Research Article

Animal cruelty as an indicator of family trauma: Using adverse childhood experiences to look beyond child abuse and domestic violence

Melissa A. Bright[a],[*], Mona Sayedul Huq[b], Terry Spencer[c], Jennifer W. Applebaum[c], Nancy Hardt[d]

[a] University of Florida, Gainesville, FL 32611, USA
[b] Department of Health Education and Behavior, University of Florida, USA
[c] College of Veterinary Medicine, University of Florida, USA
[d] Departments of Pathology, Obstetrics and Gynecology, University of Florida, USA

ARTICLE INFO

ABSTRACT

Youth who engage in animal cruelty are known to be at increased risk of perpetrating violence on other people in their lives including peers, loved ones, and elder family members. These youths have often been exposed to family violence, including animal cruelty perpetrated on their beloved pets by violent adults. The current study utilizes a data set of 81,000 juvenile offenders whose adverse childhood experiences are known and includes 466 youth who self-report engaging in animal cruelty. Compared to the larger group of juvenile offenders, the children admitting to engaging in animal cruelty are younger at time of first arrest, more likely to be male, and more likely to be White. When looking at their reports of adverse childhood experiences (ACEs), they are more likely than other juvenile offenders to have an array of adverse experiences beyond family violence and to have four or more ACEs. Although the youth who are cruel to animals are already troubled, the fact that they present to law enforcement at early ages provides early opportunities for intervention. Service providers outside the law enforcement field, such as teachers, physicians, veterinarians and animal control officers may be able to identify these vulnerable youth, and refer them to needed services before violence is visited on other humans.

1. Introduction

Animal cruelty can be observed or reported to child-serving adults including teachers, health professionals, veterinarians, animal control, and law enforcement. Although ample literature links animal cruelty with childhood exposure to family violence and perpetration of violence towards humans, review of a large cohort of youth who admit to animal cruelty indicates that they present to service providers earlier in life than other juvenile offenders. Because of their early encounters with youth-serving professionals, they may have more opportunities for early intervention. After discovering cruelty to animals, adults can ask, "What happened to you?" and begin a trauma informed and trauma responsive course of action for these vulnerable youths.

Cruelty to animals includes intentional and unintentional acts of abuse, neglect, torture, and abandonment of animals such as orchestrated fighting, burns, blunt force trauma, sharp force injuries, gun and projectile injuries, asphyxia and drowning, sexual abuse, and poisoning (Thompson, 2014). Acts of animal cruelty by children is one of the earliest symptoms of conduct disorder (Frick

---

et al., 1993) and often a precursor to engaging in later crimes (Becker & French, 2004; Degue & Dilillo,2009).

Children may commit acts of cruelty to animals because of curiosity or imitation of actions they have observed, their desensitization to violence, decreased empathy, or lack of attachment (Ascione, Thompson, Black, 1997; Ascione, Weber, Wood, 1997; Hensley & Tallichet, 2005). In the most extreme cases, children living in a violent household may kill an animal to prevent their pet from further torture (McDonald et al., 2015). Animal abuse during childhood is also linked to later violence and abuse of children, spouses, and elders (Walton-Moss, Manganello, Frye, & Campbell, 2005). Theoretical constructs and empirical research have linked cruelty to animals to serial murder (Wright & Hensley, 2003).

Two of the most documented precipitants of children engaging in animal cruelty are domestic violence and child abuse. Several studies document a co-occurrence between intimate partner violence (IPV), child abuse, and animal abuse (Arluke, Levin, & Ascione, 1999; Ascione & Arkow, 1999Degue & Dilillo, 2009; Faver & Strand, 2003). A common form of exertion of power and control in violent relationships is to threaten or harm beloved pets. Between 26% and 57% of domestic violence victims report that pets were harmed or killed by their abuser (Ascione et al., 1997; Carlisle-Frank, Frank, & Nielsen, 2004; Flynn, 2000). Additionally, animal abuse occurs in 88% of homes with child physical abuse and 34% of homes with child physical neglect or sexual abuse (DeViney, Dicker, & Lockwood, 1983). Adult perpetrators commit acts of animal cruelty to incite and perpetuate fear and submission in their victims. Harming beloved pets serves to intimidate, retaliate, punish, and isolate victims, prevent victims from leaving, or coerce return (Arkow, 2014).

Although not all child victims of domestic violence and maltreatment – either as a witness, a direct victim, or both- go on to commit acts of violence, many do (Becker, Stuewig, Herrera, & McCloskey, 2004). Approximately 32% of children exposed to domestic violence engage in animal cruelty (Ascione, Weber, Wood, 1997). Additionally, children exposed to IPV are three times more likely to be cruel to animals (Currie, 2006).

Exposure to multiple forms of abuse seems to have an additive effect: whereas 29% of children who were exposed to domestic violence only engaged in cruelty and 44% of victims of physical abuse only engaged in cruelty, 54% of child victims of domestic violence *and* physical abuse were cruel to animals (McEwen, Moffitt, & Arseneault, 2014). Similar results were found in another study: Among children who experienced sexual abuse, the proportion who engaged in animal cruelty was higher for those who also experienced both physical abuse and exposure to DV compared to children who experienced just physical abuse, just domestic violence, or neither (Ascione, Friedrich, Heath, & Kayashi, 2003).

The demonstrated link between cruelty to animals and household violence – both maltreatment and domestic violence – is important but studies are limited. Research on the impact of cumulative stress and poly-victimization illuminates the importance of identifying children who experience multiple forms of adversity. These children experience more psychological distress than children who experience only one form of victimization, even if that one form is repeated (Finkelhor, Ormrod, & Turner, 2007). The sequelae of poor health outcomes associated with experiencing multiple forms of childhood adversity, as opposed to just one form of adversity, has been well documented in both children (Evans, Li, & Whipple, 2013; Flaherty et al., 2009) and adults (Felitti et al., 1998).

To date, few studies are able to describe a comprehensive trauma history of children who engage in animal cruelty. Moreover, not many studies examine the association between cruelty to animals and a history of multiple adverse experiences beyond sexual abuse, physical abuse, and domestic violence. Based on the extant studies, it appears that exposure to multiple forms of violence – intimate partner and maltreatment – puts children at greater risk for engaging in cruelty (Ascione et al., 2003; Boat, 2014; McEwen et al., 2014). Understanding how multiple forms of abuse as well as other types of adversity (e.g., having a caregiver with mental illness, caregiver with substance abuse issues, caregiver incarcerated) provide important insight into which types of childhood adversity increase the risk of perpetrating animal cruelty.

There may also be gender differences in the path from childhood trauma to animal cruelty, albeit the extant literature is limited. In general, boys are more likely to engage in animal cruelty than are girls (Ascione et al., 2003; Baldry, 2003). In addition, one study found boys who experienced physical abuse were at higher risk for engaging in cruelty whereas the co-occurrence of physical abuse and domestic violence put girls at higher risk (Ascione et al., 2003). Thus, in predicting perpetration of animal cruelty, there appears to be a gender-by-abuse type interaction.

In the current study, we extend the scientific literature on children who engage in animal cruelty by examining how cruelty may be related to multiple forms of childhood adversity. Using a sample of high-risk adolescents, the specific aims of the current study are to: (a) describe the demographic characteristics and trauma history of youth who engage in animal cruelty beyond household violence and maltreatment, (b) test the association between animal cruelty and these adversities, and (c) examine how gender moderates this trauma-cruelty association.

2. Method

2.1. Design

This study is a cross-sectional, retrospective review of data on juvenile offenders. We utilize predictive modeling to assess the likelihood of engaging in animal cruelty based on history of family trauma, with acknowledgement that cross-sectional research precludes statements of causation. Although prospective designs are ideal, this study capitalizes on a unique opportunity to examine the population of juvenile offenders in a single state across 9 years. This significant sample size also provides an opportunity to identify a large sample of youth who engaged in animal cruelty that has not previously been available in the literature.

2.2. Sample

This study utilized a retrospective record review of juvenile delinquency data for the population of 81,171 juveniles who were first referred to juvenile justice in the state of Florida between December 2005 and December 2014. All adjudicated youths in this time frame were included in the current study; there were no inclusion or exclusion criteria. All youths were under 18 years old at the time of their delinquency referral.

2.3. Measures

All youths (not just youth in this study) referred to juvenile justice in the state of Florida are assessed using the Positive Achievement Change Tool (PACT). The PACT is a fourth-generation actuarial risk/needs assessment designed to assess a youth's overall risk to reoffend, and is administered by Florida Department of Juvenile Justice (FDJJ) employees trained in Motivational Interviewing techniques. The assessment is given in a multi-session, semi-structured interview format between a caseworker and the youth. Youth, caseworkers, and Department of Juvenile Justice (DJJ) employees who are knowledgeable of the youth's history provide information in interview format toward the assessment. In addition, questions may be completed using data from collaborative sources (e.g., Department of Education or Department of Children & Families child welfare databases). The PACT assessment covers twelve domains including record of referrals, education, use of free time, relationships, employment, family history, living arrangements, alcohol and drug use, mental health, attitudes, aggression, and skills. Risk to re-offend is measured using criminal history and social history sub-scores; risk to re-offend is assigned based on four categories: low, moderate, moderate-high, and high. This assessment methodology has been validated across multiple samples of youth in the FDJJ (Baglivio, 2009; Baglivio & Jackowski, 2013; Mersky, Topitzes, & Reynolds, 2013).

2.3.1. Adverse childhood experiences

We identified the ten most commonly studied adverse childhood experiences (ACEs) from the PACT dataset. These include physical, sexual, and emotional abuse; emotional and physical neglect; caregiver divorce/separation; household member mental illness, substance abuse, incarceration, and domestic violence. Each ACE is derived from multiple items within the PACT, details described elsewhere (Baglivio et al., 2014). For example, household member incarcerated was derived from two items. The first states "History of jail/imprisonment of persons who were ever involved in the household for at least three months" and the second states "jail or history of persons who are currently involved in the household" with response options: no jail/imprisonment history in family, mother/female caretaker, father/male caretaker, sibling drug problem history, older sibling, younger sibling, or other member. If the response was any item other than "no jail/imprisonment history" for either item, then that youth was given a positive score for household member incarceration.

Consistent with the seminal ACE study, experiencing each event was assigned a score of 1 (and absence assigned 0), regardless of the frequency and timing of events. In addition to examining each ACE, we examined cumulative ACE scores. Each youth was assigned a total score of 0–10 based on the number of ACEs experienced. Previous researchers have identified relevant cutoff scores of 3 or higher (Flaherty et al., 2013) and 4 or higher as indicating high risk (Dube, Anda, Felitti, Edwards, & Croft, 2002; Raleva et al., 2014). Because juvenile offenders tend to have higher ACE scores than normative adult samples (Baglivio et al., 2014; Naramore, Bright, Epps, & Hardt, 2015), we defined a high-risk score as 4 or more ACEs.

2.3.2. Animal cruelty

Animal cruelty was ascertained with an item from the violence/aggression not related to offense section: "What's the worst thing that you've ever done to an animal?" Based on responses, interviewers well-trained in both the purpose of the PACT and juvenile offending coded whether the juvenile engaged in animal cruelty as a dichotomous present/absent variable. Because cruelty to animals can take many forms, this open-ended response option increases the likelihood of capturing a full range of types and severity of animal cruelty.

2.4. Analytic plan

We first examined the prevalence of animal cruelty and adverse childhood experiences among the total sample of juvenile offenders, a sub-sample cohort of offenders who were not cruel to animals, and a sub-sample cohort of offenders who were cruel to animals. Next, bivariate analyses were used to compare the proportion of ACEs– both individually and cumulatively – between cohorts (cruel to animals and not cruel to animals): chi-square analyses (for individual ACEs) and *t*-tests (to compare mean ACE scores). Logistic regressions were used to examine the likelihood of engaging in cruelty based on each ACE and a high-risk ACE score, accounting for sex, race/ethnicity, and household income. To assess gender differences in the association between ACEs and engaging in cruelty, additional logistic regressions were conducted examining the likelihood of engaging in cruelty based on sex, each ACE, and a sex*ACE interaction. Additionally, we explored other demographic factors (race/ethnicity, age at first offense, and household income) as potential moderators in the association between ACEs and likelihood of engaging in animal cruelty. Adjusted odds ratios are presented with 95% confidence intervals. Probability levels for multivariate analyses were set at α = 0.05 and adjusted with a Holm-Bonferroni correction to control for Type I error.

Table 1
Demographic characteristics for sample of juvenile offenders who did and did not engage in animal cruelty.

	N (%)		
	Total	Did not engage in animal cruelty	Engaged in animal cruelty
Age at First Offense			
12 and under*	20,768 (25.6%)	20,595 (25.5%)	175 (37.6%)
13 to 16	29,583 (36.4%)	43,654 (54.1%)	242 (51.9%)
Over 16*	6010 (7.4%)	16,458 (20.4%)	49 (10.5%)
Sex			
Male*	63,314 (78%)	62,914 (78.0%)	400 (85.8%)
Female*	17,835 (22%)	17,769 (22.0%)	66 (14.2%)
Race/Ethnicity			
White*	30,990 (38.2%)	30,743 (28.1%)	247 (53.0%)
Black	37,094 (45.7%)	12,615 (15.6%)	58 (12.4%)
Hispanic*	12,673 (15.6%)	36,933 (45.8%)	161 (34.5%)
Other	392 (.5%)	392 (.5%)	0 (0%)
Household income			
< $15,000	20,884 (26.3%)	20,754 (26.3%)	130 (28.6%)
$15,000–$34,999	41,091 (51.7%)	40,864 (51.8%)	227 (50.0%)
$35,000– $49,999	11,899 (15.0%)	11,842 (15.0%)	57 (12.6%)
≥$50,000	5534 (7.0%)	5494 (7.0%	40 (8.8%)
Risk to re-offend			
Low*	36,917 (45.5)	35,815 (45.6%)	102 (21.9%)
Moderate	15,370 (18.9)	15,275 (18.9%)	95 (20.4%)
Moderate-high	17,993 (22.2)	17,882 (22.2%)	111 (23.8%)
High*	10,891 (13.4)	10,733 (13.3%)	158 (33.9%)
High risk ACE score* (≥4 ACEs)	27,066 (33.3%)	267,46 (33.1%)	320 (68.7%)

*Indicates a significant difference between those who did and did not engage in cruelty to animals, p < 0.05

3. Results

3.1. Trauma history of youth who engage in animal cruelty

Descriptive statistics for the demographic characteristics and ACEs prevalence can be found in Table 1. Less than 1% of the total Florida Juvenile Justice population (n = 466) of youth reported engaging in cruelty to an animal. Youth who reported cruelty to animals were more often male, White non-Hispanic, and under age of 15 at first adjudication. Particularly striking was the offenders who first entered the system as pre-teens. More than one third of youth who reported animal cruelty were pre-teens (younger than 12 years) at time of first offense (37.6%), while only 25% of the youth who did not engage in cruelty were pre-teenagers (Fig. 1).

Nearly all of the 81,000 juvenile offenders experienced at least one ACE (93.7%) and approximately one-third (33.3%) experienced four or more ACEs. The most commonly experienced ACE was parental separation (83.8%) and the least common was household mental illness (5.0%).
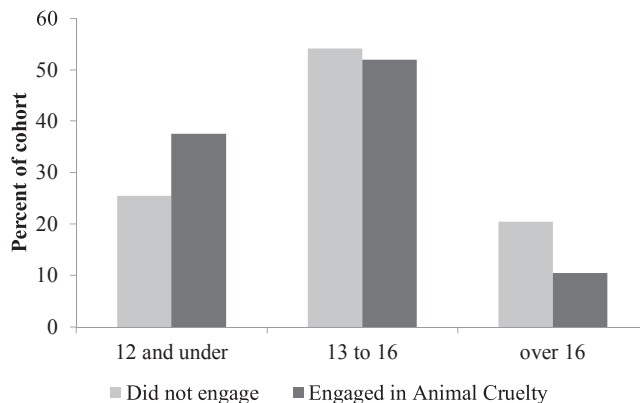

Fig. 1. Age at first offense among juvenile offenders who did and did not engage in animal cruelty.
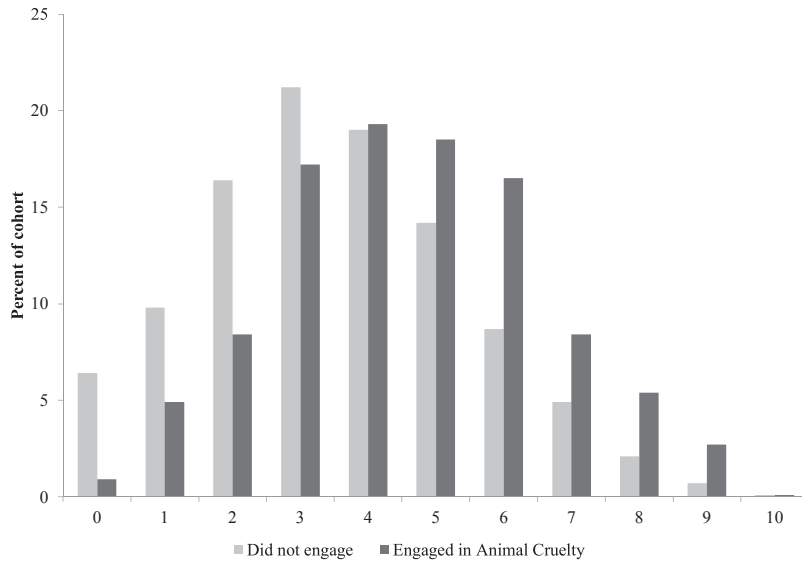
Fig. 2. Prevalence of ACE scores among juvenile offenders who did and did not engage in animal cruelty.

3.2. Association between animal cruelty and these adversities

Nearly all youth (99.1%) who engaged in cruelty experienced at least 1 ACE, and 94.2% had more than one (Fig. 2). For all 10 ACEs, the proportion of individuals endorsing any individual ACE was higher for the youth who engaged in cruelty than for the youth who did not (all p-values < 0.05) (Fig. 3). The prevalence of ACE high-risk scores (≥ 4 ACEs) was significantly higher among youth who engaged in cruelty (68.7%) than among youth who did not (33.1%, X^2 [1] = 263.14, p = .000). The mean ACE score for youth who engaged in animal cruelty (M = 4.49, SD = 1.87) was higher than the mean ACE score for youth who did not engage in animal cruelty (M = 2.79, SD = 1.86), $t(81,169)$ = 19.65, p = 0.000.
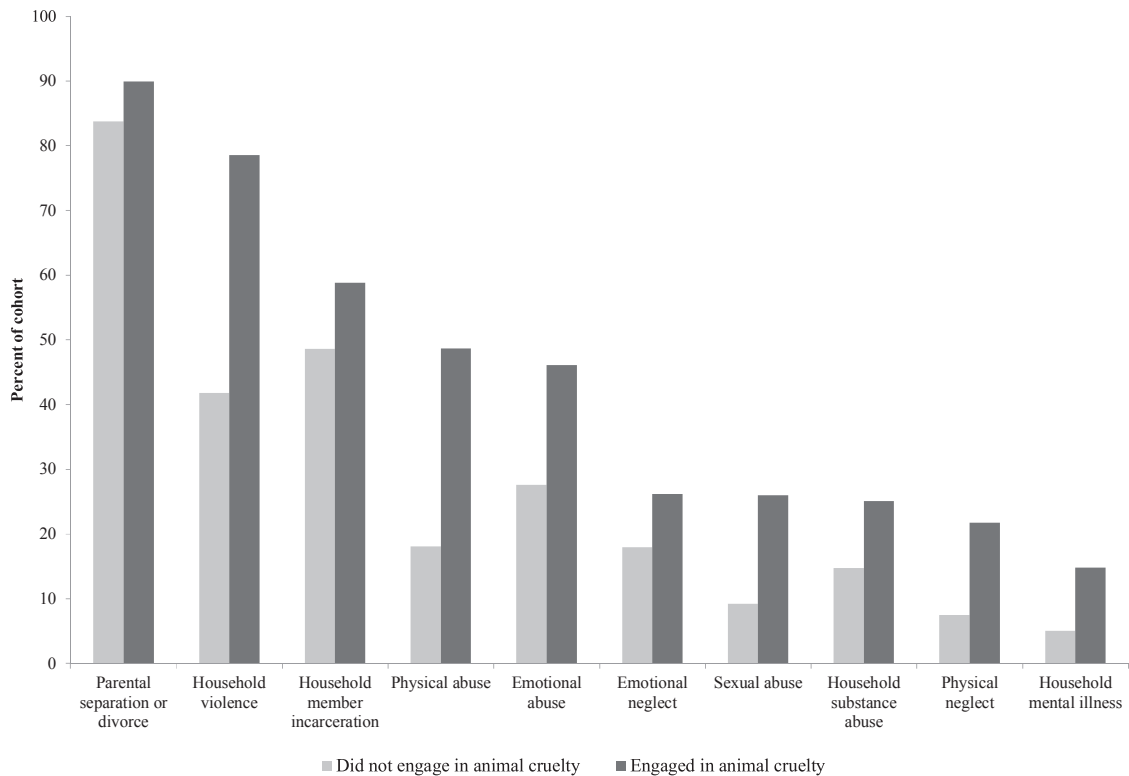

Fig. 3. Prevalence of adverse childhood experiences among juvenile offenders who did and did not engage in animal cruelty.
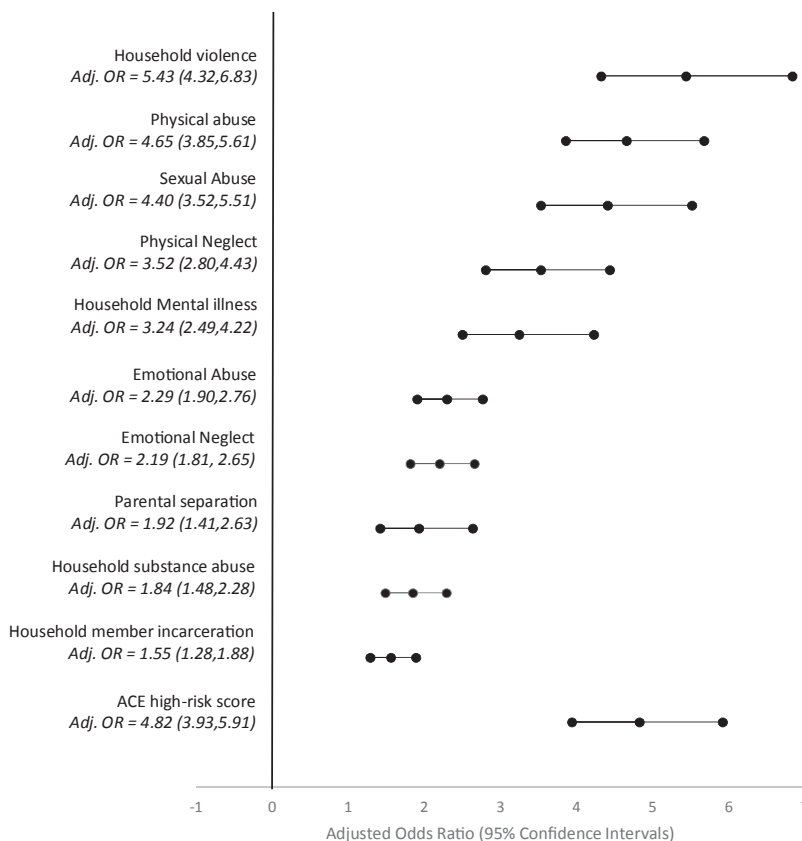
Fig. 4. Likelihood of engaging in animal cruelty based on each ACE and ACE score Adj. OR = Adjusted odds ratio. Logistic regressions adjusted for sex and race/ethnicity, and household income. Referent group = no ACE and low ACE score. All *p*-values < 0.001.

Using logistic regression, the likelihood of engaging in animal cruelty was 4.82 times (95% CI 3.93–5.91) higher for youth with high-risk ACE scores (4 or more) than for youth with low scores (< 4). Additionally, the likelihood of engaging in cruelty was 3.24–5.43 times higher for youth who experienced household mental illness, physical neglect, sexual abuse, physical abuse, and household violence (Fig. 4). Finally, the odds of engaging in cruelty was 1.28–2.29 times higher for youth who experienced household member incarceration, household substance abuse, parental separation, emotional neglect, and emotional abuse.

3.3. Gender moderates the association between animal cruelty and these adversities

Models predicting cruelty from a sex-by-ACE interaction are presented in Table 2. Sex was a significant predictor of engaging in cruelty in nearly all models with females demonstrating lower likelihood of engaging in cruelty compared to males. Sex moderated the association between substance abuse and engaging in animal cruelty such that substance abuse appeared to have no effect on likelihood of engaging in cruelty for females but increased the likelihood of engaging in cruelty for males (Fig. 5), X^2 (7) = 95.25, Adj. OR = 0.51 (95% CI 0.26–.97), *p* = 0.040. However, this association was not significant after a Holm-Bonferroni correction.

3.4. Income moderates the association between physical neglect and animal cruelty

We did not find any interactions between race or age at first offense and ACEs in terms of likelihood of engaging in cruelty, all *p*-values > 0.05. We did, however, find an interaction between physical neglect and household income: For youth who do not experience neglect, lower income is linked to higher likelihood of engaging in animal cruelty, X^2 (7) = 169.68, Adj. OR = 1.70 (95% CI 1.32–2.19), *p* = 0.000. For youth who do experience neglect, there are no differences in likelihood of engaging in cruelty based on income. Thus, it appears that the experience of neglect is more powerful than the impact of household income.

4. Discussion

In the current study, we described the detailed trauma history of youth who engage in animal cruelty. Use of the PACT database allowed identification of more than 400 youth who admitted to animal cruelty and the 10 adverse childhood experiences described by Felitti and Anda. Youth who were cruel to animals were more likely to present early to the juvenile justice system, and were more

Table 2
Likelihood of engaging in cruelty to animals based on ACEs and a sex-by-ACE interaction.

	-2 Log likelihood	*Pseudo R^2	chi-square	Adj. OR	95% CI
Household violence				5.18**	4.08–6.57
Sex				0.33**	0.15–0.76
Sex*Household violence	5,271.11	0.06	323.19**	1.38	0.57–3.30
Physical abuse				4.60**	3.76–5.64
Sex				0.46**	0.30–0.71
Sex*Physical abuse	5,301.81	0.05	292.50**	0.89	0.51–1.55
Sexual abuse				4.58**	3.58–5.85
Sex				0.44**	0.30–0.64
Sex*Sexual abuse	5,396.53	0.04	197.77**	0.69	0.40–1.03
Physical Neglect				3.36**	2.61–4.34
Sex				0.50**	0.37–0.69
Sex*Physical Neglect	5,540.83	0.03	153.48**	1.03	0.57–1.86
Mental illness				3.51**	2.65–4.66
Sex				0.60**	0.45–0.79
Sex*Mental illness	5,467.00	0.02	127.30**	0.46	0.21–1.02
Emotional abuse				2.42	1.98–2.95
Sex				0.67*	0.47–0.96
Sex*Emotional abuse	5,453.56	0.03	140.74**	0.92	0.82–1.03
Emotional neglect				2.25**	1.83–2.76
Sex				0.59 ‡	0.42–0.83
Sex*Emotional neglect	5,467.14	0.02	127.17**	0.77	0.45–1.33
Separation/Divorce				1.86**	1.34–2.58
Sex				0.55	0.22–1.38
Sex*Separation/Divorce	5,509.04	0.02	85.27**	0.99	0.38–2.63
Substance abuse				1.92**	1.52–2.43
Sex				0.64**	0.47–0.86
Sex*Substance abuse	5,499.05	0.02	95.25**	0.51‡	0.26–0.97
Incarceration				1.49**	1.22–1.83
Sex				0.52**	0.33–0.81
Sex*Incarceration	5,508.43	0.02	85.87**	0.93	0.83–1.05
High-risk ACE (4 +)				4.64**	3.75–5.76
Sex				0.37**	0.20–0.71
Sex*High-risk ACE	5,284.24	0.06	310.06**	1.17	0.58–2.38

*Nagelkerke R Square; Models were adjusted for race, age at first offense, and household income. Adj. OR = Adjusted odds Ratio. Referent groups = male, no ACE, low-risk ACE score. all df = 7; **p $<$ 0.0, ‡p $<$ 0.05, however not-significant after a Holm-Bonferroni correction
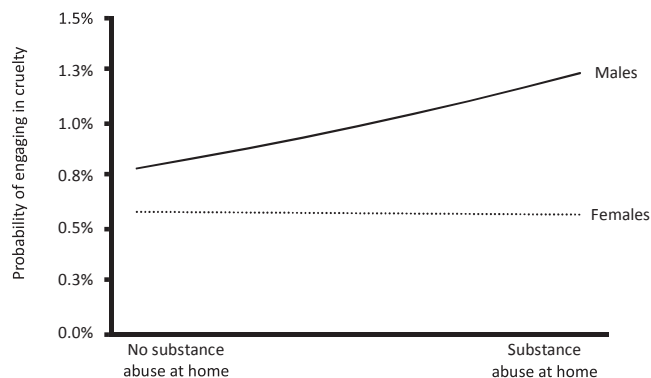

Fig. 5. Probability of engaging in cruelty to animals based on sex and having a household member with a substance abuse problem.

likely to have experienced multiple traumas in their lives. Also, these cruel-to-animal youths were more likely to be white non-Hispanic and were more likely to be male. These descriptions may allow child serving professionals throughout the community to identify children at risk for experiencing multiple family traumas and in need of intervention.

Our findings are validated by their consistency with existing literature on domestic violence and child maltreatment (e.g., Vaughn et al., 2011), yet expand the literature in several important ways. In addition to examining the co-occurrence of multiple childhood traumas, we contribute demographic description of a relatively large sample of cruel youth ($n = 466$) compared to other samples of 20–150 cruel youth described in the literature.

More than half of youth who engaged in cruelty to animals also experienced domestic violence, caregiver divorce, and caregiver incarceration. Less than half of youth (but still a significant proportion) who engaged in cruelty to animals also experienced physical

abuse, emotional abuse, household substance use, physical neglect, sexual abuse, emotional neglect, and household member with mental illness suggesting a weaker association between these ACEs and animal cruelty.

The current study supports the arguments of previous studies suggesting that cruelty to animals may be used as a marker or red flag of family violence (Boat, 2014; Degue & Dilillo, 2009; McEwen et al., 2014). In addition, our findings support the use of animal cruelty as a marker of a host of additional adverse childhood experiences.

Some published studies combine a child's exposure to cruelty to animals and engagement in cruelty to animals when investigating animal cruelty by children. Combining these observations may over-identify youth by including those exposed to animal cruelty but not party to it. Exposure to animal cruelty may serve as a risk factor for engagement in animal abuse by children and adolescents, but not all children so exposed perpetrate violence upon animals. Witness to abuse, exposure and engagement in animal cruelty, and direct experience of maltreatment desensitizes children to all types of violence and harms attachment by children and adolescents.

Although discerning the mechanisms linking family trauma to cruelty to animals is beyond the scope of this study, it is important to consider the complexity of this association. Because the PACT provides a cross sectional sample, it difficult to know whether ACEs give rise to cruelty to animals or if cruelty to animals stems from some other underlying factor. Family trauma may lead to cruelty to animals through adult modeling of cruelty toward animals, desensitizing children to violence, or by limiting development of secure attachment in early childhood. Additionally, children who experience trauma often have difficulty regulating their emotions and behavior (Cook et al., 2005). Thus, these children may have difficulty controlling their violent behavior toward animals or choose to exert their limited power over a family pet.

In contrast, some researchers suggest child psychopathology, particularly callous and unemotional traits, – not family violence or poor parenting – are the leading driver of cruelty to animals (Dadds, Whiting, & Hawes, 2006). Support for this theory comes from the adult literature. In one study, researchers found the "dark triad" of personality – psychopathology, narcissism, and Machiavellianism – to be a latent predictor of negative attitudes and cruelty toward animals (Kavanagh, Signal, & Taylor, 2013). In all likelihood, it may be a combination of these child and family characteristics that lead to cruelty. The factors together give even more credence to the necessity of intervention for children who engage in animal cruelty.

4.1. Limitations

There are several noteworthy limitations to the current study. First, our measure of animal cruelty is broad and subject to reporting and interviewer bias. Due to social desirability, juveniles may have been less inclined to report engaging in the most severe forms of cruelty leaving our sample biased toward a less egregious sample. Additionally, by using a semi-structure interview with a broad question of "What's the worst thing that you've ever done to an animal?", we may have captured youth who engaged in a broad range of behaviors, some of which may be argued as not acts of cruelty. Given that the question was designed as a risk assessment for juvenile offenders and asked and coded by interviewers trained in risk behaviors, it is unlikely that our sample included youth who did not truly engage in cruelty. If anything, we may have failed to ascertain all youth in the 81,000 who were indeed cruel to animals. Future research on this topic would benefit from use of a validated measure of abuse such as the Animal Violence Inventory or Boat Inventory on Animal Related Experiences (Boat, 1999).

Third, we do not have information on whether youth were exposed to animal cruelty which is in itself a family trauma experience that is related to engaging in cruelty. Fourth, we utilized a sample of juvenile offenders which is a high-risk sample for both animal cruelty and ACEs. Thus, our findings may not generalize to non-offending samples. Finally, the data is cross-sectional and precludes use from defining causality among the constructs.

4.2. Implications

Some advocates have suggested that observation of animal cruelty should be added to the list of 10 ACEs, along with witnessing violence in the neighborhood, experiencing racial discrimination, or experiencing bullying. Each of these traumatic events may have long term consequences for children and their abilities to have healthy relationships with humans and animals. Furthermore, because family violence is so prevalent, and because we know that perpetrators of IPV may use animal cruelty to control their victims, there should be additional efforts to identify children who witness animal or human cruelty when family violence is documented. Children would benefit from intervention to prevent them becoming perpetrators of cruelty or violence.

The first responders to crimes against animals include law enforcement, humane officers, animal control officers, and veterinarians. While most law enforcement officers receive standardized training for documenting crimes and have many opportunities for continuing education to improve their ability to recognize the links between interpersonal violence and animal abuse, this is not the case for humane officers, animal control officers, or veterinarians. Only a few states mandate any training or continuing education for humane and animal control officers (Harding, 2016). Very few veterinary colleges include training in veterinary forensics or in the link between animal abuse and interpersonal violence in pre-professional curriculum and most states do not even mandate veterinarians to report suspected cruelty or neglect.

Thus, there is an ongoing need for training of first responders to animal cruelty and neglect. Law enforcement, humane officers, animal control officers, and veterinarians need to know how to recognize signs that should make them suspicious of intentional injury to a pet or a person as well has whom to report their suspicions to, and what community resources should be enlisted for assistance (Kogan, Schoenfeld-Tacher, Hellyer, Rishniw, & Ruch-Gallie, 2017). Such training should emphasize findings from this paper: youth, especially boys, who commit crimes against animals are likely experiencing adverse events in their family that require intervention. Thus, interventions directed at the underlying family trauma, including cruelty to animals, could improve the well-being of the child

and family.

Communities might benefit by sharing geo-coded data about interpersonal violence collected by law enforcement and cases of animal abandonment, neglect, and cruelty collected by animal control. Animal shelter intake data could thus be useful as an additional marker of communities in need of resources to build resiliency (Spencer et al., 2017). Delivering community resources to geographically-clustered, high-risk locations might increase efficiency and effectiveness of interventions. Future research could investigate whether geo-targeting community resources serves to reduce co-morbidity of high ACEs and animal abuse.

Cross-reporting and cross-training is vital to prevention of future trauma against both humans and animals. Social services, medical providers, law enforcement, as well as animal protection personnel, and veterinarians should serve together as a community resource for those investigating cases of animal abuse or family trauma.

Conflict of interest

The authors have no conflicts of interest to declare.

Funding

Financial disclosure

The authors have no financial relationships to declare.

References

Arkow, P. (2014). Form of emotional blackmail: Animal abuse as a risk factor for DV. *Family & Intimate Partner Violence Quarterly, 7*(1), 7–14.
Arluke, A., Levin, J., & Ascione, F. (1999). The relationship of animal abuse to violence and other forms of antisocial behavior. *Journal of Interpersonal Violence, 14*(9), 963–975.
Ascione, F. R., & Arkow, P. (1999). *Child abuse, domestic violence, and animal abuse: Linking the circles of compassion for prevention and intervention.* West Lafayette, Ind: Purdue University Press.
Ascione, F., Friedrich, W., Heath, J., & Kayashi, K. (2003). Cruelty to animals in normative, sexually abused, and outpatient psychiatric samples of 6-to 12-year-old children: Relations to maltreatment and exposure to domestic violence. *Anthrozoös, 16*(3), 194–212.
Ascione, F. R., Thompson, T., & Black, T. (1997). Childhood cruelty to animals: Assessing cruelty dimensions and motivations. *Anthrozoös, 10*(4), 170–177.
Ascione, F., Weber, C., & Wood, D. (1997). The abuse of animals and domestic violence: A national survey of shelters for women who are battered. *Society & Animals, 5*(3), 205–218.
Baglivio, M. T., & Jackowski, K. (2013). Examining the validity of a juvenile offending risk assessment instrument across gender and race/ethnicity. *Youth Violence and Juvenile Justice, 11*(1), 26–43. http://dx.doi.org/10.1177/1541204012440107.
Baglivio, M. T., Epps, N., Swartz, K., Huq, M. S., Sheer, A., & Hardt, N. S. (2014). The prevalence of adverse childhood experiences (ACE) in the lives of juvenile offenders. *OJJDP Journal of Juvenile Justice, 3*(2), 1–23.
Baglivio, M. T. (2009). The assessment of risk to recidivate among a juvenile offending population. *Journal of Criminal Justice, 37*(6), 596–607. http://dx.doi.org/10.1016/j.jcrimjus.2009.09.008.
Baldry, A. (2003). Animal abuse and exposure to interparental violence in Italian youth. *Journal of Interpersonal Violence, 18*(3), 258–281.
Becker, F., & French, L. (2004). Making the links: Child abuse, animal cruelty and domestic violence. *Child Abuse Review, 13*(6), 399–414.
Becker, K. D., Stuewig, J., Herrera, V. M., & McCloskey, L. A. (2004). A study of firesetting and animal cruelty in children: Family influences and adolescent outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*(7), 905–912. http://dx.doi.org/10.1097/01.chi.0000128786.70992.9b.
Boat, B. (1999). Abuse of children and abuse of animals: using the links to inform child assessment and protection. In F. Arkow, & F. Ascione (Eds.). *Child abuse, domestic violence, and animal abuse: Linking the circles of compassion for prevention and intervention* (pp. 83–100). West Lafayette, IN: Purdue University Press.
Boat, B. (2014). Connections among adverse childhood experiences, exposure to animal cruelty and toxic stress: What do professionals need to consider? *Natl Cent Prosecution Child Abuse Update, 24,* 1–3.
Carlisle-Frank, P., Frank, J., & Nielsen, L. (2004). Selective battering of the family pet. *Anthrozoös, 17*(1), 26–42.
Cook, A., Spinazzola, J., Ford, J., Lanktree, C., Balustein, M., Cloitree, M., ... Van der Kolk, B. (2005). Complex trauma in children and adolescents. *Psychiatric Annals, 35*(5), 390–398.
Currie, C. L. (2006). Animal cruelty by children exposed to domestic violence. *Child Abuse & Neglect, 30*(4), 425–435. http://dx.doi.org/10.1016/j.chiabu.2005.10.014.
Dadds, M. R., Whiting, C., & Hawes, D. J. (2006). Associations among cruelty to animals, family conflict, and psychopathic traits in childhood. *Journal of Interpersonal Violence, 21*(3), 411–429. http://dx.doi.org/10.1177/0886260505283341.
DeViney, E., Dicker, J., & Lockwood, R. (1983). The care of pets within child abusing families. *International Journal for the Study of Animal Problems, 4,* 321–329.
Degue, S., & Dilillo, D. (2009). Is animal cruelty a red flag for family violence? Investigating co-occurring violence toward children, partners, and pets. *Journal of Interpersonal Violence, 24*(6), 1036–1056. http://dx.doi.org/10.1177/0886260508319362.
Dube, S. R., Anda, R. F., Felitti, V. J., Edwards, V. J., & Croft, J. B. (2002). Adverse childhood experiences and personal alcohol abuse as an adult. *Addictive Behaviors, 27*(5), 713–725.
Evans, G. W., Li, D., & Whipple, S. S. (2013). Cumulative risk and child development. *Psychological Bulletin, 139*(6), 1342–1396. http://dx.doi.org/10.1037/a0031808.
Faver, C., & Strand, E. (2003). Domestic violence and animal cruelty: Untangling the web of abuse. *Journal of Social Work EducationJournal of Social Work Education, 39*(2), 237–253.
Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., ... Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine, 14*(4), 245–258.
Finkelhor, D., Ormrod, R. K., & Turner, H. A. (2007). Poly-victimization: A neglected component in child victimization. *Child Abuse Neglect, 31*(1), 7–26. http://dx.doi.org/10.1016/j.chiabu.2006.06.008.
Flaherty, E. G., Thompson, R., Litrownik, A. J., Zolotor, A. J., Dubowitz, H., Runyan, D. K., ... Everson, M. D. (2009). Adverse childhood exposures and reported child health at age 12. *Acad Pediatr, 9*(3), 150–156. http://dx.doi.org/10.1016/j.acap.2008.11.003.
Flaherty, E. G., Thompson, R., Dubowitz, H., Harvey, E. M., English, D. J., Proctor, L. J., ... Runyan, D. K. (2013). Adverse childhood experiences and child health in early adolescence. *JAMA Pediatr, 167*(7), 622–629. http://dx.doi.org/10.1001/jamapediatrics.2013.22.

Flynn, C. (2000). Woman's best friend pet abuse and the role of companion animals in the lives of battered women. *Violence Against Women, 6*(2), 162–177.

Frick, P., Lacey, B., Lobber, R., Tannenbaum, L., Van Horn, Y., Christ, M., ... Hanson, K. (1993). Oppositional defiant disorder and conduct disorder: A meta-analytic review of factor analyses and cross-validation in a clinic sample. *Clinical Psychology Review, 13*(4), 319–340.

Harding, G. (2016). *From the desk of the national animal care and control association (NACA)*. NACA NEWS.

Hensley, C., & Tallichet, S. E. (2005). Animal cruelty motivations: Assessing demographic and situational influences. *Journal of Interpersonal Violence, 20*(11), 1429–1443. http://dx.doi.org/10.1177/0886260505278714.

Kavanagh, P., Signal, T., & Taylor, N. (2013). The Dark Triad and animal cruelty: Dark personalities, dark attitudes, and dark behaviors. *Personality and Individual Differences, 55*(6), 666–670.

Kogan, L. R., Schoenfeld-Tacher, R. M., Hellyer, P. W., Rishniw, M., & Ruch-Gallie, R. A. (2017). Survey of attitudes toward and experiences with animal abuse encounters in a convenience sample of US veterinarians. *Journal of the American Veterinary Medical Association, 250*(6), 688–696. http://dx.doi.org/10.2460/javma.250.6.688.

McDonald, S. E., Collins, E. A., Nicotera, N., Hageman, T. O., Ascione, F. R., Williams, J. H., ... Graham-Bermann, S. A. (2015). Children's experiences of companion animal maltreatment in households characterized by intimate partner violence. *Child Abuse Negl, 50*, 116–127. http://dx.doi.org/10.1016/j.chiabu.2015.10.005.

McEwen, F. S., Moffitt, T. E., & Arseneault, L. (2014). Is childhood cruelty to animals a marker for physical maltreatment in a prospective cohort study of children? *Child Abuse Neglect, 38*(3), 533–543. http://dx.doi.org/10.1016/j.chiabu.2013.10.016.

Mersky, J. P., Topitzes, J., & Reynolds, A. J. (2013). Impacts of adverse childhood experiences on health, mental health, and substance use in early adulthood: A cohort study of an urban, minority sample in the U.S. *Child Abuse Neglect, 37*(11), 917–925. http://dx.doi.org/10.1016/j.chiabu.2013.07.011.

Naramore, R., Bright, M. A., Epps, N., & Hardt, N. S. (2015). Youth arrested for trading sex have the highest rates of childhood adversity: A statewide study of juvenile offenders. *Sexual Abuse, 29*(4), 396–410. http://dx.doi.org/10.1177/1079063215603064.

Raleva, M., Peshevska, D. J., Filov, I., Sethi, D., Novotni, A., Bonevski, D., ... Haxhihamza, K. (2014). Childhood abuse, household dysfunction and the risk of attempting suicide in a national sample of secondary school and university students. *Macedonian Journal of Medical Sciences, 7*(2), 381–385.

Spencer, T., Behar-Horenstein, L., Aufmuth, J., Hardt, N., Applebaum, J. W., Emanuel, A., & Isaza, N. (2017). Factors that influence intake to one municipal animal control facility in Florida: A qualitative study. *Animals, 7*(7), 48.

Vaughn, M., Fu, Q., Beaver, K., DeLisi, M., Perron, B., & Howard, M. (2011). Effects of childhood adversity on bullying and cruelty to animals in the United States: Findings from a national sample. *Journal of Interpersonal Violence, 26*(17), 3509–3525.

Walton-Moss, B. J., Manganello, J., Frye, V., & Campbell, J. C. (2005). Risk factors for intimate partner violence and associated injury among urban women. *Journal of Community Health, 30*(5), 377–389.

Wright, J., & Hensley, C. (2003). From animal cruelty to serial murder: Applying the graduation hypothesis. *International Journal of Offender Therapy and Comparative Criminology, 47*(1), 71–88. http://dx.doi.org/10.1177/0306624 X02239276.