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A Preliminary Exploration of the Psychological Risk Factors for Childhood Animal Cruelty: The Roles of Attachment, Self-Regulation, and Empathy

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ABSTRACT

Despite growing awareness of the psychological issues associated with childhood animal cruelty, there is a scarcity of research carried out directly with children. This study investigates the psychological factors influencing the likelihood of a child harming animals, specifically the roles of attachment, empathy, executive functioning, issues related to externalizing behavior, and Callous Unemotional (CU) traits. The sample comprised children at high risk of animal harm referred to the Scottish Society for the Prevention of Cruelty to Animal's Animal Guardians program ($n = 9$) and low-risk controls ($n = 18$) matched for age and school class. A range of assessment techniques was used over three interview sessions for each child. Externalizing problems were measured using teacher reports; attachment was blind-coded using the Child Attachment Play Assessment; executive functioning was assessed using a Dimensional Change Card Sort (DCCS); and empathy was measured using self-report and picture-based tasks, the Kids Empathy Development Scale. Children at high risk of animal harm were more likely to be insecurely attached ($p = 0.002$), scored significantly higher on Strengths and Difficulties ($U = 1.5$, $p < 0.001$) and CU traits ($U = 6.4$, $p = 0.001$) as rated by their teachers, scored lower on cognitive empathy ($U = 36.5$, $p = 0.043$), and performed more poorly on the DCCS test of executive functioning ($U = 31.0$, $p = 0.014$). No significant differences were found between high-risk and low-risk children on self-reported empathy or emotion recognition. We also found that insecure attachment was related to an increased score for many psychological risk factors. This exploratory study demonstrates that childhood animal harm can act as an indicator of a range of psychological issues and highlights the importance of designing appropriate interventions for this vulnerable population.

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Research suggests that interactions with animals during childhood can have a range of positive effects, including the development of empathy (Daly & Morton, 2009), stress reduction (Beetz et al., 2012), and as helpful agents of therapeutic change (Feng et al., 2021; Levinson, 1965). By contrast, children's harm of animals is associated with behavioral issues and low empathy (Hawkins et al., 2017). It can be an indicator for both cycles of violence (DeGue & DiLillo, 2009) and/or adverse childhood experiences (Bright et al., 2018) and may be predictive of future violent behavior (Longobardi & Badenes-Ribera, 2019).

Existing Research on Childhood Animal Harm

Childhood animal harm can be defined as "any behavior, either intentional or unintentional, where a child negatively impacts an animal's welfare" (Wauthier & Williams, 2022). It encompasses a range of behaviors, from accidental harm due to lack of knowledge, to harm of high concern such as intentional cruelty, which has historically received the most research. The first studies of childhood animal cruelty, based on retrospective questionnaires with prison inmates, showed animal cruelty is predictive of later interpersonal violence (Macdonald, 1963), establishing it as a marker for psychopathic traits or their precursor in childhood, Callous Unemotional (CU) traits (Dadds et al., 2006). Animal cruelty was included as a diagnostic criterion for Conduct Disorder (CD) in 1987 (Gleyzer et al., 2002) and added to the Child Behavior Checklist (Achenbach & Ruffle, 2000). However, more recent studies suggest that animal cruelty is not more predictive of committing violent rather than non-violent crimes (Walters, 2014; Walters & Noon, 2015). Children who have harmed animals are at much higher risk of being caught in inter-generational cycles of family violence (Knight et al., 2014), of being abused themselves (DeViney et al., 1983; Lee-Kelland & Finlay, 2018), and of having psychological difficulties (Hawkins et al., 2017). Thus, childhood animal harm might be seen as an indicator for a range of developmental issues and an opportunity for targeted early intervention.

Psychological Factors that Influence Childhood Animal Harm

AniCare® Child (Shapiro et al., 2013) is the only existing treatment approach designed for psychological professionals to assess and treat children who have abused animals. It proposes a conceptual framework in which attachment underpins the development of further psychological factors involved in childhood animal abuse. It shows attachment as basal, followed by emotional intelligence, self-management, and finally the influence of culture and family (see Figure 1). Although promising, this conceptual framework has never been tested and the authors do not cite any supporting research. In the following sections, we review evidence for the role of each of these dimensions in explaining childhood animal harm and highlight gaps in the literature.

Attachment Style and Attachment to Pets

Attachment theory explains the drive to seek close emotional bonds, starting with primary caregivers in early childhood and gradually expanding to include bonds to a
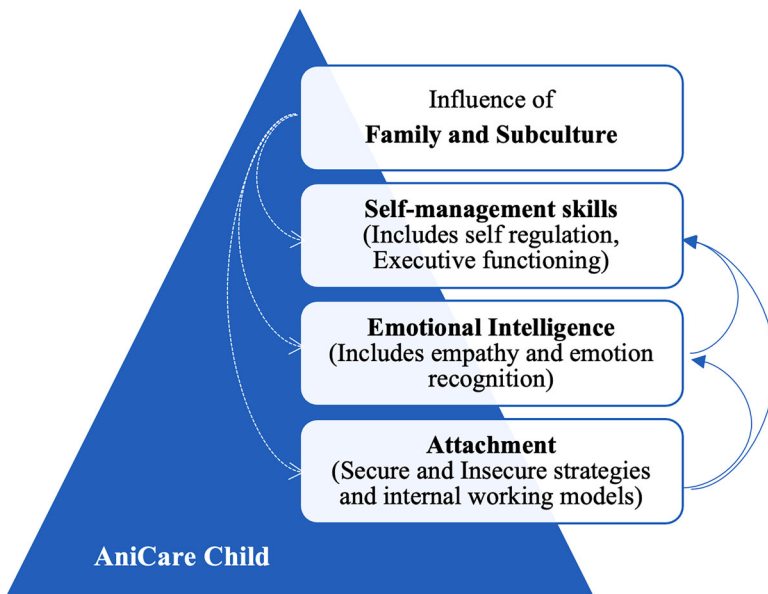
Figure 1. Schematic showing the different psychological factors informing the AniCare® Child approach. Attachment is the basis of the approach and interacts with additional psychological processes through top-down and bottom-up processes. Adapted from Shapiro et al. (2013) with permission from the authors.

wider network of secondary attachment figures, including peers, siblings, and romantic attachments (Ainsworth, 1989; Bowlby, 1969). Children can develop either "secure" or "insecure" representations of themselves and others, and the patterns in these attachment representations can be used to classify attachment styles (Ainsworth, 1979; Belsky, 2002). When discussing children's animal harm, two aspects of attachment can be considered: children's overall attachment style and their relationship to pets, which sometimes fulfills characteristics of secondary attachment (Marsa-Sambola et al., 2016; Wanser et al., 2019).

A range of negative developmental outcomes is linked to insecure attachment: lower empathy, lower self-esteem, poorer behavioral regulation, and higher risk for psychopathology (Mikulincer & Shaver, 2012), each of which has separately been found to increase a child's risk for animal harm (Hawkins et al., 2017). Thompson and Gullone (2008) provide the only study that directly investigated the role of attachment in animal harm, finding that more securely attached adolescents have higher prosocial behavior and reduced animal harm behaviors, a correlation partially mediated by empathy. More indirectly, Fielding et al. (2011) found that people coming from "not loving" homes are more likely to have harmed animals as children, while a qualitative study by Wauthier and Williams (2020) found that children referred to an intervention for animal harm had signs of insecure attachment, even though the attachment networks included pets. In fact, attachment to animals does not correlate strongly with a person's primary attachment pattern (Julius et al., 2012), and children who have experienced relationship trauma or abuse may use pets as sources of support over humans

(Beetz et al., 2012), even though they are also at higher risk of harming animals (Yamazaki, 2010). Unfortunately, there are currently no published studies directly relating attachment strategy to childhood animal harm behavior (CAHB).

Empathy and Emotion Recognition

Empathy is the capacity to imagine or feel another's (person or animal) experience and can be a powerful motivator for compassionate behavior. Empathy can be divided into three subtypes: (1) cognitive empathy, which is the capacity to recognize and understand others' emotions, (2) affective empathy, which is the degree to which another person's feelings influence one's own feelings, and (3) behavioral empathy, which is the desire to help someone in distress (Reid et al., 2013). Although several studies show that lower empathy is associated with animal harm (Akdemir & Gölge, 2020; McPhedran, 2009), the results are not always consistent. For example, Plant et al. (2019) found that affective empathy is especially predictive of animal harm, while Hartman et al. (2019) found that only cognitive empathy predicted animal abuse, and that affective empathy was not predictive when controlling for socio-economic status (Hartman et al., 2019). Empathy can also be studied through psychopathologies such as CD and its modifier CU Traits, which have repeatedly been linked to animal cruelty (Dadds et al., 2006; Hartman et al., 2019). Unfortunately, there is little research on the link between empathy toward humans and empathy toward animals; one study with adults showed a moderate correlation (Paul, 2000), but there is no published research with children. Given that animals express their emotions differently than humans, it seems important to establish whether any differences in empathy toward animals stem from a reduced ability to recognize emotion in animals or occur despite good emotion recognition.

Self-Regulation

Although AniCare® Child refers to self-management rather than self-regulation, the two concepts are overlapping (Zeidner et al., 2000). Self-regulation is a multi-dimensional construct relying on several psychological processes and can be defined as "the capacity of controlling or directing one's attention, thoughts, emotions, and actions" (McClelland & Cameron, 2012). Difficulties with self-regulation are linked to poorer school outcomes (Neuenschwander et al., 2012), higher rates of externalizing behavior problems (Perry et al., 2018), and bullying (Garner & Hinton, 2010), all of which are also risk factors for childhood animal harm (Hawkins et al., 2017; Wauthier & Williams, 2022). Self-regulation overlaps with executive functioning (EF; Diamond, 2013) and emotional regulation (Thompson et al., 2019). Although the role of executive functioning in childhood animal harm has never been directly tested, this seems a promising construct to explore: EFs can be reliably and validly measured (Zelazo et al., 2013), issues with EF have been linked to externalizing disorders such as CD and attention deficit hyperactivity disorder (ADHD; Holmes et al., 2010), and positive interactions with animals may improve EFs (Ling et al., 2016).

Attitudes, Beliefs, and Knowledge

Finally, recent research also provides support for Shapiro et al.'s (2013) theory that a child's social environment frames their relationships with animals, both directly and through interaction with other dimensions. For example, Plant et al. (2019) found that cultures more accepting of animal abuse are associated with higher rates of animal abuse in adolescence, while Amici et al. (2019) found that recognition of dog emotions is dependent on cultural background, exposure, and attitudes to dogs. Family and cultural environments will also inform a child's knowledge, attitudes, and beliefs about animals (Jegatheesan, 2015). In fact, research with children has found a role for attitudes toward cruelty (Hawkins et al., 2020), belief in animal sentience (Hawkins & Williams, 2016), and welfare knowledge (Muldoon et al., 2016) in predicting animal harm. These factors seem promising candidates for study as they can potentially be targeted through educational interventions, even with very young children (Williams et al., 2021).

The Current Study

The purpose of this exploratory study was to investigate the psychological factors involved in childhood animal harm, given its potential as an indicator for developmental psychopathology and the need for effective treatment and interventions. AniCare® Child is the only existing treatment approach addressing this, and our goals were: (1) to provide the first evaluation of its theoretical premises, and (2) to address gaps within the literature on childhood animal cruelty, including scarcity of research carried out with children, heavy reliance on self-report, and a lack of well-selected control groups (Wauthier & Williams, 2022). We triangulated results using a range of task-based, self-report, and teacher report methods to test differences between children at high risk for animal harm and children at low risk for animal harm on the four dimensions of AniCare® Child. We predicted that children at high risk of animal harm would (1) have higher rates of insecure attachment than children at low risk of animal harm, (2) score lower on measures of emotion recognition and empathy than low-risk children, (3) have lower scores on measures of executive functioning and self-regulation than low-risk children, and (4) would score higher on measures of attitudes to cruelty, such as acceptance of animal harm, than low-risk children.

Methods

This study was approved by the University of Edinburgh's Department of Clinical and Health Psychology [reference number: CLIN629], and Local Authority consent was obtained prior to establishing contact with schools and obtaining parent consent and child assent to participate in the research.

Participants

This study involved two groups of participants: "high-risk" children who had been referred to the Animal Guardians (AG) program, and "low risk" children who were recruited as partially matched controls from the referred children's school classes. AG is a targeted

humane education intervention program for children (aged 4–12 years) at high risk of animal cruelty, run by the Scottish Society for the Prevention of Cruelty to Animals (SPCA) in Scotland. Recruitment occurred from August 2019 to March 2020. Referrals to the program came from various sources: teachers, parents, social workers, and Scottish SPCA inspectors dealing with animal cruelty incidents. For the current sample, we received two referrals from Scottish SPCA incidents, two referrals from the children's charity Barnardo's, two referrals from the child's primary school, one referral from a specialist residential school, and one referral from a parent. Referrals always received AG intervention in the child's school, where research interviews were also carried out. Parental consent for the research was separate from consent for AG. Parents could refuse for their child to participate in the research without affecting their child's eligibility for the AG program. Once a referral was made, the child's class teacher was contacted and asked to hand out parental consent forms for up to four children who would be matched controls. Referred children completed the research interview before going through the AG program.

A total of 27 children were interviewed over three 30-minute sessions. This sample was composed of nine high-risk children referred to the AG program (three girls and six boys, mean age = 8.8 years, SD = 2.1, range = 4–11 years) and 18 low-risk matched-control children (ten girls and eight boys, mean age = 8.6 years, SD = 2.5, range = 4–11 years). Among the referred children, two were referred for "at-risk" behavior (no harm had occurred but referring adult was concerned it was likely), five were referred to for "minor harm/rough handling" of animals, and two were referred for "moderate harm" (physical or emotional harm had occurred). None of the children were referred for "serious harm" (animal needing veterinary care or animal died). Most children came from families that owned pets (n = 19): dogs (n = 9), cats (n = 8), small mammals (n = 5), and fish or reptiles (n = 3). See online Supplemental Table 1 for full demographic details on the children.

Materials and Measures

We used a range of measures to investigate the four dimensions proposed in AniCare® Child, including three measures related to empathy (self-report, task-based, and emotion recognition) three measures related to self-regulation (executive functions, behavioral difficulties in the classroom, and CU traits), and three measures related to social environment (attitudes, beliefs, and knowledge).

Attachment: The Child Attachment Play Assessment

The Child Attachment Play Assessment (CAPA; Farnfield, 2016) is a narrative story-stem procedure assessing attachment style in 3–11-year-old children, using the dynamic maturational model (Crittenden, 2006). For this research, children's attachment styles were grouped into three categories: secure (B), insecure "normal" (A1/2 and C1/2 classifications), and insecure "pathological" (A+ and C+ classification). In the CAPA procedure, the interviewer gave each child the beginning of a story-stem introducing a problem and asked, "tell me and show me what happens next," allowing the child to resolve the story however they chose. The stories are told with a set of simple props (human and

animal figures, furniture, and a doll house), and the procedure is videotaped for later coding. Children were given six "human stories," which were taken from the standard story-stem procedures, and three "pet stories" designed for this study and using themes from Wauthier et al., (2020) to inform common sources of conflict in children's relationships with pets. Videos were double-coded by certified reliable CAPA coders: by the first author, and blind-coded by a second reliability coder who was not aware of the child's condition or background. Any disagreements in classification were discussed until a consensus was reached.

Emotional Intelligence

Measures of Empathy: We used two different measures of empathy: Bryant's Empathy Index (BEI; Bryant, 1982) and a slightly modified version of the Kids' Empathic Development Scale (KEDS; Reid et al., 2013). The BEI is a reliable self-report empathy measure originally developed for children 6–13 (α = 0.77 in an adolescent sample; Del Barrio et al., 2004). Responses are given on a 5-point Likert scale (as in Del Barrio et al., 2004) and children are asked how much they agree with each statement (from "Not at all" to "A lot"). Although the BEI was originally designed as a 22-item measure, it was condensed to an 18-item scale for this study (transforming the eight items investigating gender-based empathy into four gender-neutral items).

The KEDS is an image-based measure of empathy designed for primary school children (Reid et al., 2013). Three dimensions of empathy are assessed by asking a series of questions for each image: affective empathy ("How do you think this girl/boy feels?"), cognitive empathy ("Why do you think he/she feels this way?"), and behavioral empathy ("What would you do if you were that boy/girl?"). The child infers the emotion of one or two characters in each scene based on body language and context. For this study, a sub-sample of six KEDS images were selected exploring four emotions (happy, sad, angry, scared) and were supplemented with four images depicting a child interacting with an animal. The KEDS procedure was video-recorded and scored by the first author and by one of three "blind" coders. Responses were scored on a 3-point scale, with 0 points for a "don't know" or wrong answer, 1 point for a simple correct or nearly correct answer, and 2 points for a complex correct answer. The average agreement between the first author and reliability coders was 79.7% (Cohen's Kappa = 0.70), which corresponds to "moderate agreement" (McHugh, 2012).

Emotion Recognition: Human and animal emotion recognition was assessed using a set of 20 color photographs showing five emotions (happy, sad, angry, scared, and neutral) across four species (human, dog, cat, and rabbit). Images for human emotions were taken from an existing photographic emotion recognition database, and animal images were collated from copyright-free images and then verified by the Scottish SPCA's veterinary and behavioral team to ensure that the animal in each image displayed the intended emotion (see Figure 2). The images were split into two blocks (human emotions and animal emotions), each block starting with a practice image to verify the child's comprehension of the task. Children saw one image at a time and were asked to select one of six options (happy, sad, angry, scared, neutral, and don't know) to describe the emotion the person or animal displayed. Children's responses were timed using the question timer in Qualtrics. Scores were calculated

	Dog	Cat	Rabbit
Happy			
Sad			
Scared			
Angry			
Neutral			

Figure 2. Full set of images of dogs, cats, and rabbits displaying five emotions used in the animal emotion recognition task.

separately for each block: the total number of correct responses was divided by the average amount of time taken for the block. Thus, a higher score corresponds to more correct answers over a shorter amount of time.

Self-Regulation

Executive Functions: Executive functioning was measured using the Dimensional Change Card Sort (DCCS; Zelazo, 2006). Children are asked to sort a set of cards based on two target cards that can be matched on either shape or color. We used the following procedure: (1) demonstration of verbally cued phase and rule check, (2) 12 trials of verbally cued "shape and color game," (3) demonstration of border-cued phase and rule check, (4) 12 trials of border version of "shape and color game." In the verbally cued phase, the experimenter randomly prompted the child at the beginning of each trail by saying "play the shape game" or "play the color game," ensuring a mix of switching and non-switching trials. In the border-cued phase, the experimenter randomly shuffled a deck of cards with and without borders and stated the rule "Remember, border means color game, no border means shape game" on the first, second, and seventh trial of the phase, but providing no feedback otherwise. This task was video-recorded so that both children's scores and timings could be calculated.

Behavioral Difficulties: Children's behavioral problems were measured through teacher report versions of two standard measures: the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and the Inventory of Callous Unemotional Traits (ICU; Ciucci et al., 2014). The SDQ has five subscales: conduct problems, hyperactivity, emotional problems, peer problems, and prosocial behavior. Teachers rate each item on a 3-point scale (from "Not true" to "Certainly true"), and an overall score is obtained by reverse coding the prosocial behavior items and calculating a total. The ICU is a 24-item questionnaire assessing CU traits (defined as lack of empathy, guilt, remorse, and emotion; Moran et al., 2009). The teacher report version of the ICU rates a child's behavior on a 4-point scale (from "Not at all true," to "Definitely true") across three sub-factors: callous, unemotional, and uncaring. Because CU traits relate strongly to both low empathy (Waller et al., 2020) and to conduct problems (Longman et al., 2016) in childhood, results from the ICU can be used to lend support to both dimensions.

Effect of Social Learning Environment

Attitudes and Behaviors Toward Animals: Children's self-reported attitudes and behaviors toward animals were measured using two related questionnaires: the Children's Attitudes toward Animal Cruelty (CAAC; Connor et al., 2021) and Children's Animal Harm Behaviors (CAHB; Connor et al., 2021). The CAAC is a self-report questionnaire that has been used with primary-school children with good reliability (α = 0.70; Hawkins et al., 2020). It has 11 items describing harmful behaviors toward animals, including physical harm, emotional harm, neglect, and accidental harm. For this study, children were asked "Is it OK to … " and had to rate each item on a 5-point scale, from "Very bad" to "Very good." The CAHB also has good reliability (α = 0.79; Connor et al., 2021) and has the same 11 items as the CAAC but asks "How often have you done the following?" and has the response options of "Never," "Sometimes," "Often," and "Very often." We supplemented the 11 items of the CAHB with three items investigating additional harm behaviors ("Play rough with a pet," "Yell at or punish a pet if it misbehaves," and "Treat an animal in a harsh way when angry or annoyed").

Welfare Knowledge: Welfare knowledge was measured using a free-response task, asking the child to report on the welfare needs of dogs, cats, and rabbits. The worksheet

prompted the child to list "everything good for a [dog/cat/rabbit]," and "everything bad for a [dog/cat/rabbit]." Children were provided with six spaces on each side but were told they could fill in as much or as little as they wanted. Children were provided help with reading and writing as needed but were not given feedback. Answers were scored by giving one point for each of the Five Freedoms correctly identified on the negative side, and one point for each of the Five Provisions correctly identified on the positive side (see Mellor, 2016). Thus, each child could receive up to 10 points for each animal.

Belief in Animal Minds: The children's view on animal sentience was measured using the Child's Belief in Animal Minds (Child-BAM; Hawkins & Williams, 2016). The BAM was developed with children aged 6–13 years using a set of seven animals and has very good reliability (α = 0.92). Here, four of the most common pets in the UK (dogs, cats, rabbits, and birds; PFMA, 2021) were shown and the child was asked whether they thought each animal: (1) was clever, and could feel (2) pain, (3) happiness, (4) sadness, and (5) fear. Each item was scored on a 5-point Likert scale, and each child's overall BAM score was calculated by averaging their score, with a higher score corresponding to higher belief in animal sentience.

Procedure

Child interviews were carried out one-to-one in a quiet room at the child's school over three 30-minute sessions on separate days. A child-consent procedure was followed on the first day of interviews and the child was free to withdraw at any time. Children were supported with reading and writing as necessary and were free to carry out self-report questionnaires by themselves if they preferred. Sessions 2 and 3 were recorded using a video recorder mounted on a tripod.

Session 1 included questionnaire measures carried out on a digital tablet using Qualtrics survey software (basic demographics, SAPS, Child-BAM, emotion recognition, CAAC-attitudes), as well as free-response measures carried out using a pen and paper (welfare knowledge). Session 2 focused entirely on the CAPA procedure, using a Playmobil house and assorted figures and furniture. Session 3 started with the executive functioning DCCS task and the KEDS empathy measure, ending with the remaining self-report questionnaire items carried out on Qualtrics (CAHB, BEI). At the end of each session, children could choose a small gift (Scottish SPCA stationary or animal figurine).

Data Handling and Analysis

Data were entered into Excel for preliminary handling, including downloading answers from Qualtrics, entering scoring from pencil-and-paper measures, reverse coding items, and calculating scores. The finalized dataset was then imported into SPSS v. 25 for statistical analysis and into RStudio to produce supplementary figures (using ggplot2 and corrplot). We first performed some preliminary analyses on the data to check the effects of potential confounding factors and to find any patterns of correlations across variables to inform our approach to the main analysis. For the main analysis, children's scores were statistically compared across potential psychological risk factors between

high-risk (referred) and low-risk (control) children, using tests of frequencies for categorical outcomes (CAPA categorization) and nonparametric tests of mean difference for scale outcomes (Mann-Whitney U and Kruskal-Wallis). Effect sizes for these tests were calculated according to the formulas in Fritz et al. (2012).

Results

Preliminary Analyses

Due to time constraints and complications during the recruitment of control children, we were unfortunately not able to match them with referred children on the basis of sex.[1] As a result, we felt it was important to establish the extent to which this might act as confounding factor. Results of a series of Mann-Whitney U tests suggest that male and female children scored similarly on all measures except on the behavioral empathy subdimension of the KEDS, with females scoring significantly higher than males ($p = 0.007$, see online Supplemental Table 2). Although this does not eliminate the confounding effect of sex, it indicates that significant differences in our subsequent analyses between high-risk and low-risk children are not entirely attributable to differences in sex ratios.

A correlogram ordered using hierarchical clustering showed a range of interesting patterns across variables (see online Supplemental Figure 1). For example, although the three measures of self-regulation correlated with each other, measures for the other dimensions did not correlate with each other very well. As a result, we decided to organize results according to risk and protective factors and show results for each variable rather than taking averages by dimension. Furthermore, attitudes to intentional and accidental animal harm had very different correlation patterns, so were analyzed as two subdimensions rather than being averaged together. Although entirely exploratory, this correlogram shows other interesting patterns; for example, while empathy to children and animals correlated with each other, they had different correlation patterns with other variables, replicating the results Paul (2000) found with adults.

Psychological Factors for Childhood Animal Harm

Attachment styles were grouped into three categories: secure (type B), insecure normal (A1/2 or C1/2), and pathological insecure (A+ or C+). We sought to establish whether children referred as high risk for animal harm were more likely to have insecure attachment

Table 1. Frequencies for high-risk referred and low-risk control children by attachment classification.

	Secure (B)		Normal insecure		Pathological insecure		
	n	%	*n*	%	*n*	%	Total
Control children	10	90.9	4	80	1	12.5	15
Referred children	1	11.1	1	20	7	87.5	9
Total	11	100	4	100	8	100	24

Note: The sample size is 24 as there were missing data on attachment classification for three control children.

Table 2. Mean ranks and results from Mann-Whitney *U* tests comparing high-risk referred and low-risk control children across psychological risk and protective factors.

		High Risk	Low Risk	Test result	η^2
Higher score is protective	KEDS – A	12.83	13.09	$U = 70.5$, $n = 25$	< 0.01
	KEDS – C	9.06	**15.22**	$U = 36.5$, $n = 25$	0.162*
	KEDS – B	10.33	**14.50**	$U = 48.0$, $n = 25$	0.074
	Emotion recognition (human)	13.50	13.50	$U = 72.0$, $n = 26$	< 0.01
	Emotion recognition (animal)	12.50	13.94	$U = 64.0$, $n = 26$	< 0.01
	BEI	12.11	**14.24**	$U = 64.0$, $n = 26$	0.018
	Welfare knowledge	12.61	**14.69**	$U = 68.5$, $n = 27$	0.015
	Executive function	8.44	**16.81**	$U = 31.0$, $n = 26$	0.231*
	Child-BAM	**15.88**	12.44	$U = 53.0$, $n = 26$	0.044
Higher score is a risk	CU traits	**20.06**	9.68	$U = 6.4$, $n = 25$	0.437**
	SDQ score	**20.31**	8.59	$U = 1.5$, $n = 24$	0.617***
	CAAC (intentional)	**15.06**	12.81	$U = 59.5$, $n = 26$	0.019
	CAAC (accidental/neglect)	**15.94**	12.42	$U = 52.5$, $n = 26$	0.048
	CAHB (intentional)	**17.94**	11.15	$U = 43.5$, $n = 26$	0.151*
	CAHB (accidental/neglect)	**17.78**	11.24	$U = 38.0$, $n = 26$	0.176*

Notes: Where the difference in mean rank is greater than 2, the higher value is bolded. BEI: Bryant's Empathy Index; CAAC: Children's Attitudes toward Animal Cruelty; CAHB: Children's Animal Harm Behaviors; Child-BAM: Child's Belief in Animal Minds; CU: Callous Unemotional; KEDS: Kids' Empathic Development Scale; SDQ: Strengths and Difficulties Questionnaire.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

patterns than control children at lower risk of animal harm. Because of the small sample size, the effect of attachment was investigated using the Fisher exact test (Kim, 2017). Table 1 shows that high-risk children's attachment patterns differed significantly from that of low-risk children ($p = 0.002$, Cramer's V = 0.735). High-risk children were more likely to have been classified as having a pathological insecure attachment pattern ($n = 7$, 78% of referred children) than low-risk children ($n = 1$, 7% of control sample; adjusted residual = 3.6). Rates of normal insecure were comparable between high-risk children ($n = 1$) and low-risk children ($n = 4$; adjusted residual = 0.9).

Table 2 presents the results for the scale variables: one side shows items where higher scores correspond to risk, the other shows those acting as protective factors. Referred children at high risk of animal harm had significantly lower scores than control children at lower risk of animal harm on cognitive empathy and on executive functioning, but not on measures of affective or behavioral empathy, BEI, emotion recognition, or Child-BAM scores. Although differences for these remaining measures were not significant, the mean rank for many of these measures was higher for low-risk children than high-risk children, suggesting the issue may be one of statistical power. High-risk children had significantly higher scores than low-risk children on CU traits, SDQ Difficulties, and both intentional and accidental self-report harm behaviors. Although scores on the CAAC were not significantly different between high-risk and low-risk children, the trend was again in the expected direction, with higher mean ranks for high-risk children.

Is There a Central Role for Attachment?

Given its central role in AniCare® Child, we wanted to examine in more detail how attachment impacted risk and protective factors. Although the limited sample size prevented us

Table 3. Mean ranks and results from Mann-Whitney *U* tests comparing securely and insecurely attached children across psychological risk and protective factors.

		Secure	Insecure	Test statistic	η^2
Higher score is protective	KEDS – A	**15.55**	9.27	$U = 29.5, n = 23$	0.212*
	KEDS – C	**17.75**	7.58	$U = 7.5, n = 23$	0.554***
	KEDS – B	**15.70**	9.15	$U = 28.0, n = 23$	0.229*
	Emotion recognition (human)	**13.09**	11.00	$U = 54.0, n = 23$	0.024
	Emotion recognition (animal)	12.82	11.25	$U = 57.0, n = 23$	0.013
	BEI	**15.40**	9.38	$U = 31.0, n = 23$	0.194*
	Welfare knowledge	**15.73**	9.77	$U = 68.5, n = 24$	0.178*
	Executive function	**15.50**	9.31	$U = 30.0, n = 23$	0.205*
	Child-BAM	11.23	12.71	$U = 57.5, n = 23$	0.012
Higher score is a risk	CU traits	7.27	**15.73**	$U = 14.0, n = 23$	0.426**
	SDQ score	6.80	**14.82**	$U = 13.0, n = 21$	0.422**
	CAAC (intentional)	10.82	**13.08**	$U = 53.0, n = 23$	0.029
	CAAC (accidental/neglect)	12.77	11.29	$U = 57.5, n = 23$	0.012
	CAHB (intentional)	11.00	**12.77**	$U = 47.0, n = 23$	0.063
	CAHB (accidental/neglect)	11.70	12.23	$U = 62.0, n = 23$	< 0.01

Notes: Where the difference in mean rank is greater than 2, the higher value is bolded. BEI: Bryant's Empathy Index; CAAC: Children's Attitudes toward Animal Cruelty; CAHB: Children's Animal Harm Behaviors; Child-BAM: Child's Belief in Animal Minds; CU: Callous Unemotional; KEDS: Kids' Empathic Development Scale; SDQ: Strengths and Difficulties Questionnaire.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

from running regression models, we report nonparametric tests comparing securely and insecurely attached children in Table 3 (merging "normal insecure" and "pathological insecure"). CAPA classifications were dichotomized in this way to maximize statistical power. Securely attached children (regardless of whether they were in the high or low risk of animal harm group) scored higher on all empathy measures, as well as on welfare knowledge and executive functioning. Insecurely attached children scored significantly higher on CU traits and SDQ. No significant differences were found for emotion recognition, CAAC score, or self-reported harm behaviors. These patterns suggest that while attachment plays an important role, it likely does not account for all differences.

Finally, we were interested in exploring whether jumps in risk or protective factors occurred only for the "pathological insecure" group or whether differences with the secure children were already emerging for the "normal insecure" group. To do this, we calculated an average of the z-scores for KEDS, BEI, Welfare Knowledge, and Executive Functioning for the protective factors, and the z-scores for CU traits, SDQ score, total harm behaviors, and CAAC measures for the risk factors, and compared these averages across the three attachment groupings (secure, "normal insecure," and "pathological insecure"). A Kruskal-Wallis test showed there was a significant difference in risk factor score between types of attachment ($H_{(2)} = 9.53$, $p = 0.009$, Epsilon squared = 0.423), with a mean rank of 8.91 for securely attached children, 10.40 for normal insecure, and 18.75 for pathological insecure. The opposite pattern was significant for protective factors ($H_{(2)} = 9.97$, $p = 0.007$, Epsilon squared = 0.431), with a mean rank of 17.41 for securely attached children, 8.40 for normal insecure, and 8.25 for pathological insecure. For risk factors, a post-hoc Dunn's test showed a significant difference between pathological insecure and secure attachment ($p = 0.004$) and between pathological insecure and normal insecure ($p = 0.037$; although this result was no longer significant when applying the Holm-Sidak correction for multiple tests), but no difference between normal insecure and
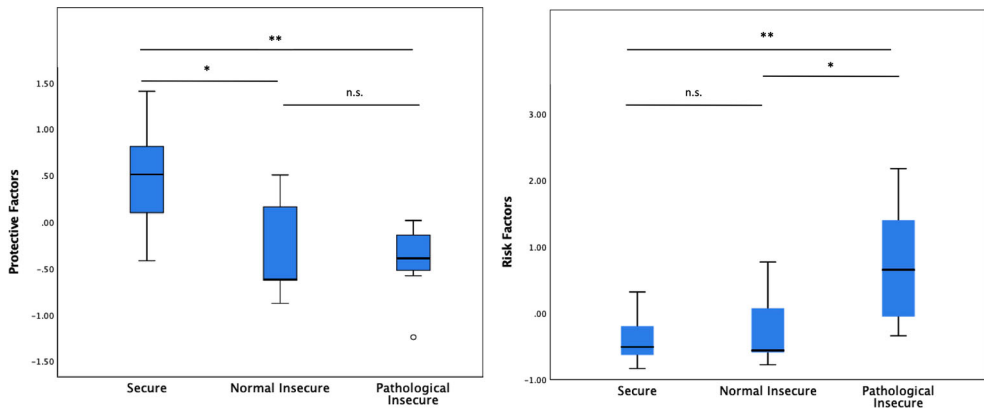
Figure 3. Boxplots showing patterns in children's risk and protective factors across secure, normal insecure, and pathological insecure attachment classifications. Significance levels are for post-hoc Dunn tests. *$p < 0.05$, **$p < 0.01$.

secure attachment. For protective factors, a post-hoc Dunn's test showed there were significant differences between pathological insecure and secure attachment ($p = 0.008$) and between normal insecure and secure attachment ($p = 0.018$) but not between pathological insecure and normal insecure. This suggests that while the biggest jump in risk factors occurs between "normal insecure" and "pathological insecure" attachment style, the biggest loss in protective factors occurs between secure and "normal insecure" attachment styles. Figure 3 summarizes this pattern, while Supplemental Figure 2 shows boxplots across the three attachment categories for individual variables.

Discussion

Using a sample of children with both high risk and low risk for childhood animal harm, we investigated the significance of the psychological factors proposed in AniCare® Child for the treatment of childhood animal abuse. We found a consistent effect for attachment and variables relating to self-regulation (EF, SDQ), mixed effects for variables relating to empathy (KEDS, BEI, and CU traits), and no difference for emotion recognition, welfare knowledge, or attitudes toward cruelty. Attachment security correlated with lower scores across a range of psychological factors, lending support to its importance as a core psychological factor in animal harm. We discuss the implications of these results for each variable in turn, followed by a discussion of the implications for the treatment of childhood animal harm and a consideration of limitations and future directions.

Psychological Factors Involved in Childhood Animal Harm

The Role of Attachment
Children referred to the AG program as "high risk" were much more likely to be classified as pathological insecure than low risk control children. This is the first study to use a standardized observational measure of attachment to confirm the importance of attachment

style in children's risk of animal harm, with previous research being carried out with adolescents using self-report (Thompson & Gullone, 2008). We also found that securely and insecurely attached children had significantly different scores across all the measures of empathy, self-management, and welfare knowledge, but found no difference for emotion recognition, attitudes to animal cruelty, or self-reported animal harm behaviors. This is consistent with the role of attachment as a basal risk factor impacting both empathy and self-management and is in line with existing research (Boldt et al., 2020; Stern & Cassidy, 2018). Overall, secure attachment created a significant increase in scores on protective factors, while pathological insecure attachment created a significant increase in psychological risk factors. More research is needed to understand how a child's attachment style impacts their interactions with pets, including whether close relationships with pets can be protective in some cases of insecure attachment (Carr & Rockett, 2017), the extent to which children transfer attachment scripts between human and animal interactions, and whether animals can be helpful therapeutic aids in cases where insecure attachment prevents a child from forming a trusting relationship with a therapist (Parish-Plass, 2018).

Empathy and Emotion Recognition
Results on the role of empathy were mixed. There was no difference between high-risk referred children and low-risk control children on the self-report empathy measure. There was a difference only on the cognitive empathy dimension of the KEDS scale and there was a very strong difference between high-risk and low-risk children on CU traits. The lack of significant difference for the self-report measure may in part be explained by social desirability bias (Camerini & Schulz, 2018). The effects of CU traits are strongly aligned with existing literature (Dadds et al., 2006), although our results should still be interpreted with caution because teachers were not "blind" to the child's condition. The lack of significant difference on the "affective empathy" dimension of the KEDS mirrors the lack of significant difference on the emotion recognition task. However, referred children performed significantly worse than control children on the "cognitive empathy" dimension, which requires complex perspective taking. These results are broadly in line with existing research, which shows a mixed role for empathy in cases of animal harm: several studies show that empathy can play a role (Akdemir & Gölge, 2020; Plant et al., 2019), while other research shows a small or no effect (de Weid, et al., 2021; Hartman et al., 2019).

Self-Regulation
We used a DCCS task as a measure of executive function and the SDQ as a measure of general difficulties linked to emotional-behavioral dysregulation (Deutz et al., 2018). Both scores were strongly linked to risk of harm: the EF score was significantly lower in children referred to the AG program, while the SDQ score was significantly higher, supporting the importance of self-regulation in cases of animal harm. Although research has already linked childhood animal harm to externalizing difficulties such as ADHD and CD (Hawkins et al., 2017; Wauthier & Williams, 2022), this is the first study to quantitatively confirm the link between EF, emotional-behavioral dysregulation, and animal harm. However, because our sampling procedure relied on adult referral, it might

over-represent reactive cases of animal harm resulting from low self-regulation, compared with proactive cases where the animal is harmed in secret. In fact, while children with reactive aggression have lower inhibitory control, children with proactive aggression are not distinguishable from control children on measures of EF (Thomson & Centifanti, 2018). Given that these forms of aggression correlate with different disorders, such as CD and ADHD with reactive aggression, and psychopathy with proactive aggression (Kempes et al., 2005), it may be important to distinguish these psychological profiles.

Attitudes, Beliefs, and Knowledge

We used measures of attitudes to cruelty (CAAC), beliefs about animal minds (Child-BAM), and welfare knowledge as proxies for the effects of family and culture on a child's views of animals. Although there was not a significant difference between low- and high-risk children's scores, means varied in the expected direction. This may suggest the present study was under-powered to detect statistical differences. Existing research found effects for attitudes and beliefs on risk for harm using self-report questionnaires with much larger samples (e.g., Hawkins et al., 2017; $n = 1,217$) and comparing children from different countries (Plant et al., 2019). Children's attitudes and knowledge did differ significantly based on attachment style, reinforcing the idea put forward in AniCare® Child that attachment and social environment might interact.

Implications for Clinical Practice

This study reiterates that childhood animal harm can be indicative of a range of developmental difficulties and provides the first exploratory evaluation of the theoretical basis of AniCare® Child. Our results lend support to the importance of its basic components, and attachment was supported both as a direct risk factor and as a predictor for empathy and self-regulation. Self-regulation was also strongly supported, perhaps suggesting that our sample of high-risk children struggled with behavioral inhibition and had higher rates of emotional-behavioral dysregulation. The role of empathy was partially supported, suggesting that the type of empathy and measurement modality may be important confounding factors. Although scores on attitudes, beliefs, and knowledge were not significantly different, they were in the predicted directions. However, unlike AniCare® Child, our results do not necessarily suggest that empathy is "basal" to self-regulation. We suggest that childhood animal harm may arise due to lower empathy, lower self-regulation, or a combination of both factors, underpinned partially or entirely by attachment style. In fact, this supports the *treatment* approach proposed in AniCare® Child, which identifies empathy and self-management as dual targets for treatment, suggesting that practitioners identify where clients lie on a 2×2 matrix of low–high empathy and low–high self-management to determine the most useful therapeutic exercises (Shapiro et al., 2013, p. 34).

Given the significant role we found for attachment in cases of even moderate childhood animal harm, this seems like an important therapeutic target. Addressing childhood attachment difficulties can require specialist approaches, such as play therapy (Dousti et al., 2018) or parenting interventions (Wright & Edginton, 2016). We recommend that practitioners who work with children at high risk of animal harm screen for potential

attachment issues and that where attachments issues are known, precautions are taken to avoid situations where animals might be harmed. This may be especially important in foster care situations, where attachment disturbances are likely: although pets can help children adjust to their placements (Carr & Rockett, 2017), animal harm can also be a serious concern (see e.g., Ascione, 2005, p. 73). Although the current study was likely under-powered to find a role for attitudes, beliefs, or knowledge, these are still important psychoeducational targets: higher animal welfare knowledge might protect against harmful behaviors in cases of low self-regulation, and discussing animal sentience may increase empathy toward animals (Hawkins et al., 2017). In fact, integrated approaches may be most effective since addressing one issue could indirectly improve other constructs.

Limitations and Future Directions

Although small samples are common in in-depth research with specialist or difficult-to-reach populations, this design comes with limitations. The small sample means that many tests were likely under-powered, so a lack of significance does not necessarily indicate a lack of effect. Furthermore, small samples are known to inflate effect sizes (La Caze & Duffull, 2011), so the effect sizes reported here should be viewed as exploratory. We were not able to correct for the confounding effects of sex or pet ownership: future studies should strive to match children on these two variables. Another issue for generalizability is the homogenous sample, with predominantly white children drawn from primary schools in central Scotland. This cultural uniformity may further explain the weak effects of beliefs, attitudes, and knowledge, which may be stronger when comparing children from different areas or cultural backgrounds (Plant et al., 2019).

Although one of the strengths of this research was the wide range of measurement techniques, allowing triangulation of results, there are certain limitations to highlight with self-report. Self-report can introduce a range of biases, including social desirability bias (Camerini & Schulz, 2018), and individuals tend not to estimate their abilities very accurately (Murphy & Lilienfeld, 2019). These biases may have especially impacted scores on BEI and on the CAHB. Since larger samples are often only achievable using self-report, this will be one of the main difficulties for future research and will also make it difficult to collect data with young children.

This research requires replication studies with larger, more heterogenous, samples. Where large samples are difficult to achieve, rigorous matching may also address certain confounds. Future research may also wish to explore whether there are different profiles (such as low self-regulation and/or low empathy) and whether these have differentiating risk factors and treatment outcomes. This study provides a foundation for a full evaluation of AniCare® Child by demonstrating that its premises are sound and that effects are detectable across many of the dimensions. Going forward, it will be important to develop evaluations for a range of interventions targeting childhood animal harm, from education to therapeutic approaches. This will help deliver effective and targeted treatment earlier and in cases where practitioners may not have otherwise considered treatment options.

Conclusions

This research shows that childhood animal harm is an outcome of a complex interaction of psychological factors, including attachment, empathy, self-regulation, and learned attitudes, beliefs, and knowledge, providing support for the conceptual framework provided in AniCare® Child. Further research is required to validate these findings across a wider sample and to test the efficacy of interventions. Special focus should be given to the roles of attachment, whether childhood animal harm can be categorized along "low empathy" and/or "low self-regulation" pathways, and how this might impact outcomes. Targeted early interventions for childhood animal harm for highly vulnerable children may also provide opportunities to assess and treat broader psychological issues for this highly vulnerable and difficult-to-reach group.

Note

1. We had planned to match based on sex: we asked class teachers to hand out parental consent forms to up to four children of the same sex as the referred child. However, we often received parental consent for children of mixed sexes. Re-collecting parental consent would have significantly delayed the start of the intervention, so we decided to interview any children for whom we had received parental consent by the first interview day.

References

Achenbach, T. M., & Ruffle, T. M. (2000). The Child Behavior Checklist and related forms for assessing behavioral/emotional problems and competencies. *Pediatrics in Review*, *21*(8), 265–271. https://doi.org/10.1542/pir.21.8.265

Ainsworth, M. D. S. (1979). Attachment as related to mother-infant interaction. In *Advances in the study of behavior* (Vol. 9, pp. 1–51). Academic Press.

Ainsworth, M. S. (1989). Attachments beyond infancy. *American Psychologist*, *44*(4), 709–716. https://doi.org/10.1037/0003-066X.44.4.709

Akdemir, S., & Gölge, Z. B. (2020). Cruelty to animals in Turkish children: Connections with aggression and empathy. *Anthrozoös*, *33*(2), 285–299. https://doi.org/10.1080/08927936.2020.1719768

Amici, F., Waterman, J., Kellermann, C. M., Karimullah, K., & Bräuer, J. (2019). The ability to recognize dog emotions depends on the cultural milieu in which we grow up. *Scientific Reports*, *9*(1), Article 16414. https://doi.org/10.1038/s41598-019-52938-4

Ascione, F. R. (2005). *Children and animals: Exploring the roots of kindness and cruelty*. Purdue University Press.

Beetz, A., Julius, H., Turner, D., & Kotrschal, K. (2012). Effects of social support by a dog on stress modulation in male children with insecure attachment. *Frontiers in Psychology*, *3*, Article 352. https://doi.org/10.3389/fpsyg.2012.00352

Belsky, J. (2002). Developmental origins of attachment styles. *Attachment & Human Development*, *4* (2), 166–170. https://doi.org/10.1080/14616730210157510

Boldt, L. J., Goffin, K. C., & Kochanska, G. (2020). The significance of early parent–child attachment for emerging regulation: A longitudinal investigation of processes and mechanisms from toddler age to preadolescence. *Developmental Psychology*, *56*(3), 431–443. https://doi.org/10.1037/dev0000862

Bowlby, J. (1969). *Attachment and loss, Vol. 1: Attachment*. Basic Books.

Bright, M. A., Huq, M. S., Spencer, T., Applebaum, J. W., & Hardt, N. (2018). Animal cruelty as an indicator of family trauma: Using adverse childhood experiences to look beyond child abuse and domestic violence. *Child Abuse & Neglect*, *76*, 287–296. https://doi.org/10.1016/j.chiabu.2017.11.011

Bryant, B. K. (1982). An index of empathy for children and adolescents. *Child Development*, *53*(2), 413–425. https://doi.org/10.2307/1128984

Camerini, A. L., & Schulz, P. J. (2018). Social desirability bias in child-report social well-being: Evaluation of the children's social desirability short scale using item response theory and examination of its impact on self-report family and peer relationships. *Child Indicators Research*, *11*(4), 1159–1174. https://doi.org/10.1007/s12187-017-9472-9

Carr, S., & Rockett, B. (2017). Fostering secure attachment: Experiences of animal companions in the foster home. *Attachment & Human Development*, *19*(3), 259–277. https://doi.org/10.1080/14616734.2017.1280517

Ciucci, E., Baroncelli, A., Franchi, M., Golmaryami, F. N., & Frick, P. J. (2014). The association between callous-unemotional traits and behavioral and academic adjustment in children: Further validation of the inventory of callous-unemotional traits. *Journal of Psychopathology and Behavioral Assessment*, *36*(2), 189–200. https://doi.org/10.1007/s10862-013-9384-z

Connor, M., Currie, C., & Lawrence, A. B. (2021). Factors influencing the prevalence of animal cruelty during adolescence. *Journal of Interpersonal Violence*, *36*(7–8), 3017–3040. https://doi.org/10.1177/0886260518771684

Crittenden, P. M. (2006). A dynamic-maturational model of attachment. *Australian and New Zealand Journal of Family Therapy*, *27*(2), 105–115. https://doi.org/10.1002/j.1467-8438.2006.tb00704.x

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. https://doi.org/10.1177/0886260505283341

Daly, B., & Morton, L. L. (2009). Empathic differences in adults as a function of childhood and adult pet ownership and pet type. *Anthrozoös*, *22*(4), 371–382. https://doi.org/10.2752/089279309X12538695316383

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. https://doi.org/10.1177/0886260508319362

Del Barrio, V., Aluja, A., & García, L. F. (2004). Bryant's empathy index for children and adolescents: Psychometric properties in the Spanish language. *Psychological Reports*, *95*(1), 257–262. https://doi.org/10.2466/pr0.95.1.257-262

Deutz, M. H., Shi, Q., Vossen, H. G., Huijding, J., Prinzie, P., Deković, M., Baar, A. L., & Woltering, S. (2018). Evaluation of the strengths and difficulties questionnaire-dysregulation profile (SDQ-DP). *Psychological Assessment*, *30*(9), 1174–1185. https://doi.org/10.1037/pas0000564

DeViney, E., Dickert, J., & Lockwood, R. (1983). The care of pets within child abusing families. *International Journal for the Study of Animal Problems*, *4*(4), 321–329.

De Wied, M., Meeus, W., & Van Boxtel, A. (2021). Disruptive behavior disorders and psychopathic traits in adolescents: Empathy-related responses to witnessing animal distress. *Journal of Psychopathology and Behavioral Assessment*, *43*(4), 869–881.

Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, *64*(1), 135–168. https://doi.org/10.1146/annurev-psych-113011-143750

Dousti, A., Pouyamanesh, J., Aghdam, G. F., & Jafari, A. (2018). The effectiveness of play therapy on reduction of symptoms of insecure attachment and separation anxiety of among preschoolers. *International Journal of Applied Behavioral Sciences*, *5*(4), 19–28. https://doi.org/10.22037/ijabs.v5i4.24039

Farnfield, S. (2016). The child attachment and play assessment (CAPA): Validation of a new approach to coding narrative stems with children ages 3–11 years. *International Journal of Play Therapy*, *25*(4), 217–229. https://doi.org/10.1037/a0038726

Feng, Y., Lin, Y., Zhang, N., Jiang, X., & Zhang, L. (2021). Effects of animal-assisted therapy on hospitalized children and teenagers: A systematic review and meta-analysis. *Journal of Pediatric Nursing*, *60*, 11–23. https://doi.org/10.1016/j.pedn.2021.01.020

Fielding, W. J., Oenbring, R. A., Brennen, S., Carroll, M. C., Bethel, N., & Minnis, J. (2011). A first look at harm toward animals by Bahamians in childhood. *The International Journal of Bahamian Studies*, *17*(2), 27–49. https://doi.org/10.15362/ijbs.v17i2.134

Fritz, C. O., Morris, P. E., & Richler, J. J. (2012). Effect size estimates: Current use, calculations, and interpretation. *Journal of Experimental Psychology: General*, *141*(1), 2–18. https://doi.org/10.1037/a0024338

Garner, P. W., & Hinton, T. S. (2010). Emotional display rules and emotion self-regulation: Associations with bullying and victimization in community-based after school programs. *Journal of Community & Applied Social Psychology*, *20*(6), 480–496. https://doi.org/10.1002/casp.1057

Gleyzer, R., Felthous, A. R., & Holzer, C. E. (2002). Animal cruelty and psychiatric disorders. *Journal of the American Academy of Psychiatry and the Law Online*, *30*(2), 257–265. https://pubmed.ncbi.nlm.nih.gov/12108563/

Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, *38*(5), 581–586. https://doi.org/10.1111/j.1469-7610.1997.tb01545.x

Hartman, C., Hageman, T., Williams, J. H., Mary, J. S., & Ascione, F. R. (2019). Exploring empathy and callous–unemotional traits as predictors of animal abuse perpetrated by children exposed to intimate partner violence. *Journal of Interpersonal Violence*, *34*(12), 2419–2437. https://doi.org/10.1177/0886260516660971

Hawkins, R. D., Hawkins, E. L., & Williams, J. M. (2017). Psychological risk factors for childhood nonhuman animal cruelty. *Society & Animals*, *25*(3), 280–312. https://doi.org/10.1163/15685306-12341448

Hawkins, R. D., Scottish Society for the Prevention of Cruelty to Animals, & Williams, J. M. (2020). Children's attitudes towards animal cruelty: Exploration of predictors and socio-demographic variations. *Psychology, Crime & Law*, *26*(3), 226–247. https://doi.org/10.1080/1068316X.2019.1652747

Hawkins, R. D., & Williams, J. M. (2016). Children's beliefs about animal minds (Child-BAM): Associations with positive and negative child–animal interactions. *Anthrozoös*, *29*(3), 503–519. https://doi.org/10.1080/08927936.2016.1189749

Holmes, J., Gathercole, S. E., Place, M., Alloway, T. P., Elliott, J. G., & Hilton, K. A. (2010). The diagnostic utility of executive function assessments in the identification of ADHD in children. *Child and Adolescent Mental Health*, *15*(1), 37–43. https://doi.org/10.1111/j.1475-3588.2009.00536.x

Jegatheesan, B. (2015). Influence of cultural and religious factors on attitudes toward animals. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy: Foundations and guidelines for animal-assisted interventions* (4th ed., pp. 37–41). Elsevier.

Julius, H., Beetz, A., Kotrschal, K., Turner, D., & Uvnäs-Moberg, K. (2012). *Attachment to pets: An integrative view of human–animal relationships with implications for therapeutic practice*. Hogrefe Publishing.

Kempes, M., Matthys, W., De Vries, H., & Van Engeland, H. (2005). Reactive and proactive aggression in children: A review of theory, findings and the relevance for child and adolescent psychiatry. *European Child & Adolescent Psychiatry*, *14*(1), 11–19. https://doi.org/10.1007/s00787-005-0432-4

Kim, H. Y. (2017). Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test. *Restorative Dentistry & Endodontics*, *42*(2), 152–155. https://doi.org/10.5395/rde.2017.42.2.152

Knight, K. E., Ellis, C., & Simmons, S. B. (2014). Parental predictors of children's animal abuse: Findings from a national and intergenerational sample. *Journal of Interpersonal Violence*, *9*(16), 3014–3034. https://doi.org/10.1177/0886260514527825

La Caze, A., & Duffull, S. (2011). Estimating risk from underpowered, but statistically significant, studies: Was APPROVe on TARGET? *Journal of Clinical Pharmacy and Therapeutics*, *36*(6), 637–641. https://doi.org/10.1111/j.1365-2710.2010.01222.x

Lee-Kelland, R., & Finlay, F. (2018). Children who abuse animals: When should you be concerned about child abuse? A review of the literature. *Archives of Disease in Childhood*, *103*(8), 801–805. https://doi.org/10.1136/archdischild-2018-314751

Levinson, B. M. (1965). Pet psychotherapy: Use of household pets in the treatment of behavior disorder in childhood. *Psychological Reports*, *17*(3), 695–698. https://doi.org/10.2466/pr0.1965.17.3.695

Ling, D. S., Kelly, M., & Diamond, A. (2016). Human–animal interaction and the development of executive functions. In L. S. Freund, S. McCune, L. Esposito, N. R. Gee, & P. D. McCardle (Eds.), *The social neuroscience of human–animal interaction* (pp. 51–72). American Psychological Association.

Longman, T., Hawes, D. J., & Kohlhoff, J. (2016). Callous–unemotional traits as markers for conduct problem severity in early childhood: A meta-analysis. *Child Psychiatry & Human Development*, *47*(2), 326–334. https://doi.org/10.1007/s10578-015-0564-9

Longobardi, C., & Badenes-Ribera, L. (2019). The relationship between animal cruelty in children and adolescent and interpersonal violence: A systematic review. *Aggression and Violent Behavior*, *46*, 201–211. https://doi.org/10.1016/j.avb.2018.09.001

Macdonald, J. (1963). The threat to kill. *The American Journal of Psychiatry*, *120*(2), 125–130. https://doi.org/10.1176/ajp.120.2.125

Marsa-Sambola, F., Muldoon, J., Williams, J., Lawrence, A., Connor, M., & Currie, C. (2016). The Short Attachment to Pets Scale (SAPS) for children and young people: Development, psychometric qualities and demographic and health associations. *Child Indicators Research*, *9*(1), 111–131. https://doi.org/10.1007/s12187-015-9303-9

McClelland, M. M., & Cameron, C. E. (2012). Self-regulation in early childhood: Improving conceptual clarity and developing ecologically valid measures. *Child Development Perspectives*, *6*(2), 136–142.

McHugh, M. L. (2012). Interrater reliability: The kappa statistic. *Biochemia Medica*, *22*(3), 276–282. https://doi.org/10.11613/BM.2012.031

McPhedran, S. (2009). A review of the evidence for associations between empathy, violence, and animal cruelty. *Aggression and Violent Behavior*, *14*(1), 1–4. https://doi.org/10.1016/j.avb.2008.07.005

Mellor, D. J. (2016). Moving beyond the "five freedoms" by updating the "five provisions" and introducing aligned "animal welfare aims." *Animals*, *6*(10), Article 59. https://doi.org/10.3390/ani6100059

Mikulincer, M., & Shaver, P. R. (2012). An attachment perspective on psychopathology. *World Psychiatry*, *11*(1), 11–15. https://doi.org/10.1016/j.wpsyc.2012.01.003

Moran, P., Rowe, R., Flach, C., Briskman, J., Ford, T., Maughan, B., Scott, S., & Goodman, R. (2009). Predictive value of callous-unemotional traits in a large community sample. *Journal of the American Academy of Child & Adolescent Psychiatry*, *48*(11), 1079–1084. https://doi.org/10.1097/CHI.0b013e3181b766ab

Muldoon, J. C., Williams, J. M., & Lawrence, A. (2016). Exploring children's perspectives on the welfare needs of pet animals. *Anthrozoös*, *29*(3), 357–375. https://doi.org/10.1080/08927936.2016.1181359

Murphy, B. A., & Lilienfeld, S. O. (2019). Are self-report cognitive empathy ratings valid proxies for cognitive empathy ability? Negligible meta-analytic relations with behavioral task performance. *Psychological Assessment*, *31*(8), 1062–1072. https://doi.org/10.1037/pas0000732

Neuenschwander, R., Röthlisberger, M., Cimeli, P., & Roebers, C. M. (2012). How do different aspects of self-regulation predict successful adaptation to school? *Journal of Experimental Child Psychology*, *113*(3), 353–371. https://doi.org/10.1016/j.jecp.2012.07.004

Parish-Plass, N. (2018). *The influence of animal-assisted psychotherapy on the establishment of the therapeutic alliance with maltreated children in residential care* [Unpublished master's thesis]. University of Haifa, Israel.

Paul, E. S. (2000). Empathy with animals and with humans: Are they linked? *Anthrozoös*, *13*(4), 194–202. https://doi.org/10.2752/089279300786999699

Perry, N. B., Calkins, S. D., Dollar, J. M., Keane, S. P., & Shanahan, L. (2018). Self-regulation as a predictor of patterns of change in externalizing behaviors from infancy to adolescence. *Development and Psychopathology*, *30*(2), 497–510. https://doi.org/10.1017/S0954579417000992

Pet Food Macufacurer's Association (PFMA). (2021). Pet Population 2021. https://www.pfma.org.uk/pet-population-2021

Plant, M., Van Schaik, P., Gullone, E., & Flynn, C. (2019). "It's a dog's life": Culture, empathy, gender, and domestic violence predict animal abuse in adolescents – Implications for societal health. *Journal of Interpersonal Violence*, *34*(10), 2110–2137. https://doi.org/10.1177/0886260516659655

Reid, C., Davis, H., Horlin, C., Anderson, M., Baughman, N., & Campbell, C. (2013). The Kids' Empathic Development Scale (KEDS): A multi-dimensional measure of empathy in primary school-aged children. *British Journal of Developmental Psychology*, *31*(2), 231–256. https://doi.org/10.1111/bjdp.12002

Shapiro, K., Randour, M. L., Krinsk, S., & Wolf, J. L. (2013). *The assessment and treatment of children who abuse animals: The AniCare Child approach*. Springer.

Stern, J. A., & Cassidy, J. (2018). Empathy from infancy to adolescence: An attachment perspective on the development of individual differences. *Developmental Review*, *47*, 1–22. https://doi.org/10.1016/j.dr.2017.09.002

Thompson, K. L., & Gullone, E. (2008). Prosocial and antisocial behaviors in adolescents: An investigation into associations with attachment and empathy. *Anthrozoös*, *21*(2), 123–137. https://doi.org/10.2752/175303708X305774

Thompson, N. M., Uusberg, A., Gross, J. J., & Chakrabarti, B. (2019). Empathy and emotion regulation: An integrative account. *Progress in Brain Research*, *247*, 273–304. https://doi.org/10.1016/bs.pbr.2019.03.024

Thomson, N. D., & Centifanti, L. (2018). Proactive and reactive aggression subgroups in typically developing children: The role of executive functioning, psychophysiology, and psychopathy. *Child Psychiatry & Human Development*, *49*(2), 197–208. https://doi.org/10.1007/s10578-017-0741-0

Waller, R., Wagner, N. J., Barstead, M. G., Subar, A., Petersen, J. L., Hyde, J. S., & Hyde, L. W. (2020). A meta-analysis of the associations between callous-unemotional traits and empathy, prosociality, and guilt. *Clinical Psychology Review*, *75*, Article 101809. https://doi.org/10.1016/j.cpr.2019.101809

Walters, G. D. (2014). Testing the direct, indirect, and moderated effects of childhood animal cruelty on future aggressive and non-aggressive offending. *Aggressive Behavior*, *40*(3), 238–249. https://doi.org/10.1002/ab.21514

Walters, G. D., & Noon, A. (2015). Family context and externalizing correlates of childhood animal cruelty in adjudicated delinquents. *Journal of Interpersonal Violence*, *30*(8), 1369–1386. https://doi.org/10.1177/0886260514540328

Wanser, S. H., Vitale, K. R., Thielke, L. E., Brubaker, L., & Udell, M. A. (2019). Spotlight on the psychological basis of childhood pet attachment and its implications. *Psychology Research and Behavior Management*, *12*, 469–479. https://doi.org/10.2147/PRBM.S158998

Wauthier, L., Scottish Society for the Prevention of Cruelty to Animals (Scottish SPCA), & Williams, J. M. (2020). A qualitative study of children's accounts of cruelty to animals: Uncovering the roles of trauma, exposure to violence, and attachment. *Journal of Interpersonal Violence*, *37*, NP6405–NP6438. https://doi.org/10.1177/0886260520928640.

Wauthier, L. M., & Williams, J. M. (2022). Understanding and conceptualizing childhood animal harm: A meta-narrative systematic review. *Anthrozoös*, *35*(2), 165–202. https://doi.org/10.1080/08927936.2021.1986262

Williams, J. M., Cardoso, M. P., Zumaglini, S., Finney, A. L., Scottish, S. P. C. A., & Knoll, M. A. (2021). "Rabbit rescuers": A school-based animal welfare education intervention for young children. *Anthrozoös*, *35*(1), 55–73. https://doi.org/10.1080/08927936.2021.1944561

Wright, B., & Edginton, E. (2016). Evidence-based parenting interventions to promote secure attachment: Findings from a systematic review and meta-analysis. *Global Pediatric Health*, *3*, 1–14. https://doi.org/10.1177/2333794X16661888

Yamazaki, S. (2010). A comparison of maltreated children and non-maltreated children on their experiences with animals – A Japanese study. *Anthrozoös*, *23*(1), 55–67. https://doi.org/10.2752/175303710X12627079939189

Zeidner, M., Boekaerts, M., & Pintrich, P. R. (2000). Self-regulation: Directions and challenges for future research. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 749–768). Academic Press.

Zelazo, P. D. (2006). The dimensional change card sort (DCCS): A method of assessing executive function in children. *Nature Protocols*, *1*(1), 297–301. https://doi.org/10.1038/nprot.2006.46

Zelazo, P. D., Anderson, J. E., Richler, J., Wallner-Allen, K., Beaumont, J. L., & Weintraub, S. (2013). II. NIH Toolbox Cognition Battery (CB): Measuring executive function and attention. *Monographs of the Society for Research in Child Development*, *78*(4), 16–33. https://doi.org/10.1111/mono.12032