactions that went beyond basic caretaking duties and more closely resembled friendship, such as "talk to" and "cry with when I am sad."

These factors were used in follow-up mediation analyses to assess which types of animal interactions predict more prosocial behavior, via empathy. We again used Preacher and Hayes's (2004) bootstrapping

**Table 3.** Factor Analysis

	Caretaking	Companionship
Play with	.803	
Give food or water	.497	
Take a walk	.681	
Pat	.699	.247
Cuddle	.494	.417
Cry with when I am sad		.887
Talk to	.314	.646
Allow to stay in my room	.362	.396
Groom	.486	.369
Tell my secrets to		.705
Spend time with	.755	.352

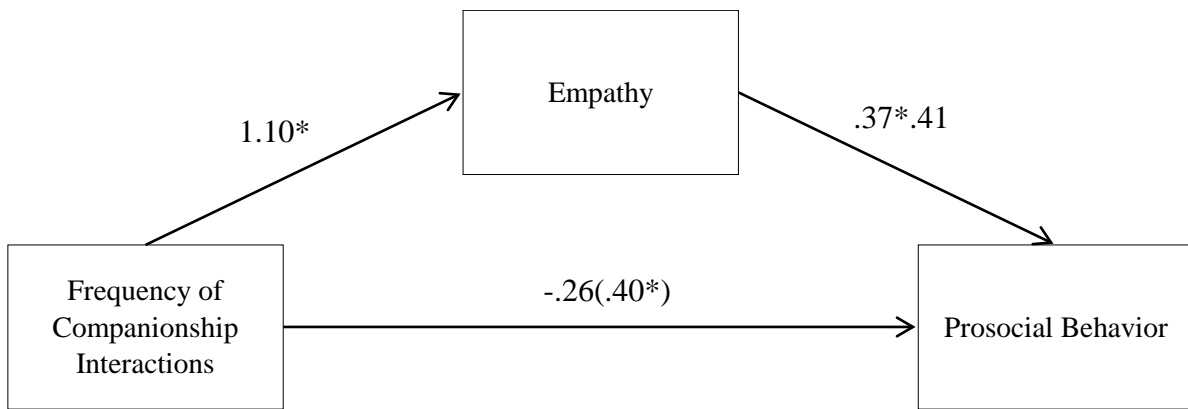
Factor loadings based on a factor analysis with varimax rotation for 11 items from the Children's Treatment of Animals Questionnaire.

Note: Factor loadings  $< .2$  are suppressed.

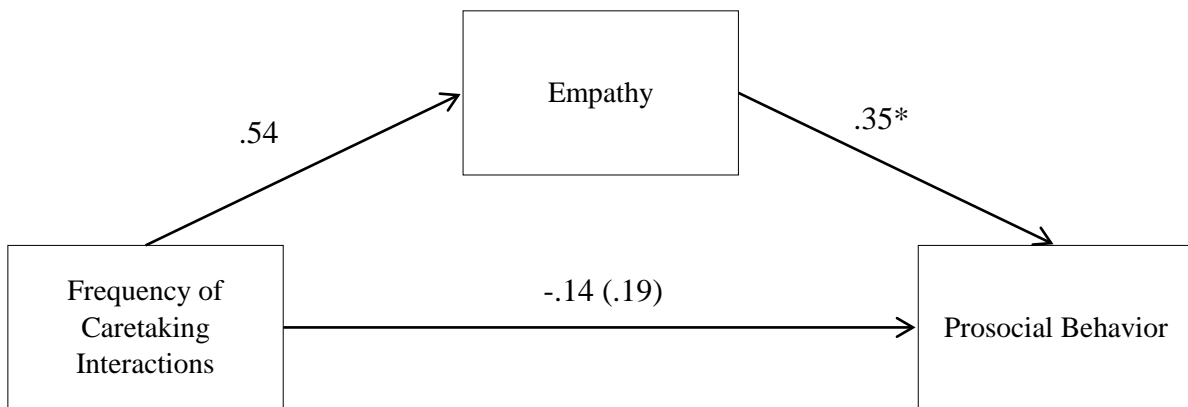


method of mediation analysis to assess if empathy mediated the relationship between companionship interactions and prosocial behavior as well as care-taking interactions and prosocial behavior. The analysis revealed that the mediation was significant for the companionship factor only. We found a significant indirect effect of companionship interactions on prosocial behavior ( $b = .400$ , BCa 95% CI [.031, 1.07]). When the mediator empathy was added to the model, companionship interactions did not predict prosocial behavior ( $b = -.257$ , BCa 95% CI [-1.44, .922]) indicating the empathy fully

mediated the relationship between companionship interactions and prosocial behavior. This effect did not hold for the care-taking factor. We did not find an indirect effect of care-taking interactions on prosocial behavior via empathy ( $b = .190$ , BCa 95% CI [-.022, .714]) and the direct effect of care-taking interactions on prosocial behavior remained non-significant ( $b = -.137$ , BCa 95% CI [-1.234, .960]) indicating that empathy did not mediate the relationship between care-taking interactions and prosocial behavior (See Figure 2).



**Figure 2a.** Regression coefficient estimates for the relationship between frequency of companionship interactions and prosocial behavior as mediated by empathy (\* $p < .05$ ).



**Figure 2b.** Regression coefficient estimates for the relationship between frequency of caretaking interactions and prosocial behavior as mediated by empathy for each factor (\* $p < .05$ ).

## Discussion

In line with our hypothesis, and with much theorizing in the literature, the frequency of children's humane interactions with animals was related to prosocial behavior via empathy. As observed in some past research (e.g., Porseky, 1990), having a pet, in and of itself, did not result in significant differences in empathy nor in prosocial behavior. Rather, it seems to be both the quantity and quality of humane interactions that are predictive of positive social outcomes. Our results indicate that interacting with animals (regardless of whether they are a pet) was related to higher dispositional empathy and that this empathy was related to higher prosocial outcomes among children. We also found that it was the interactions that involved treating the animal as a companion, rather than more basic care-taking type interactions, that were driving the relationship between humane interactions, empathy, and prosocial behavior. One possible interpretation of this result is that the companionship interactions involved a greater degree of emotional involvement with the animal (e.g., crying with the animal), with such emotion sharing serving to cultivate empathic concern. Another possible explanation is that these companionship interactions showed a stronger relationship with empathy because they entailed treating the animal as an equal, which may thus lead to a greater tendency for the warm feelings evoked in these companionship interactions to generalize more broadly. Because of the correlational nature of our data, however, it is important to interpret the relationship tested

here, cautiously. It may be the case that children who are high in dispositional empathy seek out companionship with animals that they encounter. We will return to this point below.

The current study contributes to a growing body of empirical literature on the relationship between humane interactions with animals and social development in children. This line of research is important both in its potential to inform ways to increase empathy and prosociality in children, but also to promote humane interactions with animals. Our finding that humane interactions with animals predicts empathy is congruent with past research demonstrating a relationship between pet interactions and empathy in children (e.g., Poresky, 1990), and thus provides further evidence of this relationship in an ethnically and socioeconomically diverse group of young children. Furthermore, our results extend this line of work by showing how this increase in empathy predicts actual prosocial behavior (as rated by teachers rather than children themselves), through offering an insight on the mechanism through which interacting with animals may result in prosocial outcomes.

Our results also suggest that in considering the role that family pet ownership may play in promoting social development, it is important to give attention to the amount of time that children spend interacting with these pets. The fact that there were not significant differences between pet owners and non-owners in empathy and prosocial behavior suggests that merely having a pet in the household may not be

sufficient to reap the potential social benefits associated with animal interactions. Furthermore, these results speak to not only the quantity, but also the quality of such interactions with pets. Our finding that empathy mediates the relationship between humane animal interactions and prosocial behavior when children engage with animals as close companions (but not when merely taking care of them as animals) is congruent with past research demonstrating the relationship between perceived bonds with pets and empathy (e.g., Vidovic et al., 1999). This finding also has important practical implications regarding the specific types of interactions that most effectively predict the desirable social outcomes associated with animal interactions. This insight (i.e., about the importance of close companionship-related behaviors) can inform both the ways in which parents encourage children to interact with pets in their households as well as the content emphasized in humane education programs.

Though the current study provides evidence of the relationship between children's interactions with animals and social behavior, some limitations exist. One limitation is that since the majority of children selected a pet dog, it is unclear the degree to which the findings generalize to other animals (due to the low number of children interacting with animals other than dogs). Indeed, some research has demonstrated differences in the effect of human-animal interaction on empathy (Vidovic et al., 1999) and oxytocin (Curry et al., 2015) depending on what type of pet is considered. Therefore, it is important in

future research to provide a comparison animal. An additional limitation is that because this was a correlational study, our conclusions about causality are tentative. The mediational models that we present here imply causation, but given the nature of the data, it would be inappropriate to firmly conclude that the mediation presented here can be interpreted in causal terms (Fiedler, Schott, & Meiser, 2011). The lack of fit of the alternative mediational model is somewhat indicative that the causal relationship may in fact be the one we theorized (interactions—empathy—prosocial behavior), but clearly more evidence is needed. Experimental designs in which the interaction with pets is manipulated would be ideal, but clearly extremely difficult to implement and may present too many ethical challenges to be carried out. Longitudinal studies, however, may be conducted to better assess the relationship between interactions with pets, the development of empathy, and the display of prosocial behavior. We would expect that such studies would demonstrate the causal impact of interactions with animals on the two other variables, but also a circular relation between the three constructs.

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