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### Exposure to intimate partner violence and internalizing symptoms

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## Abstract

**Background:** It is estimated that more than half of children living in households where intimate partner violence (IPV) occurs are also exposed to animal cruelty (AC). Although prior research links bonds with pets with higher levels of socioemotional competence among school-age children, exposure to AC may negate the protective effects of pet ownership and/or exacerbate the potentially deleterious effect of IPV on children's mental health.

**Objective:** The current study evaluates whether and to what extent the associations between exposure to IPV and several indicators of children's mental health vary as a function of children's positive engagement with pets and exposure to AC.

**Participants and Setting:** Participants included 204 children (aged 7-12 years; 47% female; 57% Latinx) and their maternal caregiver who were recruited from domestic violence agencies in a western U.S. state.

**Method:** Multiple moderation analysis evaluated whether the association between children's exposure to IPV and internalizing and posttraumatic stress symptoms vary as a function of children's positive engagement with pets and exposure to AC.

**Results:** Analyses revealed several moderation effects for positive engagement with pets (e.g., internalizing problems: [ $b = -.15, t(195) = -2.66, p = .008$ ]; posttraumatic stress symptoms: [ $b = -.13, t(195) = -2.24, p = .026$ ]), whereas exposure to AC only moderated the association between IPV and anxious/depressed symptoms ( $b = .32, t(195) = -2.41, p = .017$ ).

**Conclusions:** These findings highlight the potential protective effects of positive engagement with pets and importance of screening for exposure to AC when engaging in trauma-informed work with children exposed to IPV.

*Keywords:* domestic violence, animal abuse, childhood adversity, trauma, child psychopathology

## Introduction

25  
26 Intimate partner violence (IPV) is a worldwide public health problem that contributes to a  
27 myriad of long-lasting negative consequences for children who are exposed to such abuse. In the  
28 United States, nearly 8 million children are exposed to IPV each year, and this type of violence  
29 exposure has received increased recognition as a form of victimization and adverse childhood  
30 experience (ACE) (Dube et al., 2002; Hamby, Finkelhor, Turner & Ormrod, 2011; NATSCEV I, 2014).  
31 Approximately 81% of children who live in homes where IPV occurs are directly exposed to physical  
32 and psychological violence (Douglas & Hines, 2016; Fantuzzo & Fusco, 2007; Vatnar & Bjørkly,  
33 2011). Among the potential short- and long-term effects of exposure to IPV on child outcomes,  
34 increased risk of internalizing (e.g. depression and anxiety), externalizing (e.g. aggression, conduct  
35 disorder), and post-traumatic stress problems have been extensively documented (Evans, Davies &  
36 DiLillo, 2008; Moylan et al., 2010; McTavish, MacGregor, Wathen & MacMillan, 2016; Vu, Jouriles,  
37 McDonald & Rosenfield, 2016). Indeed, rates of clinical levels of internalizing and externalizing  
38 problems are estimated to be as high as 40-60% among youth exposed to IPV (Grych, Jouriles, Swank,  
39 McDonald & Norwood, 2000).

40 A large body of research indicates that child adjustment following exposure to IPV involves a  
41 complex interplay between risk and protective factors (McDonald et al., 2016). Childhood adversities  
42 frequently co-occur, and for a majority of U.S. children, childhood victimization involves multiple  
43 rather than single experiences (Bynum et al., 2010). Children exposed to IPV are at greater risk for  
44 exposure to co-occurring forms of family violence, such as physical abuse (Finkelhor, Ormond &  
45 Turner, 2007; Moylan et al., 2010), maltreatment of a sibling (Renner & Boel-Studt, 2017), and animal  
46 cruelty (AC), than their non-exposed counterparts, which may increase their risk for maladjustment  
47 (McDonald et al., 2017). At the same time, not all children experience poor outcomes following IPV  
48 exposure (Holt, Buckley & Whelan, 2008). Some children may develop healthy coping mechanisms  
49 and/or external sources of social support that help attenuate or prevent the negative consequences of

50 early exposure to violence (Haj-Yahia, Sokar, Hassan-Abbas & Malka, 2019; Howell, Graham-  
51 Bermann, Czyz & Lilly, 2010; Nicolotti, El-Sheikh & Whitsonet, 2003). Other factors associated with  
52 resilience in children exposed to IPV include: self-regulation and positive self-perception (Yule,  
53 Houston & Grych, 2019); maternal sensitivity, mental health, and social support (Barbarin, Richter &  
54 DeWet, 2001; Howell, Graham-Bermann, Czyz, Lilly, 2010; Fogerty, Wood, Giallo, Kaufman, &  
55 Hanson, 2019); and positive parenting practices (Grogan- Kaylor, Galano, Hines, Howell, Miller-Graff  
56 & Graham-Bermann, 2019; Manning, Davies & Cicchetti, 2014; Yule et al., 2019).

57 Although research on resilience among children exposed to IPV has identified a long list of  
58 risk and protective factors, an often-overlooked relationship that may confer both risk and protection in  
59 the context of IPV concerns a child's relationship with their family pet(s). In this paper we address this  
60 gap and examine the extent to which positive engagement with pets and exposure to AC influence  
61 children's adjustment in the context of IPV.

## 62 **Protective Effects of Relationships with Pets**

63 Household pets are important aspects of the social and environmental ecologies of children  
64 (Carr & Rockett, 2017). When examining family relationships and social support, it is important to  
65 consider broad modern networks of relationships and the subsequent impact on development, which  
66 include pet animals (Cassels, White, Gee & Hughes, 2017; Melson, 2003). It is estimated that up to  
67 75% of U.S. households with children above the age of 6 years are characterized by cohabitation of  
68 human and non-human animals (American Veterinary Medical Association, 2007), and a majority of  
69 people who reside with pet animals consider them to be a member of the family (American Veterinary  
70 Medical Association, 2007; Burns, 2019). Children can form strong, emotional bonds with their pets;  
71 such bonds meet the prerequisites for an attachment relationship (proximity seeking, safe-haven, secure  
72 base and separation distress) and share many features with human parent-child attachment (Hawkins,  
73 Williams & Scottish SPCA, 2017; Rockett & Carr, 2014; Sable, 2013; Zilcha-Mano, Mikulincer &

74 Shaver, 2011, 2012). Although arguably different from the quality of relationship with humans, pets  
75 can offer children a secure attachment figure (Beck & Madresh, 2008).

76 Children often value their relationships with their pets over and above relationships with other  
77 family members including siblings (Cassels, White, Gee & Hughes, 2017), and turn to their pets in  
78 times of difficulty for support and comfort (Melson, Schwartz & Beck, 1997; Russell et al., 2017). For  
79 example, children may become more attached to their pets when facing adversity such as parental  
80 divorce (Strand, 2004), and pets can serve as important attachment figures and a source of emotional  
81 support, companionship and friendship within adverse family settings (Cassels, White, Gee & Hughes,  
82 2017; McDonald et al., 2015; Newberry, 2017). Additionally, caring for pets may contribute to a  
83 child's global sense of competence and positive self-regard, which may be particularly beneficial to  
84 promoting child resiliency in households where there is family conflict and/or parents struggle to  
85 demonstrate healthy parenting practices (McDonald et al., 2016). Furthermore, prior research suggests  
86 that animals can offer children a path towards re-establishing attachment security with others and can  
87 help facilitate human-human attachments (Carr & Rockett, 2017; Cassels, White & Hughes, 2017;  
88 Messent, 1983; Parish-Plass, 2008).

89 A plethora of studies demonstrate that positive relationships with pets are associated with  
90 physical, social, psychological, and emotional benefits in both normative and vulnerable populations  
91 (Gadomski et al., 2015; Purewal et al., 2017; Rhoades, Winetrobe & Rice, 2015). Research into the  
92 impact of animals on human health and wellbeing has shown that interactions with animals are  
93 associated with reductions in stress, mental health problems, loneliness, aggression, and increases in  
94 quality of life, positive wellbeing, happiness, sociality and prosocial behavioral outcomes (Beetz,  
95 Uvnäs-Moberg, Julius & Kotrschal, 2012; Charnetski, Riggers & Brennan, 2004; Handlin et al., 2011;  
96 Kotrschal & Ortbauer, 2003; Marsa-Sambola et al., 2016; McNicholas & Collis, 2000; Purewal et al.,  
97 2017). Prior research also indicates that pets can mitigate against adverse effects of life trauma and  
98 stress, acting as a 'protective' factor against the development of psychological problems following

99 potentially traumatic events, such as losing a spouse (Akiyama, Holtzman & Britz, 1986) and growing  
100 up within the foster care system (Carr & Rockett, 2017). However, there is a paucity of research on the  
101 links between pet ownership, pet attachment, and mental health in childhood, and no research to date  
102 has examined whether and to what extent relationships with family pets help children cope with  
103 childhood adversity due to family violence. It is important to consider that the potential benefits  
104 associated with pets may only be present for children who demonstrate a positive relationship with  
105 their pet and/or may not be the case for children who have been exposed to AC in their home.

### 106 **Childhood Animal Cruelty Exposure**

107         Pets that child and adult IPV survivors are closely bonded with, or attached to, can often  
108 become a target for abuse by perpetrators of IPV (Ascione et al., 2007; Volant et al., 2008). Thus, AC  
109 often functions as a tactic of coercive control in households where IPV occurs (DeGue, 2011; Hardesty  
110 et al., 2013; Hawkins, Hawkins, & Williams, 2017; McDonald et al., 2017). Prior studies report that  
111 IPV perpetrators who engage in AC are more likely to display extreme forms of violence including  
112 sexual abuse, stalking, harsh physical punishment, and physical injury when compared to IPV  
113 perpetrators without histories of AC (Ascione et al., 2007; Carlise-Frank et al., 2004; Walton-Moss,  
114 Manganello, Frye & Campbell, 2005). However, there is some evidence of ethnic differences in these  
115 relations, particularly among U.S. Hispanic perpetrators, who are less likely than non-Hispanic  
116 perpetrators of IPV, to utilize AC as a coercive control tactic (Hartman, Hageman, Williams &  
117 Ascione, 2018). Although the rate of AC in the context of IPV has varied across samples (Collins et al.,  
118 2018), some studies have found rates of exposure to AC in childhood to be as high as 61.5% in homes  
119 where family violence is present (Ascione et al., 2007). Often in such cases, children are directly  
120 exposed to AC, which can be traumatic for the child and lead to negative impacts on the child's  
121 emotional and behavioral health. Moreover, children who witness AC may be at increased risk for  
122 intervening in incidents of violence toward pets, which may increase their risk of injury by a caregiver  
123 (McDonald et al., 2015).

124 Research on the consequences of exposure to AC among IPV survivors and children is scarce.  
125 However, recent studies suggest that exposure to AC in childhood is associated with increased risk of  
126 psychopathology (McDonald et al., 2017), behavioral problems such as delinquency and violence  
127 (Longobardi & Badenes-Ribera, 2018), and childhood cruelty to animals (Hawkins, Hawkins &  
128 Williams, 2017); most of the research in this area has focused on *externalizing* outcomes and failed to  
129 attend to internalizing behavior and posttraumatic stress symptoms. However, adults who witness AC  
130 in their childhood report ‘still being bothered’ by such acts in adulthood (Flynn, 2000; Henry, 2004). It  
131 has been argued that witnessing violence toward, or the death of, a family pet, can be equally traumatic  
132 for a child as witnessing violence directed at other family members (Girardi & Pozzulo, 2015). Animal  
133 cruelty can therefore be viewed as a distinct manifestation of family violence that may complicate the  
134 adverse impacts of IPV on posttraumatic stress and internalizing symptoms (McDonald et al., 2015).

135 An emerging body of research suggests that AC exposure in childhood may account for more  
136 variance in internalizing psychopathology than other co-occurring adversities (e.g., IPV and emotional  
137 abuse; Girardi & Pozzulo, 2015; McDonald et al., 2016, 2017). Internalizing consequences of exposure  
138 to AC, such as emotional distress, may be more pronounced in cases where the abuse is frequent and  
139 severe, and in cases where the child is highly attached to their pets (Girardi & Pozzulo, 2015;  
140 McDonald et al., 2016). A retrospective study by Girardi and Pozzulo (2015) found a significant  
141 interaction between participants’ level of bonds with pets and AC exposure in childhood, controlling  
142 for co-occurring emotional abuse. Those who reported medium-level bonds with pets who were  
143 exposed to AC in childhood, displayed significantly higher depression and anxiety scores in adulthood  
144 than those who were not exposed to AC. Participants who reported medium-level bonds with pets and  
145 had not been exposed to AC in childhood, displayed lower depression and anxiety scores adulthood  
146 than those with low-level bonds.

#### 147 **Current Study**

148 To our knowledge, no prior studies have examined associations and interactions between  
149 positive engagement with pets, exposure to AC and IPV, and internalizing and post-traumatic stress  
150 symptoms among children. The aim of the current study was to evaluate whether and to what extent the  
151 associations between exposure to IPV and several indicators of mental health (i.e., internalizing  
152 behavior symptoms and posttraumatic stress) vary as a function of children's positive engagement with  
153 pets and exposure to AC. Given prior evidence that cats and dogs have greater impacts on  
154 psychological support than other species (see Purewal et al., 2017), the current study specifically  
155 focused on children living in households where dogs and/or cats were present. We hypothesized the  
156 following: 1) Higher levels of exposure to IPV will be associated with higher levels of internalizing and  
157 posttraumatic stress symptoms, and the magnitude of the effect of IPV will be greater among children  
158 who are also exposed to AC, 2) Positive engagement with a pet will serve as a protective factor against  
159 the impact of exposure to IPV on children's internalizing and posttraumatic stress symptoms when  
160 adjusting for the effect of AC exposure, and 3) Children exposed to IPV will exhibit greater  
161 internalizing problems when they display higher levels of positive engagement with pets and have been  
162 exposed to AC in the home (see Figure 1). Due to the inconsistent methodological and measurement  
163 approaches employed across studies examining the impact of human-animal interaction on child health  
164 and wellbeing, the current study examines multiple domains of internalizing symptoms in addition to  
165 posttraumatic stress symptoms to clarify how AC and positive engagement with pets are related to  
166 specific clusters of symptomatology.

167 [Figure 1 here]

## 168 **Methods**

### 169 **Participants and Procedure**

170 Child participants for the present **cross-sectional** study were drawn from a larger dataset of  
171 mother-child dyads recruited from 22 domestic violence agencies in the western United States between  
172 2010 and 2016. Women were eligible to participate if they were over the age of 21 and had: (1)



173 experienced IPV in the last year, (2) at least one child between the ages of 7 to 12 in the home, and (3)  
174 lived with at least one companion animal (dog or cat) within the past year. Consistent with IRB  
175 approved protocol, designated staff members (including Spanish-English bilingual staff) from each  
176 agency were trained to recruit participants, obtain consent and assent, and administer standardized  
177 surveys to eligible mother-child pairs. If women had more than one child who was in the eligible age  
178 range, they were asked to select one child to participate in the study (no criteria for this decision).  
179 Surveys were conducted with mothers and children separately.

180 The present study restricted analyses to those individuals who owned at least one dog or cat  
181 within the past year ( $N=237$ ). Thirty-three participants were excluded from analysis due to missing  
182 data, yielding a total sample of 204 children. We conducted independent samples *t*-tests to determine  
183 whether the youth with missing data ( $n = 33$ ) differed from those included in the final sample ( $n = 204$ )  
184 and found that there were no significant differences in the children's race/ethnicity, gender, nativity,  
185 income, or internalizing symptoms ( $ps > .05$ ). However, on average, individuals with missing data were  
186 younger ( $M = 8.4, SD = 6.4$ ) than those included in this study's sample ( $M = 9.1, SD = 1.6$ ),  $t(235) = -$   
187  $2.25, p = .025$ .

188 The sample consisted of 108 (52.9%) male and 96 (47.1%) female children, ranging in age from  
189 7 to 12 years old (mean 9.11 years,  $SD = 1.63$ ). Most participants identified as Latinx/Hispanic  
190 (57.4%), followed by White/Non-Hispanic (22.5%), Multi-racial (16.2%), Black/African American  
191 (2.9%), Asian (.5%) and American Indian/Alaska Native (.5%). Approximately 37.5% of the mothers  
192 had not completed high school, 38.9% had obtained a high school degree, 14.8% had completed some  
193 college, and 8.9% had completed a bachelor's degree or higher. Nearly 19% of the sample had at least  
194 one dog and one cat at home; 21% had at least one cat, but no dogs; and 60% had at least one dog, but  
195 no cats. A majority (72%) of families' income fell below the 2016 poverty threshold for their family  
196 composition. Thirty-six percent of the surveys were completed in Spanish; existing Spanish language  
197 versions of the measures were used when available. When Spanish language versions were not

198 available, a professional translator with expertise in research with Latinx populations translated English  
199 language versions of the scale using the translation-back-translation procedure (van de Vijver &  
200 Hambleton, 1996). This process included input from Bilingual (Spanish/English) domestic violence  
201 advocates at partnering agencies, who reviewed Spanish language versions of our measures (both  
202 existing and those created for our study) to confirm the appropriateness of the items for the dialects and  
203 experiences of their Latinx clients.

## 204 Measures

205 **Exposure to IPV.** Children's exposure to IPV was measured using the Child Exposure to  
206 Domestic Violence Scale (CEDV, Spanish and English language versions; Edleson, Shin &  
207 Armendaris, 2008). The CEDV is a 42-item scale that is separated into 6 subscales. For the purposes of  
208 the present study, participants only completed the "Home Exposure" subscale, which asks children  
209 about different types of domestic violence they may have been exposed to in the home. Participants  
210 completed a revised 9-item version of this subscale; one item referring to exposure to harm of animals  
211 by the mother's partners was removed from the original 10-item CEDV Home Exposure subscale due  
212 to its overlap with the Pet Treatment Survey. Prior studies have supported use of the revised 9-item  
213 version as a unidimensional measure of children's IPV exposure (e.g., McDonald et al., 2016).  
214 Responses on the revised CEDV scale were measured on a Likert scale, with scores ranging from 0  
215 'Never' to 3 'Almost Always'. All of the responses were averaged together to compute one total CEDV  
216 score for each participant ( $\alpha = .78$ ).

217 **Exposure to AC.** The Pet Treatment Survey (PTS; McDonald, Vidacovich, Williams, Ascione  
218 & Green, 2015) measured children's exposure to AC as reported by maternal caregivers. This survey  
219 was designed to measure the treatment of animals in homes experiencing IPV as reported by women  
220 receiving residential and non-residential domestic violence services. The PTS has been used in prior  
221 studies of children's exposure to AC (McDonald et al., 2016; McDonald et al., 2017), and contains two  
222 main items focusing on AC: one item asks whether a woman's partner has ever *threatened* to hurt or

223 kill a family pet, and another asks whether the partner has ever *actually hurt or killed* a family pet. If  
224 the mother answers yes to either of these items, she is then asked a series of follow-up questions which  
225 includes whether her child has ever seen or heard a pet hurt or killed in the home. Thus, the PTS yields  
226 a dichotomous parent-report measure of children's exposure to AC in the home (0 = not exposed, 1 =  
227 exposed). **This measure was translated to Spanish for the current study.**

228 **Positive engagement with pets.** Children's self-reported positive engagement with their pet(s)  
229 was measured using the Children's Treatment of Animals Questionnaire (CTAQ; Thompson &  
230 Gullone, 2003). The CTAQ contains 13 items asking children how often they engage in behaviors  
231 relating to companion animals (e.g., "play with", "cuddle", "groom", etc.). Choices range from 'Never'  
232 to 'Often' and were scored on a Likert scale from 1 to 3, respectively. A total CTAQ score for each  
233 participant was computed as a mean of responses on all items, excluding the item "yell at", which is the  
234 only item that does not reflect positive engagement with pets, and has been identified as problematic in  
235 prior research using **English and Spanish versions of the measure** (McDonald, Vidacovich, Williams,  
236 Ascione & Green, 2015). The CTAQ demonstrates good internal consistency and test-retest reliability,  
237 as well as sufficient convergent validity (Thompson & Gullone, 2003). Internal consistency in the  
238 current sample was good ( $\alpha = .85$ ).

239 **Internalizing problems and posttraumatic stress.** Internalizing problems were measured  
240 using six total scores from the Child Behavior Checklist (CBCL 6/18, **Spanish and English language**  
241 **versions**; Achenbach & Rescorla, 2001). This is a widely used measure that utilizes caregiver reporting  
242 to evaluate children's behavior problems reflecting multiple domains of socioemotional functioning.  
243 For the present study, items from the internalizing scale (INT) and its component syndrome-based  
244 subscales (Anxious/Depressed, AD [ $\alpha = .91$ ]; Withdrawn/Depressed, WD [ $\alpha = .90$ ]; and Somatic  
245 Complaints, SC [ $\alpha = .89$ ]) were examined, as well as the DSM-oriented Anxiety Problems scale (AP;  
246  $\alpha = .88$ ) and Posttraumatic Stress Problems scale (PTS;  $\alpha = .91$ ). For the INT scale and subscales, scores  
247 ranging from 60 to 63 are considered to be in the "borderline" clinical range, while scores greater than

248 or equal to 64 are considered to be clinically significant levels of symptoms. All analyses were  
249 conducted using raw total scale/subscale scores.

250 **Demographic survey.** Child age, gender, ethnicity, household income, family size, and pet  
251 ownership information were obtained using a parental demographic survey that has been used in prior  
252 human-animal interaction research with victimized children and adults. Socioeconomic status was  
253 measured using a log transformation of an income-to-needs ratio based on family income, household  
254 size, and federal poverty threshold data.

### 255 **Data analysis**

256 All analyses were conducted using SPSS 25 (IBM Corp., 2017). A multiple moderation analysis  
257 using PROCESS (Hayes, 2017) evaluated whether the association between exposure to IPV and parent-  
258 reported internalizing (i.e., INT, AD, WD, SC, AP) and posttraumatic stress symptoms vary as a  
259 function of children's positive engagement with pets and exposure to AC (see Figure 1). Each outcome  
260 (INT, AD, WD, SC, AP, PTS) was examined in a separate model. Before running the moderation  
261 analyses, the association between the **independent and dependent variables** and possible covariates  
262 were examined (i.e., child age, gender, ethnicity, and socioeconomic wellbeing). Child age, gender, and  
263 Hispanic ethnicity were retained as covariates in each model **as they were significantly associated with**  
264 **engagement with pets, behavior problems, and/or exposure to IPV in our sample.** Prior to analysis, all  
265 variables were standardized to reduce multicollinearity (Baron & Kenny, 1986). Moderation effects  
266 were probed. A post hoc power analysis was conducted using G\*Power software (Faul, Erdfelder,  
267 Buchner & Lang, 2009) to determine whether the current sample size of 204 was sufficient to detect a  
268 hypothesized incremental effect size of .05 (a small effect) and an alpha level of  $\alpha = .05$ . Results  
269 indicated the current sample size was sufficient to achieve power of .99, with a critical  $F$  value of 3.89.  
270 Assumptions of normality, linearity, and homoscedasticity were all satisfied. The assumption of  
271 singularity was met, as the independent variables were not a combination of other independent  
272 variables.

[Figure 1 here]

## Results

Intercorrelations of all variables included in the analyses are displayed in Table 1. Correlations among the outcome variables were significant at  $p < .001$ . Exposure to IPV was significantly correlated with positive engagement with pets ( $r = .22, p = .001$ ). However, the effect is not strong enough to violate the assumption of multicollinearity. Approximately 26% of mothers reported that their children had been exposed to AC. We did not find evidence of a significant association between exposure to IPV and exposure to AC ( $r = -.04, p = .594$ ) or exposure to AC and positive engagement with pets ( $r = .10, p = .170$ ). Tolerance and VIF were all within accepted limits, which indicate that the assumption of multicollinearity was met (Hair, Black, Babin & Anderson, 2010). We examined Mahalanobis distance scores, which did not identify any multivariate outliers.

[Table 1 here]

### Internalizing Behavior Problems

Results indicate that children's positive engagement with pets functions as a moderator of the effect of exposure to IPV on overall internalizing behavior problems (INT),  $b = -.15, t(195) = -2.66, p = .008$ . The interaction between exposure to IPV and exposure to AC did not significantly predict internalizing problems,  $b = .26, t(195) = 1.96, p = .051$ . These results indicate that the effect of exposure to IPV on internalizing outcomes changes across different levels of children's positive engagement with pets when AC exposure is held constant. Specifically, the moderation of the effect of exposure to IPV by children's level of positive engagement with pets uniquely accounts for 2.74% of the variance,  $F(1, 195) = 7.09, p = .008$ , whereas the moderation by exposure to AC uniquely accounts for 1.49% of the variance,  $F(1, 195) = 3.86, p = .051$ . Table 2 displays the conditional effects of exposure to IPV at different levels of the moderator variables.

[Table 2 here]

297 As shown in Figure 2A, the magnitude of the effect of exposure to IPV on internalizing  
298 problems is strongest for children who have been exposed to AC and report low or moderate levels of  
299 positive engagement with pets. The association between exposure to IPV and internalizing behavior is  
300 not significant for children exposed to AC that have a high level of positive engagement with pets.  
301 Thus, high levels of positive engagement with pets may function as a protective factor against  
302 internalizing outcomes for children exposed to IPV and AC.

303 [Figure 2 here]

#### 304 **Anxious/Depressed (AD) Symptoms**

305 The effect of exposure to IPV on comorbid AD problems was moderated by both children's  
306 positive engagement with pets,  $b = -.16$ ,  $t(195) = -2.95$ ,  $p = .004$ , and exposure to AC,  $b = .32$ ,  $t(195) =$   
307  $-2.41$ ,  $p = .017$ . The effect of the interaction between exposure to IPV and children's level of positive  
308 engagement with pets uniquely accounts for 3.23% of the variance in AD,  $F(1, 195) = 8.70$ ,  $p = .004$ .  
309 The moderated effect of exposure to IPV by exposure to AC uniquely accounts for 2.16% of the  
310 variance,  $F(1, 195) = 5.82$ ,  $p = .017$ . Figure 2B displays the conditional effect of exposure to IPV on  
311 AD as a function of children's positive engagement with pets and exposure to AC. The effect of  
312 exposure to IPV on AD is statistically significant at low and moderate levels of children's positive  
313 engagement with pets, but only for children exposed to AC. Similar to the results of the model  
314 predicting internalizing problems, these results indicate that exposure to AC amplifies the relationship  
315 between exposure to IPV and AD unless children also have high levels of positive engagement with  
316 their pets.

#### 317 **Withdrawn/Depressed Symptoms (WD) and Somatic Complaints (SC)**

318 We did not find evidence of a moderated effect of exposure to IPV by children's positive  
319 engagement with pets on WD [ $\Delta R^2 = .017$ ,  $F(1, 195) = 3.76$ ,  $b = -.12$ ,  $t(195) = -1.94$ ,  $p = .054$ ], SC  
320 [ $\Delta R^2 = .011$ ,  $F(1, 195) = 2.81$ ,  $b = -.09$ ,  $t(195) = -1.68$ ,  $p = .095$ ], or SC,  $\Delta R^2 = .005$ ,  $F(1, 195) = 1.24$ ,  
321  $b = -.07$ ,  $t(195) = -1.11$ ,  $p = .267$ . Similarly, we did not find evidence that exposure to AC moderated

322 the effect of exposure to IPV on WD [ $\Delta R^2 = .006$ ,  $F(1, 195) = 1.30$ ,  $b = .17$ ,  $t(195) = 1.14$ ,  $p = .256$ ],  
323 SC [ $\Delta R^2 = .005$ ,  $F(1, 195) = 1.39$ ,  $b = .16$ ,  $t(195) = 1.18$ ,  $p = .239$ ], or SP,  $\Delta R^2 = .003$ ,  $F(1, 195) = .75$ ,  
324  $b = .12$ ,  $t(195) = .86$ ,  $p = .389$ .

### 325 **DSM-Oriented Anxiety Problems (AP)**

326 Children's positive engagement with pets moderated the effect of exposure to IPV on AP,  $b = -$   
327  $.14$ ,  $t(195) = -2.54$ ,  $p = .012$ . See Figure 2C. We did not find evidence that exposure to AC moderated  
328 the effect of exposure to IPV on AP,  $b = .18$ ,  $t(195) = 1.39$ ,  $p = .167$ . The effect of the interaction  
329 between exposure to IPV and children's level of positive engagement with pets uniquely accounts for  
330 2.39% of the variance in AP,  $F(1, 195) = 6.47$ ,  $p = .012$ . In contrast, the effect of exposure to IPV by  
331 exposure to AC uniquely accounts for only .71% of the variance in AP,  $F(1, 195) = 1.92$ ,  $p = .167$ . As  
332 shown in Table 2, the effect of exposure to IPV is statistically significant among children with low  
333 levels of positive engagement with pets who have been exposed to AC. However, the effect is not  
334 significant when children exposed to AC have moderate or high levels of positive engagement with  
335 pets.

### 336 **Post-traumatic Stress Problems (PTS)**

337 Results indicate that the effect of exposure to IPV on PTS is significantly moderated by  
338 children's positive engagement with pets [ $b = -.13$ ,  $t(195) = -2.24$ ,  $p = .026$ ], but not by AC exposure,  $b$   
339  $= .21$ ,  $t(195) = 1.59$ ,  $p = .114$ . Whereas exposure to AC uniquely accounts for .95% of the variance in  
340 PTS, children's positive engagement with pets uniquely accounts for 1.89% of the variance. As seen in  
341 Figure 3, we found that the effect of exposure to IPV on PTS was significant at low and moderate  
342 levels of children's positive engagement with pets, but only for those who had been exposed to AC.  
343 The effect of exposure to IPV was not significantly different from zero among children who had been  
344 exposed to AC and had high levels of positive engagement with pets. We also did not find evidence of  
345 a significant effect among children who had not been exposed to AC, regardless of their degree of  
346 positive engagement with pets.

347 [Figure 3 here]

348 **Discussion**

349 To our knowledge, this study is the first to evaluate whether and to what extent the associations  
350 between exposure to IPV and several indicators of children’s mental health vary as a function of  
351 children’s positive engagement with pets and exposure to AC. Generally, we found support for two of  
352 our three hypotheses: 1) children who had been exposed to higher levels of IPV exhibited more  
353 internalizing and posttraumatic stress symptoms if they had also been exposed to AC, and 2) positive  
354 engagement with pets buffered the impact of exposure to IPV on children’s internalizing and  
355 posttraumatic stress symptoms when adjusting for the effects of AC exposure. Although we  
356 hypothesized that children exposed to IPV would exhibit increased internalizing problems when they  
357 had higher levels of positive engagement with pets *and* had been exposed to AC in the home, we found  
358 that for children exposed to AC, high levels of positive engagement with pets had a protective effect  
359 against the adverse consequences of exposure to IPV, where this was not the case for children reporting  
360 low-to-moderate levels of engagement with pets in the context of AC. Collectively, these findings  
361 demonstrate the powerful role that pets can play in the lives of children, especially in the context of  
362 exposure to IPV. Multiple scholars focusing on preventive interventions for children experiencing early  
363 life adversity (e.g., Luthar & Cicchetti, 2000) argue that it is more practical for preventive interventions  
364 serving victimized children to promote the development of adaptive functioning by bolstering  
365 children’s assets and resources at multiple levels within children’s social ecologies rather than aim to  
366 reduce negative behavioral symptoms. Our findings suggest that relationships with pet animals are an  
367 asset and resource in children’s lives that warrant increased attention alongside the welfare of pets in  
368 families experiencing IPV.

369 Specifically, our findings suggest that **high** levels of children’s positive engagement with a  
370 family pet functions as a moderator of the effect of exposure to IPV on generalized internalizing  
371 symptoms as well as three symptom clusters including: anxious/depressed symptoms, DSM-oriented



372 anxiety problems, and PTS symptoms. Although our study is unable to examine potential mechanisms  
373 through which engagement with pets operates as a protective factor among children exposed to IPV  
374 and AC, it is possible that engaging with pets fosters social regulation of emotion, enhances cognitive  
375 control, and/or increases a child's sense of social support (Freund, McCune, Esposito, Gee &  
376 McCardle, 2016) which are well-documented factors that discriminate between resilience and  
377 psychopathology among children exposed to violence (Yule et al., 2019). Further, prior studies link  
378 multiple forms of competence (social, academic, and extracurricular) to positive psychosocial  
379 adjustment among children experiencing adversity across developmental stages (Ostrov et al., 2009;  
380 Yule et al., 2019). Positive engagement with pets, particularly care-taking behaviors (which are  
381 reflected among the CTAQ items), may help children develop a positive sense of self and prosocial  
382 competence **by helping the child engage in externally oriented activities, which can protect against**  
383 **negative affect**. Further research is needed to tease apart whether and to what extent distinct domains of  
384 engagement with pets (e.g., caretaking, play, affectionate behavior) have protective effects on the  
385 relation between IPV and specific domains of psychopathology, as well as the dynamic processes (e.g.,  
386 competence, self-regulation) through which child-pet interactions influence these relations. For  
387 example, behaviors such as dog-walking may help to mitigate the effects of IPV exposure by increasing  
388 children's sense of community and social support, whereas affectionate behaviors may support stress  
389 reduction by reducing cardiovascular reactivity (Allen, Blascovich & Mendes, 2002).

390 Relatedly, we did not find evidence that positive engagement with pets buffers the impact of  
391 IPV on somatic complaints or withdrawn/depressed symptoms. It is possible that specific aspects of  
392 child-pet interactions (e.g., stress reduction, social support) may be more relevant to mitigating the  
393 impact of IPV on these symptom clusters, rather than the more generalized construct of positive  
394 engagement measured in the current study. Alternatively, symptoms such as somatic complaints and  
395 being withdrawn may go unnoticed in high conflict households where parenting is compromised  
396 (Maddoux et al., 2016). For this reason, it is possible that caregiver reports of these symptom clusters

397 do not accurately capture variability among children in our sample. Future research in this area should  
398 incorporate self-report assessments of children's mental health symptoms and a greater breadth of  
399 measures to capture multiple features of the child-pet relationship. In addition, longitudinal research  
400 should test the relationship between pet engagement and these symptom clusters over time, in order to  
401 shed light on potential reciprocal relations between human-animal interaction and internalizing  
402 psychopathology in this population.

403         As shown in Table 2, the conditional effects models indicate that IPV is not significantly  
404 associated with posttraumatic stress or any of the internalizing behavior scores among children in our  
405 sample who were not exposed to AC (across all levels of positive engagement with pets). This finding  
406 conflicts with the wide body of research documenting deleterious impacts of IPV on child mental  
407 health (Evans, Davies & DiLillo, 2008; Fong, Hawes & Allen, 2019; Grip, Almqvist & Broberg, 2012);  
408 although, we are unaware of any study that has adjusted for the presence of pets in the household.  
409 Given that all families in our sample lived with pets in the past year, even children with low levels of  
410 positive engagement with pets may have benefited from other protective aspects of pet-ownership, such  
411 bonds or attachments to pets and associated stress-reduction, which may have buffered the impact of  
412 IPV on children (McDonald et al., 2015; Melson, Schwartz & Beck, 1997). Other explanations for the  
413 null associations between the child-reported IPV and child adjustment include: reduced variability in  
414 scores due to our sampling procedures or that children were reluctant to report exposure to specific IPV  
415 behaviors due to the repercussions of reporting on their family environment.

416         As expected, we found a significant effect of IPV exposure on multiple domains of internalizing  
417 behavior and PTS among children exposed to AC. Across all models, the magnitude of the effect of  
418 IPV on these child outcomes was strongest for those who had been exposed to AC and reported low  
419 levels of positive engagement with pets. For children exposed to AC, IPV exposure was not  
420 significantly associated with increases in internalizing behavior or PTS problems among children with  
421 high levels of positive engagement with pets. Thus, exposure to AC can put children at a greater risk of

422 developing internalizing problems when they lack high levels of positive engagement with their pets.  
423 This finding is not surprising given that a previous study found that children exposed to AC were over  
424 5 times more likely to display severe maladjustment (characterized by clinical levels of 5 behavioral  
425 problems, including internalizing problems) than children not exposed to AC (McDonald et al., 2016),  
426 adjusting for the effects of severity of child IPV exposure and other household risk factors.

427         Although our study indicates that exposure to AC exacerbates the negative impact of IPV on  
428 anxious/depressed symptoms, particularly for children with low to moderate levels of positive  
429 engagement with pets, we did not find evidence of moderation by AC for any of the other mental health  
430 variables. Quantitative research in this area is limited, and therefore we cannot directly compare our  
431 results with similar studies of children exposed to IPV. However, when reflecting on the items that  
432 comprise the AD subscale, our findings mirror and complement prior qualitative work on children's  
433 experiences of AC. The AD subscale primarily reflects items capturing negative cognitions (e.g., fear,  
434 worry, worthless, guilty) and emotion regulation (cries). Prior qualitative studies document that  
435 children's exposure to AC is multifaceted, and that children often become involved in preventing and  
436 intervening in IPV incidents involving AC (Collins et al., 2018; McDonald et al., 2015). Thus, it is  
437 understandable that exposure to AC may be uniquely related to this symptom cluster, given that  
438 children's accounts of their involvement in AC incidents often centers on the interplay between  
439 negative emotions (i.e., fear) and emotion regulation (e.g., crying, becoming involved in an IPV  
440 incident involving pets), as well as subsequent negative cognitions such as guilt and negative self-  
441 image.

442         Although our findings mirror Girardi and Pozullo's (2015), in that we found AC was associated  
443 with increased risk for anxiety and depressive symptoms, their retrospective study suggested that the  
444 impact of AC exposure on internalizing symptoms was greatest for those with close bonds with pets.  
445 Our study examined children's positive *engagement* with their pets, rather than the child's bond with  
446 the pet. Therefore, it may be important for future research to consider multiple domains of children's

447 relationships with pets in order to disentangle relations between child victimization, AC, and mental  
448 health outcomes. Furthermore, it is possible that children’s level of positive engagement with pets  
449 reflects enhanced parent-child interactions in the home. Several of the CTAQ items reflect pet-keeping  
450 activities such as feeding, grooming, and walking the pet, which are behaviors often encouraged by  
451 adult caregivers (Muldoon, Williams & Lawrence, 2015). Moreover, it is possible that pets help to  
452 buffer the impact of IPV on adult survivors’ mental health, thereby having an influence on the indirect  
453 effect of IPV on child outcomes via maternal mental health. Future studies would do well to control for  
454 the quality of the child-caregiver relationships and maternal health and parenting to more rigorously  
455 evaluate the impact of relationships with pets on child outcomes in the context of family adversity.

456         These findings add important contributions to knowledge of the role of pets as a protective  
457 factor in the context of family violence. Taken as a whole, this study supports prior assertions that  
458 children in adverse family environments experience both potential benefits and risks associated with  
459 pets in the household (Collins et al., 2018; McDonald et al., 2015; McDonald et al., 2017). Many  
460 children exposed to IPV display high levels of positive engagement with pets (McDonald et al., 2015).  
461 Although replication is needed, our results suggest that pets may serve as a protective factor for  
462 children **if there is high engagement**, whether or not they have been exposed to AC. These findings  
463 have significant implications for promoting positive adjustment in violence-exposed **children, although**  
464 **we cannot draw causal inferences due to the cross-sectional nature of our study.**

#### 465 **Limitations**

466         Although this study has many strengths, we note several limitations that should be considered  
467 when interpreting our results. First, all families enrolled in this study were connected with community-  
468 based IPV services. Thus, our convenience sample may not be representative of the full population of  
469 women and children experiencing IPV. **Relatedly, our results might only be generalizable to families**  
470 **experiencing violence towards mothers.** Additionally, mothers decided which one of their eligible  
471 children would participate in the study. Our project was advertised as the “Pets in Families Study”;

472 therefore, mothers may have been more likely to choose children with strong bonds or negative  
473 relations with their pets. Another significant limitation is our use of listwise deletion. Although we  
474 found only a minor age difference between individuals excluded and those included in the present  
475 study, other methods have been found to be more robust in addressing missing data (e.g., full  
476 information maximum likelihood). This study is also limited by our reliance on a dichotomous measure  
477 of child exposure to AC that included both animal harm and death. This prevented us from testing and  
478 accounting for differences in frequency, severity and proximity of children's exposure to AC, which  
479 are important aspects of violence exposure to consider in relation to child wellbeing. Although prior  
480 research indicates that children display the strongest attachment to dogs and cats (Hawkins, Williams &  
481 Scottish SPCA, 2017; Muldoon, Williams & Currie, 2019), another limitation of this study is that other  
482 types of pets (e.g., lizards, lagomorphs, fish) were not considered. Finally, we relied on mothers'  
483 reports of children's behavioral symptoms. Future studies would do well to include child assessments  
484 of internalizing behavior and trauma symptoms.

#### 485 **Implications for Research and Practice**

486 Exposure to IPV and AC in childhood places children at-risk for internalizing problems and  
487 posttraumatic stress. Results of this study suggest that positive engagement with family pets, via  
488 normal day-to-day activities such as play, grooming, and caretaking, may help mitigate the adverse  
489 impact of exposure to family violence on child health and wellbeing. Results of this study also  
490 demonstrate the powerful role that dogs and cats can play in the lives of children when children have  
491 high levels of engagement with their pet, especially in the context of exposure to IPV. Our findings  
492 should not be interpreted as support for the notion that pet ownership alone is protective against the  
493 impacts of IPV exposure. These findings underscore the need for further research to consider how  
494 exposure to AC and positive aspects of child-animal interactions, interact and influence children's  
495 development, particularly in the context of other ACEs.

496 Future studies should also test whether positive engagement with pets is a protective factor  
497 against the impact of other ACEs. As mentioned previously, it is well documented that ACEs  
498 exposures often occur as multiple, rather than single events (Shin, McDonald & Conley, 2018). The  
499 current study was unable to account for co-occurring ACEs, such as child maltreatment. It is possible  
500 that associations between AC exposure and children's psychological wellbeing may be explained by  
501 confounding factors such as the co-occurrence of child physical abuse or other forms of adversity (e.g.,  
502 emotional abuse and sexual abuse) that our and prior studies have failed to test. Longitudinal research  
503 is needed to tease apart the unique impact of AC exposure on child development while adjusting for the  
504 effects of other ACEs. Finally, qualitative and mixed-methods studies with children would enable a  
505 more in-depth understanding of children's views surrounding how their relationship with their pet(s)  
506 helps them cope with IPV. Such information would provide valuable insight into how to incorporate  
507 pets into intervention and prevention efforts for this population.

508 Our findings, when considered alongside previous work in this area, demonstrate that children  
509 who have been referred to professional and community services due to exposure to IPV, should also be  
510 screened for exposure to AC and relationships with family pets, to ensure that appropriate, efficient  
511 support and resources can be provided. There is strong empirical evidence of children's attachment to  
512 pets in the context of IPV, and so appropriate safety planning and intervention efforts are needed for  
513 IPV survivors with pets. There may be important psychological and safety consequences for the  
514 removal of an animal within families where IPV and AC are present, or a delay in seeking shelter due  
515 to children and adults' concern for pets left behind (Barrett et al., 2018; Collins et al., 2018). Our  
516 findings highlight the importance of residential co-shelter IPV services that allow families and pets to  
517 stay together. There is also a need for evidence-based interventions to be developed that address  
518 children's exposure to AC, support trauma and grief associated with AC, and consider both the benefits  
519 and adverse consequences of children's positive relationship with their pet in the context of family  
520 violence.

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**Table 1.***Intercorrelations among exposure to intimate partner violence, moderator variables, and internalizing scales (N = 204).*

	1	2	3	4	5	6	7	8	9
1. Exposure to IPV	-								
2. Exposure to AC	-.04	-							
3. Positive engagement with pets	.22**	.10	-						
4. Internalizing Problems	.02	.41***	.03	-					
5. Anxious/Depressed	.07	.43***	.11	.93***	-				
6. Anxiety Problems	.02	.47***	.10	.84***	.89***	-			
7. Withdrawn/Depressed	.06	.23**	-.10	.86***	.70***	.63***	-		
8. PTS Problems	.00	.43***	-.04	.90***	.85***	.81***	.78***	-	
9. Somatic Problems	-.12	.29***	-.01	.72***	.54***	.51***	.50***	.61***	-
10. Somatic Complaints	-.11	.37***	.01	.82***	.65***	.61***	.58***	.72***	.93***

*Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .*

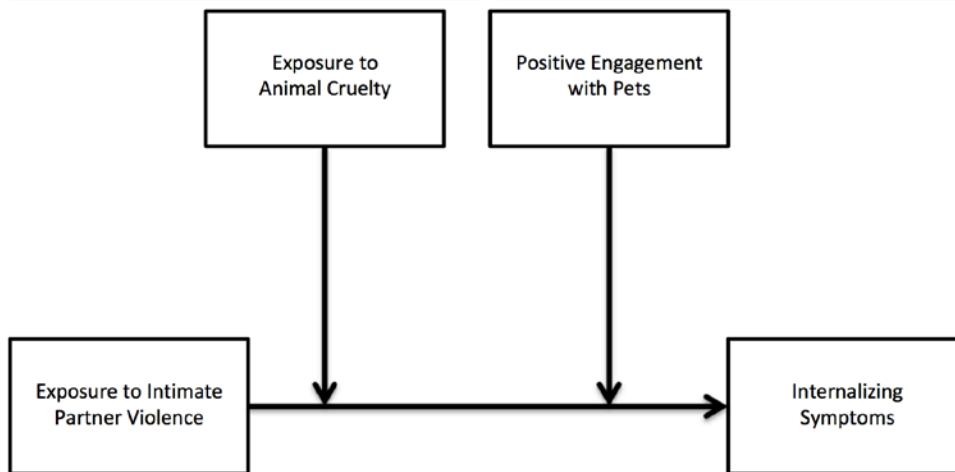
**Table 2.**

*Conditional effects of exposure to intimate partner violence on internalizing scales at different levels of positive engagement with pets (N = 204).*

		Positive engagement with pets	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>95% CI</i>	
							<i>LL</i>	<i>UL</i>
Internalizing problems	Not exposed to AC	Low <sup>a</sup>	.16	.10	1.55	.124	-.04	.36
		Moderate	.00	.08	.06	.952	-.15	.16
		High <sup>b</sup>	-.15	.09	-1.62	.106	-.33	.03
	Exposed to AC	Low <sup>a</sup>	<b>.42</b>	<b>.13</b>	<b>3.14</b>	<b>.002</b>	<b>.16</b>	<b>.68</b>
		Moderate	<b>.27</b>	<b>.11</b>	<b>2.37</b>	<b>.019</b>	<b>.04</b>	<b>.49</b>
		High <sup>b</sup>	.12	.12	.98	.331	-.12	.35
Anxious/Depressed	Not exposed to AC	Low <sup>a</sup>	.19	.10	1.87	.063	-.01	.38
		Moderate	.02	.08	.28	.783	-.13	.17
		High <sup>b</sup>	-.14	.09	-1.62	.106	-.32	.03
	Exposed to AC	Low <sup>a</sup>	<b>.50</b>	<b>.13</b>	<b>3.83</b>	<b>.000</b>	<b>.24</b>	<b>.76</b>
		Moderate	<b>.34</b>	<b>.11</b>	<b>3.04</b>	<b>.003</b>	<b>.12</b>	<b>.56</b>
		High <sup>b</sup>	.17	.12	1.48	.140	-.06	.40
Anxiety Problems	Not exposed to AC	Low <sup>a</sup>	.15	.10	1.47	.143	-.05	.34
		Moderate	.00	.08	.05	.960	-.15	.15
		High <sup>b</sup>	-.14	.09	-1.56	.121	-.31	.04
	Exposed to AC	Low <sup>a</sup>	<b>.33</b>	<b>.13</b>	<b>2.50</b>	<b>.013</b>	<b>.07</b>	<b>.59</b>
		Moderate	.19	.11	1.68	.095	-.03	.40
		High <sup>b</sup>	.04	.12	.38	.707	-.19	.27
Post-Traumatic Stress Problems	Not exposed to AC	Low <sup>a</sup>	.13	.10	1.29	.200	-.07	.33
		Moderate	.00	.08	.03	.976	-.15	.15
		High <sup>b</sup>	-.12	.09	-1.39	.167	-.30	.05
	Exposed to AC	Low <sup>a</sup>	<b>.34</b>	<b>.13</b>	<b>2.56</b>	<b>.011</b>	<b>.08</b>	<b>.60</b>
		Moderate	.21	.11	1.90	.059	-.01	.43
		High <sup>b</sup>	.09	.12	.73	.465	-.15	.32

*LL* = Lower level; *UL* = Upper level; <sup>a</sup> Indicates scores less than or equal to one standard deviation below the centered mean (-1.01);

<sup>b</sup> Indicates scores greater than or equal to one standard deviation above the centered mean (1.01).



*Figure 1.* Theoretical model of the collective moderating effects of positive engagement with pets and AC exposure on the relationship between children's exposure to intimate partner violence exposure and internalizing behavior symptoms. Effects of covariates (e.g., age, gender, and Hispanic ethnicity) are not included in the figure to reduce complexity.

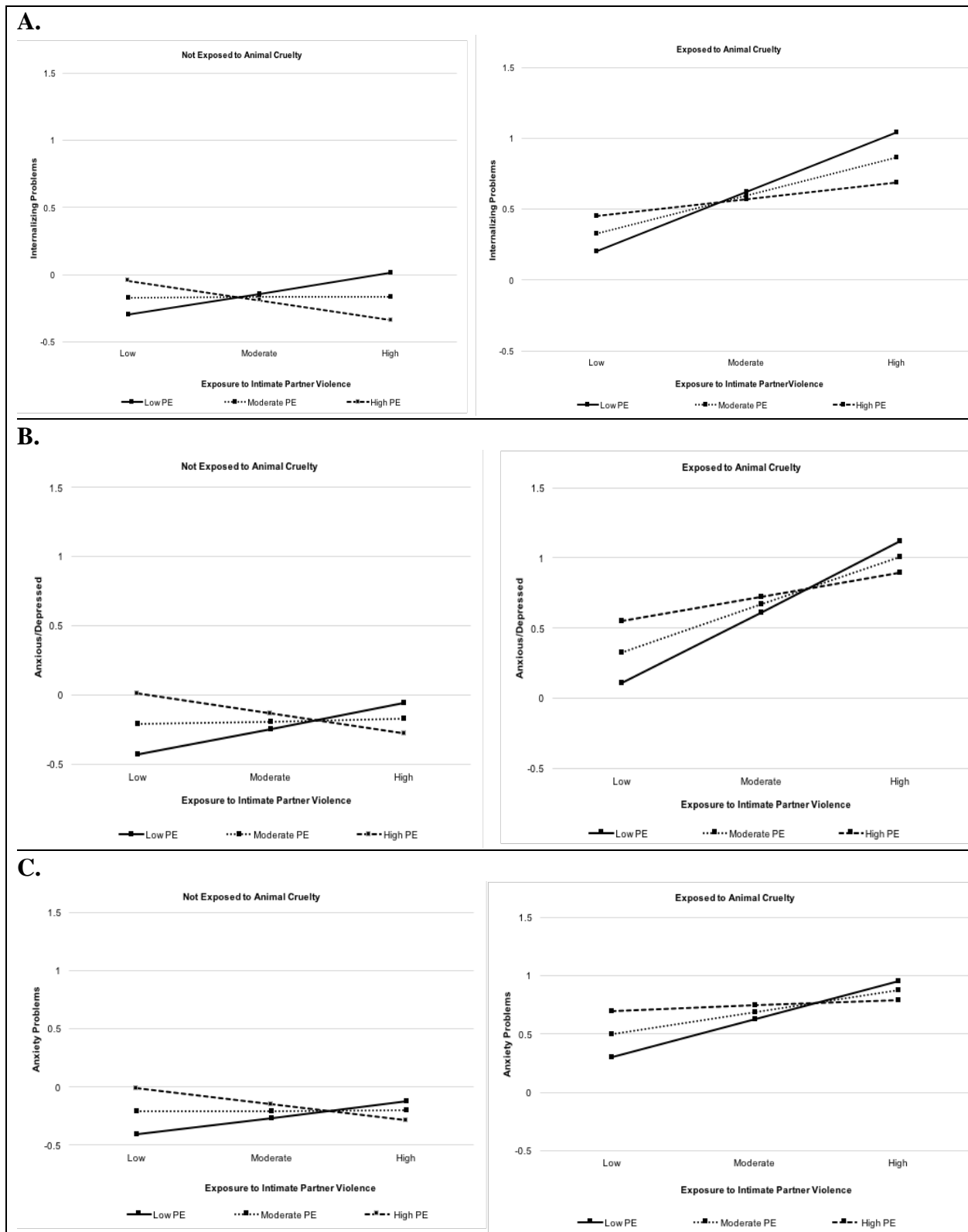


Figure 2. Conditional effect of exposure to intimate partner violence on internalizing symptoms as a function of children’s positive engagement (PE) with pets and exposure to animal cruelty ( $N = 204$ ).

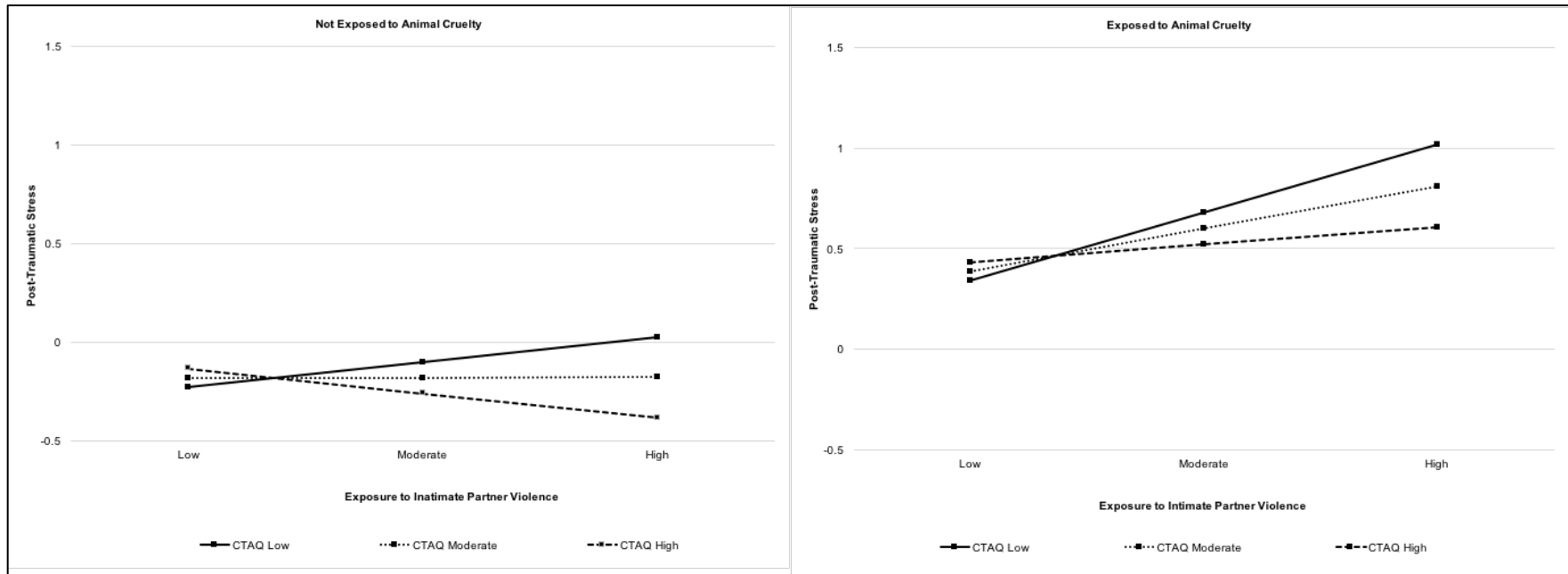


Figure 3. Conditional effect of exposure to intimate partner violence on posttraumatic stress symptoms as a function of children's positive engagement (PE) with pets and exposure to animal cruelty ( $N = 204$ ).