An evaluation of a canine welfare education intervention for primary school children

Routledge
Taylor & Francis Group

Anthrozoös

A multidisciplinary journal of the interactions between people and other animals

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rfan20

An Evaluation of a Canine Welfare Education Intervention for Primary School Children

Unaiza Iqbal, Joanne M. Williams & Monja A. Knoll

To cite this article: Unaiza Iqbal, Joanne M. Williams & Monja A. Knoll (13 Nov 2023): An Evaluation of a Canine Welfare Education Intervention for Primary School Children, Anthrozoös, DOI: 10.1080/08927936.2023.2268978

To link to this article: https://doi.org/10.1080/08927936.2023.2268978

ANTHROZOÖS
https://doi.org/10.1080/08927936.2023.2268978

Routledge
Taylor & Francis Group

An Evaluation of a Canine Welfare Education Intervention for Primary School Children

Unaiza Iqbal, Joanne M. Williams, and Monja A. Knoll

School of Health in Social Science, University of Edinburgh, Edinburgh, UK

ABSTRACT

This study evaluated the effectiveness of a canine welfare education intervention, "Mr T's Tickles Workshop," for improving 8- to 9-year-old children's canine emotion recognition, their belief about canine sentience, their knowledge of canine welfare needs, their attitudes toward cruelty to canines, and their attachment to pets. "Mr T's Tickles Workshop" was a one-off intervention comprising a 1.5-hour workshop of welfare activities delivered to whole classrooms online. The workshop consisted of three activities: (1) a canine emotion recognition task, (2) creating a "box of comfort" of care equipment for older dogs, and (3) creating a memory jar of positive memories for children. A 2×2 mixed factorial design was used for the quantitative evaluation of this study. Factor one was the phase of testing (time), a repeated-measure variable (pre-test versus post-test), and factor two was the between-subject variable conditions (intervention versus control group). A sample of 120 children aged 8–9 years from five primary school classes (4 intervention classes and 1 control class) from one school participated in the study. The results showed that children in the intervention group improved significantly more than the children in the control group in terms of children's canine emotion recognition from pre-test to post-test. There was no change in attitudes that intentional cruelty is acceptable in the intervention group; these attitudes worsened in the control group. Finally, the qualitative content analysis of children's responses showed that feedback on the intervention was highly positive. The findings indicate that age-appropriate canine welfare education can effectively enhance children's canine emotion recognition and attitudes toward intentional cruelty.

KEYWORDS

Animal cruelty prevention; animal welfare education; children; emotion recognition; human–animal interaction; humane education

Dogs are the UK's second most common companion animal (PDSA, 2022; Westgarth et al., 2013). However, many people are unaware of dogs' basic welfare needs, leading to intentional and unintentional cruelty toward them (PDSA, 2022). The most common concerns among veterinarians are the non-availability of a balanced diet (Davies et al., 2019;

CONTACT Unaiza Iqbal U.Iqbal@sms.ed.ac.uk School of Health in Social Science, University of Edinburgh, Old Medical School, Elsie Inglis Quadrangle, Teviot Pl, Edinburgh EH8 9AG, UK

Supplemental data for this article can be accessed online at https://doi.org/10.1080/08927936.2023.2268978.

Stockman et al., 2013) and the lack of exercise for pet dogs (Zillochi et al., 2016), leading dogs to experience obesity and behavioral problems (PDSA, 2022). Despite the efforts to make people aware of the welfare needs of dogs, many people lack this basic canine knowledge (PDSA, 2022). In the UK, most households that own a pet have children, and consequently, children may have roles and responsibilities for pet care (Hawkins et al., 2019; Muldoon et al., 2016). Animal cruelty behaviors among children are socially unacceptable because they cause pain, harm, or involve violence toward animals (Ascione, 1993; Ascione, 2005); a range of risk factors influence cruelty behaviors (Hawkins et al., 2017; Wauthier & Williams, 2021).

Animal welfare/humane education may be one of the most useful approaches for enhancing animal welfare and preventing animal cruelty among children (Baatz et al., 2020; Hawkins et al., 2017a, 2017b; Muldoon et al., 2009; Williams et al., 2022). Previous research established that children's animal emotion recognition, their beliefs about animal sentience, their knowledge of animal welfare needs, their attitudes toward cruelty, and their attachment to pets impact their interactions with animals (Hawkins et al., 2019; Williams et al., 2022). Therefore, animal welfare education targeting these constructs is required to enhance children's behavior toward animals (Hawkins et al., 2019; Williams et al., 2022).

Animal welfare education interventions vary widely in content, delivery, frequency, and duration (Muldoon & Williams, 2021a, 2021b, 2021c). Recently there has been a focus on exploring the impact of animal welfare education interventions on children's animal emotion recognition and emotional comprehension (Brelsford et al., 2017). An animal's emotional state is fundamental to its welfare (Mellor et al., 2020). Emotion recognition, the fundamental ability to interpret another's emotional state, is arguably the foundation of empathy (Stetina et al., 2011) and is fundamental to maintaining interpersonal and interspecies relationships (Izard, 1971). Being able to read the emotional state of a dog through its facial expressions or body language enables a child to decide if a dog is happy, sad, angry, or frightened, and this interpretation will influence the child's behavior toward the animal. As a foundational ability, emotion recognition is a key element of education interventions. For instance, Stetina et al. (2011) found that canine emotion recognition (e.g., anger, fear, and disgust) improved among children and adults following a canine-assisted intervention. More recently, Scandurra et al. (2021) found improvement in emotion comprehension in children aged 6–7 years immediately following a canine education intervention and after three months. Thus, canine emotion recognition is a key target for animal welfare education interventions. The intervention evaluated in this study focused on improving children's canine emotion recognition. In line with previous emotion recognition studies (Hawkins et al., 2022), picture stimuli were used instead of living animals.

Previous research evaluating animal welfare education interventions to prevent animal harm from children suggests that it is often easier to target the concepts that are based on the cognitive dimension of human–animal relationships (e.g., emotion recognition, belief in animal minds, and knowledge of welfare needs), compared with the concepts that are a part of the affective dimension (e.g., affective empathy and attachment) and attitudes about animals (Hawkins et al., 2017) during short animal welfare education interventions (Hawkins et al., 2019; Scandurra et al., 2021). However, evidence suggests that animal

welfare knowledge, belief in animal minds, and attitudes toward animal cruelty can be enhanced through education interventions (Faver, 2010; Hawkins et al., 2017; Jamieson et al., 2012; Lakestani et al., 2015; Muldoon et al., 2016; Williams et al., 2022). While many animal welfare education programmes focus on a range of animals or animals other than dogs (e.g., Hawkins et al., 2017; Jamieson et al., 2012; Lakestani et al., 2015), interventions focusing on canine welfare have demonstrated knowledge and attitude gains among children. For example, a canine welfare education intervention based on two types of workshops (i.e., "Be Dog Smart (BDS)" and "Responsible Dog Ownership (RDO)") for 7- to11-year-olds (Baatz et al., 2020) led to improvements in canine welfare knowledge and attitudes toward dogs.

Despite these promising findings, further research is needed to draw robust conclusions about the effectiveness of animal welfare education interventions in targeting different types of animals (Arbour et al., 2009; Hawkins et al., 2017). For example, it is not clear which activities within these interventions are effective in promoting change, or whether change in knowledge and attitudes ultimately results in behavior change. Animal welfare education interventions have different activities and different models of change (Glanville et al., 2020), so successful outcomes for one canine welfare education intervention (e.g., Baatz et al., 2020) do not mean that all canine welfare education interventions will be equally successful. For example, interventions on the welfare needs of puppies and puppy care may involve different types of knowledge and behaviors (e.g., socialization, Christos & Buckley, 2022) than interventions on the welfare needs of older dogs. Aging dogs may face health, cognitive, and behavioral changes (Bellows et al., 2015) that affect their daily functioning. They are also less likely to be adopted from, and more likely to be euthanized in, shelters (Hawes et al., 2018). Thus, increasing knowledge and compassionate concern for older dogs is an important focus for canine animal welfare education interventions.

The intervention evaluated in the current study is focused on older dogs and included activities to enhance canine emotion recognition and children's knowledge of the welfare needs of the dogs. It was also designed to promote empathy and compassion for older dogs by engaging children in an activity to provide real-life "boxes of comfort," including care items relevant to older dogs that would be delivered to a named older rescue dog living in an animal shelter. Compassion toward older dogs was also encouraged through an activity that engaged children in reflecting on their own positive memories and writing them on pieces of paper to put in a memory jar that they could keep and refer to after the intervention.

Aims of the Study

The current study evaluated a school-based canine welfare education intervention called "Mr T's Tickles Workshop," designed and delivered by Fostering Compassion (fostering-compassion.org). Fostering Compassion is a humane education organization that aims to foster caring, compassionate, and nurturing behavior toward animals in children. The workshop aimed to improve children's understanding of canine emotions and human emotions, encouraging children to show compassion toward animals, other people, and themselves. The intervention was used during the COVID-19 pandemic

and was delivered to the children within their schools. The evaluation of the workshop aimed to assess the impact of the intervention on children's canine emotion recognition, their understanding of canine sentience, knowledge of canine welfare needs, attitudes toward cruelty to dogs, and attachment to pets. The intervention was delivered online and was accompanied by a range of classroom resources for activities led by the teachers and involved three tasks: human and dog emotions tasks; creating a box of comfort; creating a memory jar activity. The human and dog emotion tasks focused on improving children's canine emotion recognition through a picture-based task to match photos of canine emotional states with different emotions. Creating the "box of comfort" activity focused on making children aware of the welfare needs of older dogs by collating care items into a box they could decorate for a named older dog. The memory jar activity focused on children recalling positive memories and collecting them together in a jar they could decorate and keep. It also focused on children's ability to recall positive memories and the ability to recall these events when facing negative emotions. In addition to the evaluation measures, children's views about the intervention and their perceived learning outcomes were also assessed. This evaluation research used a pre- to post-test evaluation design to assess changes following the intervention and investigate the following predictions:

(1) The "Mr T's Tickles Workshop" will improve children's canine emotion recognition, their understanding of dog sentience, knowledge of canine welfare needs, attitude toward dog cruelty (intentional cruelty, unintentional cruelty, and animal neglect), and attachment to pets.
(2) The "Mr T's Tickles Workshop" will be a positive learning experience for children.

Methods

Ethics Approval

The ethical guidelines of the British Psychological Society were adopted, and an ethics committee of the University of Edinburgh granted approval. The study also gained ethical approval from the Local Authority that gave research access to the schools.

Study Design

A 2×2 mixed factorial design was used for the current intervention. The within-subject factor was the phase of testing (time), which consisted of two different time points: pre-test and post-test. The between-subject factor was the conditions (intervention and control group). The dependent variables were children's canine emotion recognition, their understanding of dog sentience, knowledge of canine welfare needs, attitude toward dog cruelty, and attachment to pets. The intervention was carried out in a school, with four intervention classes and one control class.

Participants

The sample for the study consisted of 120 children from four classes of Primary 4 (P4) from a Scottish primary school. Children's classes were assigned to one of the two conditions (Intervention: four classes from P4; Control: one P4 class was assigned to the waitlist control group). Children were aged between 8 and 9 years old (intervention group: $M = 8.29$, $SD = 0.45$; control group: $M = 8.29$, $SD = 0.45$). Among the sample from the intervention classes ($n = 97$), there were 55 boys and 34 girls and 8 children chose the option "rather not say" for sex. Among the sample from the control class ($n = 23$), there were 10 boys and 9 girls; 4 opted for "rather not say." Among the sample from intervention group, 83 were pet owners and 14 were non-pet owners, and from the control group 19 children were pet owners and 4 were non-pet owners. Children in all conditions completed the pre- and post-intervention questionnaires. Children in the waitlist control group completed the pre- and post-test three weeks before participating in the intervention. Detailed information about children's pet ownership (if they like pets, etc.) can be found in Table 1.

Measures

Measures were administered at pre-test and post-test and were completed by all children.

Demographic Items

The pre-test and the post-test questionnaires contained demographic questions at the beginning. The pre-test questionnaire included questions about age, sex, pet ownership, and type of pet/s. The post-test questionnaire had just one question related to demographic information (i.e., What is your name?) to facilitate data matching.

Children's Beliefs About Animal Mind (Child-BAM, Hawkins & Williams, 2016)

The Child-BAM was included to measure children's understanding of dog sentience (i.e., that they are emotionally and cognitively capable). Children were asked, "Do you think dogs are/can feel … ?" (clever/pain/happiness/sadness/ fear). Each item was scored on a 5-point Likert scale ("strongly agree" to "strongly disagree"). Total Child-BAM scores

Table 1. Sample characteristics for both conditions.

		Intervention *n* (%)	Control *n* (%)
Sex	Boys	55 (56.7)	10 (43.5)
	Girls	34 (35.1)	9 (39.1)
	Rather not say	8 (8.2)	4 (17.4)
Like pets	Yes	97 (100)	23 (100)
	No	–	–
Family pet (pet at home)	Yes	83 (85.6)	19 (82.6)
	No	14 (14.4)	4 (17.4)
Type of family pet	Dog(s)	27 (27.8)	10 (43.5)
	Other	56 (57.7)	9 (39.1)
Own pet type (pets that children considered their own)	No pet	43 (44.3)	13 (56.5)
	Dog(s)	16 (16.5)	5 (21.7)
	Other	38 (39.2)	5 (21.7)

were calculated for each participant (minimum score 5, maximum score 25). The measure demonstrated high internal consistency ($\alpha = 0.70$) for the present study.

Children's Canine Emotion Recognition

An emotion-recognition task was developed to assess children's ability to recognize canine emotions before and after the intervention. This measure originally contained 15 items with images of animals (10 dog images and 5 cat images), showing different emotions (happy, sad, fear, anger, neutral). The cat images were included as a control to test whether the intervention influenced canine emotion recognition specifically. We did not expect children's cat emotion skills to change post-intervention. As there is no openly available validated database of images of dogs and cats, the images included in this task were sourced from royalty-free websites. Images were searched using specific terms such as "happy dog" or "aggressive cat" (see also Hawkins et al., 2021). Potential images to be included in the task were collected and then reviewed based on material, depicting different emotions in dogs and cats (Bloom & Friedman, 2013; RSPCA, 2021; Veterinary Behaviour Team, 2021). No inclusion or exclusion criteria were set for the breed or ages of dogs and cats, so images of different breeds were included to assess the ability of children to recognize emotions in various breeds and ages of dogs and cats (Aldridge & Rose, 2019). Finally, the images were reviewed by a panel of seven experts, including companion animal veterinarians, animal care workers, and animal behavior and welfare experts. Panel members were asked individually to identify the emotion depicted in each of the images. The final set of images for this task were those where there was a high (i.e., at least 70%) or perfect agreement between panel members on the emotion depicted in the images. Based on the expert panel's ratings, nine dog and four cat images were included in the final analyses of the data. Two images (1 dog image displaying fear and 1 cat image displaying sad emotion) were excluded from the analyses as they were not found to be reliable based on a low agreement between the panel members. Excluding these images is also consistent with previous research by Bloom and Friedman (2013), in which it was noticed that expressions of sad emotion might depict "submissiveness" that could be hard to distinguish from other negative emotions (such as fear) without the awareness of the exact situation (Bloom & Friedman, 2013).

All images were edited to ensure uniformity in brightness and size, and they were placed on a white background to improve the clarity of the images (Hawkins et al., 2021). The children identified the emotions by choosing from a set of response options (happy, sad, anger, fear, neutral). One point was assigned for each correct response; zero was given for incorrect answers. A higher score indicated a better ability to recognize animal emotions (see Table 2). Canine and cat emotion recognition scores were calculated separately to investigate the changes from pre- to post-test for each animal type.

Children's Treatment of Animals Questionnaire (CTAQ, Thompson & Gullone, 2003)

The CTAQ is a 13-item questionnaire that measures children's self-reported positive or negative treatment of animals. It was included in the pre-test questionnaire for the intervention and the control groups. The data for this measure were analyzed at baseline to

Table 2. Images/emotions in the emotion-recognition task.

Image	Emotion	Image	Emotion
	Happy		Happy
	Anger		Fear
	Neutral		Happy
	Neutral		Neutral
	Sad		Anger

(*Continued*)

Table 2. Continued.

Image	Emotion	Image	Emotion
	Anger		Fear
	Sad		

examine if there were any differences among the children in both groups regarding their treatment of animals; however, the data for this measure were not included in further analysis. McDonald et al. (2015) showed that CTAQ is a reliable measure to assess children's humane treatment of animals. In the current study, the measure had high internal consistency ($\alpha = 0.76$).

Children's Attitudes Toward Animal Cruelty (CAAC, Hawkins & Williams, 2016)

The CAAC was used to measure children's reactions toward various forms of dog cruelty. The scale comprises 11 items. Children are asked, "How acceptable do you think it is to … " with 11 behaviors (e.g., "Hurt a dog on purpose"). This scale has three subscales: intentional animal cruelty, unintentional animal cruelty, and animal neglect. Intentional cruelty includes items such as "Kick a dog on purpose"; unintentional cruelty includes items such as "Hurt a dog by accident?"; and animal neglect has items such as "Forget to give a dog food or water?" Items were scored on a 5-point Likert scale ("not acceptable at all" to "very acceptable"). Total scores are calculated by adding up responses to the 11 items; they range from 11 to 55. A high score indicates a high acceptance of dog cruelty. The measure demonstrated high internal consistency ($\alpha = 0.73$) in the current study. The internal consistencies for the three subscales were intentional cruelty ($\alpha = 0.73$), unintentional cruelty ($\alpha = 0.71$), and animal neglect ($\alpha = 0.87$).

Short Attachment to Pets Scale for Children and Young People (SAPS, Marsa-Sambola et al., 2016)

The SAPS was included to measure attachment to pets/sense of attachment. The scale comprises one question, "Please tell us how you feel about your favourite pet animal,"

and there are nine items (e.g., I don't really like animals; I spend time every day playing with my pet (or would if I had one)) that are scored on a 5-point Likert scale ("strongly agree" to "strongly disagree"). A total attachment score was calculated (minimum 9, maximum 45). The measure demonstrated high internal consistency ($\alpha = 0.85$).

Knowledge of Canine Welfare Needs

The pre- and post-test questionnaires included items related to knowledge of canine welfare needs. Knowledge of canine welfare needs was assessed using five open-ended questions related to the welfare needs of dogs (environment, diet, behavior, companionship, and health) (UK Animal Welfare Act, 2006). Children were asked, "What do you know about dogs?" and this was followed by the five questions (e.g., "What should you give a dog to eat and drink?", "What should you give a dog to live in?"). A coding scheme was developed to classify answers as correct or incorrect (e.g., "water" and "dog food, kibble" were among the correct answers for what to give a dog to eat and drink). Responses were coded by assigning one point for each correct answer and zero points for each wrong or irrelevant answer. Higher scores indicate higher levels of knowledge of dog welfare needs. Two researchers coded the responses for reliability. Inter-rater reliability was 95%. The discrepancies were discussed and resolved among the researchers.

Children's Experiences of the Intervention

The post-test questionnaire for the intervention group also included five items related to the children's experience of the workshop. The questions asked whether the children liked the workshop, enjoyed the activities, learned a lot about dogs, liked dogs more now, and whether they knew how to look after dogs following the workshop. They were rated on a 5-point Likert scale ("strongly disagree" to "strongly agree"). Children were also given the opportunity to answer four open-ended questions to expand on their experience qualitatively (see Table 5).

Intervention Content

Because of COVID-19 restrictions, the intervention workshop was delivered online via Google Meet and was completed in around 1.5 h. The workshop activities targeted achieving various learning outcomes (see Table 3). The workshop was delivered to four whole school classes of children and combined interactive online guidance with classroom discussions and educational materials provided in the classrooms (boxes and care items for older dogs).

Human–Dog Emotions

At the start of this activity, children discussed how animals could share and feel similar emotions to humans. The children were then given a sheet containing pictures of five human facial expressions and five dog facial/body language expressions (see online supplemental material). These included a variety of emotions that humans and dogs can experience and display through their facial expressions and body language. The children were

Table 3. Intervention activities, equipment, and learning outcomes.

Activity	Duration	Equipment	Learning outcome
Box of comfort activity	20–30 min	Mr T's story. Basic welfare needs of older dogs (e.g., toothbrush, blankets, training pads). Dream catchers.	Improving children's knowledge of the welfare needs of older dogs.
Memory jar craft activity	20 min	Small jars with labels and children's names on them.	Improving children's ability to recall happy memories when facing distress or negative emotions.
Human–dog emotions	20 min	A sheet containing 5 images of humans and 5 images of dogs expressing different emotions.	Improving children's canine emotion recognition.
Workshop closing	10 min	Workshop certificates, Mr T's wooden stars, and watching a funny video.	Showing children's appreciation for their participation in the intervention and encouraging them to apply the gained knowledge.

asked to connect the human emotion picture with the matching dog emotion picture. This exercise was to reinforce that both humans and dogs can share the same feelings.

Learning About Mr T and Creating a Box of Comfort for Senior Dogs

In their classes, the children were taught Mr T's (an older dog) story: how he stayed with his human dad until he was 10 years old, at which point his human dad became too old to look after him and he was adopted by the workshop facilitator ("Do you think it's maybe a bit harder to place [rehome] an older dog?"). The children were encouraged to draw parallels between themselves and Mr T (e.g., "sometimes when Mr T was asked to come in from outside, he would pretend not to hear so he could stay out and play – do you ever pretend not to hear when it's time to stop playing?"). The children were prompted to think about how they could identify the signs of age in older dogs (e.g., white nose, white eyebrows).

The children were educated about how older dogs finding new homes may feel anxious. Then, with their classmates, children were invited to create a "box of comfort" for a specific named senior dog. The children were told that the box would be delivered to the dog after the workshop was complete. Children were informed about the welfare needs of senior dogs (e.g., the medication they require) and prompted to think about and discuss a range of welfare needs of older dogs (e.g., "what do you do to your teeth?"). They then considered care items that they could provide in the box of comfort to meet these needs (e.g., a canine toothbrush). Through this process, children were informed of a range of welfare needs of older dogs and given care items (e.g., blankets, training pads) to put in the boxes of comfort. Children wrote letters or drew pictures for the dog to put into the box. They also decorated the outside of the box. They were taught how providing the dogs with boxes of comfort may help them settle into their new homes.

Memory Jar Craft Activity

To reinforce some of the messaging about compassion in the "boxes of comfort" activity, the children were invited to reflect on themselves and their own needs and the things

that made them happy. Each was provided with a small jar that had their name on it. They were asked to think about memories that made them happy, write them on a small piece of paper, and put them in the memory jar, which they could decorate. In this craft activity, the children were taught how getting older may sometimes lead to things being forgotten. The children could keep the memory jars to remind them of happy memories whenever they felt down.

Conclusion of Workshop

Children left the workshop with the memory jar, Mr T's certificates (thanking them for caring for a senior dog), and Mr T's Tickles star. After the intervention, the classroom teachers were sent a photograph of the older dogs with their boxes of comfort to share with the children.

Procedure

The study had three phases for the intervention and control groups. Data collection was carried out before and after the workshop delivery, and there was a gap between the pre-test and post-test for the intervention group and the control group. For the intervention group, the pre-test was conducted two days before the intervention and the post-test one day after the intervention. The study involved a waitlist control group. For the waitlist control group, the post-test was conducted three days after the pre-test, with no intervention. The waitlist control group received the intervention three weeks after data collection. Parental information sheets and consent forms were sent to the parents via the school and completed before the data collection. The children completed child assent forms before data collection. The children completed the questionnaires under the supervision of their teachers as a classroom activity. The teachers also signed a consent form to indicate their agreement as gatekeepers to facilitate data collection.

Data Analysis and Analytical Strategy

Before the main analysis, the data were checked for normality and assumption violations for parametric tests. The data were normally distributed, as assessed by Shapiro–Wilk's test of normality ($p > 0.05$). The data for the dependent variable Post Child-BAM total score were found to be positively skewed; as a result, the BAM (pre and post scores) were transformed using reflect and logarithm transformation (log 10) (Field, 2009). Before the main analysis, preliminary Pearson's chi-square tests were run to explore if there were any associations between the test conditions, sex, pet ownership, and pet types/own pet type. Studentized residuals were calculated, and residuals $\geq \pm 3$ (standard deviations) were classified as outliers and not included in the analysis. There were no missing data. To investigate the differences in both groups for the Children's Treatment of Animals Questionnaire (CTAQ) at pre-test, an independent sample *t*-test was conducted before the main analysis. Before the main analysis, associations between pet ownership (yes/no) and the dependent variables were assessed through correlation analyses; however, no signification associations were found.

To explore the hypotheses, nine 2 × 2 mixed analyses of variance (ANOVAs) were conducted, with condition (intervention and control) as a between-group and time (pre and post) as a within-group factor. Four ANOVAs were conducted: for Child-BAM, knowledge of canine welfare needs, attitudes toward dog cruelty, and attachment to pets. Furthermore, three ANOVAs were conducted for the three subscales of the children's attitudes toward dog cruelty scale, and two ANOVAs were conducted separately for the dog emotions and cat emotions scores. Significant interactions were followed with Bonferroni-adjusted pairwise comparisons of the factor time for each of the groups. As the groups were not matched, our main focus for the analyses was on the within-subject variable, time. ANOVA assumption testing was carried out as a part of the analysis. Finally, five one-sample *t*-tests were carried out for the Likert scale items to assess the children's experience of the workshop. Content analysis was carried out for the open-ended responses to explore children's experiences of the intervention (Krippendorff, 2018).

Results

Descriptive Statistics

Descriptive statistics of mean scores and standard deviations on each key variable at pre- and post-test for the two conditions are presented in Table 4.

Preliminary Tests

Independent samples *t*-tests showed no statistically significant sex differences in any measure at pre-test. Furthermore, an independent samples *t*-test revealed no difference between intervention and control groups in children's treatment of animals scores (CTAQ) at pre-test.

Children's Canine Emotion Recognition

The children's recognition of canine emotions was expected to increase after the intervention, and this was assessed separately for the dog and cat stimuli. With regards to

Table 4. Means and standard deviations (in parentheses) at pre- and post-test for each of the four dependent variables across conditions.

	Intervention group		Control group	
Variables	Pre-test	Post-test	Pre-test	Post-test
Dog emotions	5.36 (1.29)	5.90 (1.25)	6.35 (1.40)	5.78 (1.65)
Cat emotions	2.88 (0.90)	2.89 (0.90)	2.96 (0.90)	2.87 (1.01)
Child-BAM	1.35 (0.58)	1.36 (0.10)	1.36 (0.03)	1.36 (0.04)
WK	4.45 (0.80)	4.44 (0.80)	4.61 (0.85)	4.67 (0.59)
CAAC	17.69 (4.15)	17.74 (4.37)	16.47 (3.95)	18.63 (4.69)
Intentional (CAAC)	7.33 (1.81)	7.20 (1.87)	7.00 (1.33)	8.42 (2.61)
Unintentional (CAAC)	7.22 (2.75)	7.10 (2.61)	6.37 (2.54)	6.68 (2.61)
Animal neglect (CAAC)	3.13 (1.47)	3.44 (1.75)	3.11 (1.45)	3.53 (1.50)
SAPS	36.37 (5.81)	37.13 (4.39)	34.26 (6.61)	36.00 (4.68)

Note: Dog Emotions: Children's dog emotion recognition; Cat Emotions: Children's cat emotion recognition; Child-BAM: Children's Beliefs About Animal Mind; WK: Children's knowledge of canine welfare; CAAC: Children's Attitudes Toward Animal Cruelty (subscales, Intentional cruelty, Unintentional cruelty, Animal neglect); SAPS: Short Attachment to Pets Scale.

the children's dog emotion recognition, we found a statistically significant interaction between time and condition ($F_{(1,118)} = 11.10$, $p < 0.01$, partial $\eta^2 = 0.09$). The follow-up analyses showed a significant increase in emotion recognition from pre-test to post-test for the intervention group ($F_{(1,118)} = 13.72$, $p < 0.001$, partial $\eta^2 = 0.10$), but no significant change from pre-test to post-test for the control group. Thus, in line with our prediction, children's dog emotion recognition improved from pre- to post-test for the intervention condition, showing that the intervention helped enhance children's canine emotion recognition, whereas the same was not the case for the control group (see Figure 1). The main effects of time and condition were not significant. The analysis of children's cat emotion recognition yielded no statistically significant main or interaction effects.

Children's Attitudes Toward Dog Cruelty

It was expected that the scores on CAAC scale would decrease following the intervention. There was no statistically significant interaction between time and condition on the total scores of CAAC and the scores on the subscales of unintentional cruelty or animal neglect. There were also no statistically significant main effects of time or condition for total scores of CAAC, the unintentional cruelty subscale, and the animal neglect subscale. However, there was a statistically significant interaction ($F_{(1,118)} = 11.17$, $p < 0.01$, partial $\eta^2 = 0.09$) between time and condition on the intentional cruelty subscale scores.

The follow-up analyses showed no statistically significant change from pre-test to post-test scores for the intervention group, but there was a significant increase in intentional cruelty subscale scores from pre- to post-test for the control group ($F_{(1,118)} = 10.54$, $p < 0.01$, partial $\eta^2 = 0.08$). There was also a significant main effect of time ($F_{(1,118)} = 6.23$, $p < 0.05$, partial $\eta^2 = 0.05$), which was due to an increase of intentional cruelty scores from pre- to post-test. There was no significant main effect of condition (see Figure 2). Overall, the findings for this subscale suggest that the scores on the intentional cruelty subscale did not significantly decrease from pre- to post-test, but they were maintained

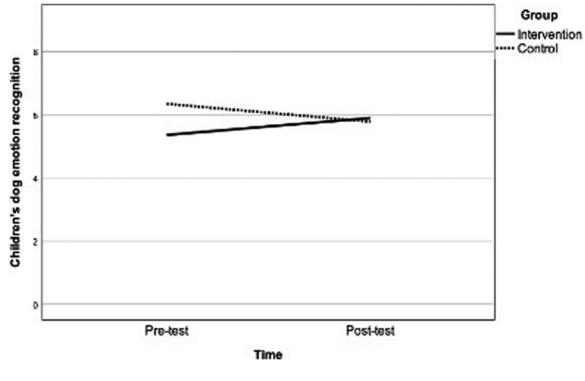

Figure 1. Changes in children's dog emotion recognition scores from pre- to post-test. A higher total score (maximum score of 13) indicates a better ability to recognise animal emotions.

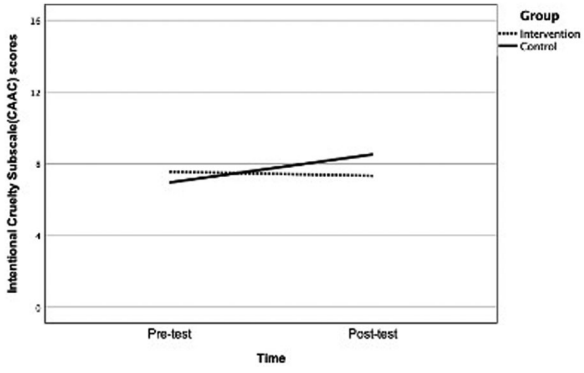

Figure 2. Changes in intentional cruelty subscales scores from pre- to post-test. A higher score indicates more acceptance of dog cruelty.

in the intervention group. However, they increased significantly from pre- to post-test for the control group, which is inconsistent with our prediction.

Children's Belief About Dog Sentience, Knowledge of Canine Welfare Needs, and Attachment to Pets

It was predicted that the scores for children's belief about dog sentience, knowledge of canine welfare needs, and attachment to pets would increase from pre-test to post-test. The results did not follow the prediction: no statistically significant main effects (time or condition) or interaction between time and condition were found for these measures. These results revealed that the intervention did not improve children's belief about dog sentience, knowledge of canine welfare needs, and attachment to pets from pre- to post-test.

Children's Experience of the Intervention

The five items scored on a Likert scale were assessed quantitatively. Children's total scores and mean scores on each item were calculated to explore children's learning experience of the intervention (scores ranging from 1 to 5). Most children responded with "strongly agree" and "agree" for all the items. Individual one-sample *t*-tests were also conducted against the mid-point of the scale (Not sure = 3) for each Likert scale item (see Table 5).

Table 5. Independent sample *t*-test results for the quantitative items.

Items	*M*	*SD*	$t_{(102)}$	*p*	Cohen's *d*
I liked the workshop.	4.42	0.83	17.24	< 0.001	0.84
I enjoyed the activities.	4.48	0.86	17.39	< 0.001	0.86
I learned a lot about dogs.	4.25	1.04	12.27	< 0.001	1.04
I like dogs more now.	4.05	1.35	7.86	< 0.001	1.35
I know how to look after dogs now.	4.05	1.31	8.13	< 0.001	1.31

Note: Individual one-sample *t*-tests were also conducted against the mid-point of the scale (Not sure = 3). Scores ranged from 1 (Strongly disagree) to 5 (Strongly agree).

Table 6. Themes derived from the content analysis.

Items	Themes of responses	Percentage response
1. Which activity did you like the most?	Memory jar activity/making the memory jar.	22.33
	Decorating/putting things in the box/making the comfort box (e.g., "Making the box because I know that a dog will be happy now").	37.86
	Letter writing for comfort box.	6.80
	The canine emotions activity.	1.94
	Video shown at workshop closing.	2.91
	All the activities.	24.27
	I don't know.	5.83
2. What activities did you enjoy the least?	None/I liked all of them. (e.g., "Nothing because they were all fun").	78.64
	Decorating the box/putting things in box.	8.74
	Writing the letter.	2.91
	Memory jar.	6.80
	Canine emotions activity.	0.97
3. Are there any other activities that could be added to the Fostering Compassion workshop?	No.	50.49
	Bring in a dog.	12.62
	Include other animals/cats.	9.71
	See who (dog) gets the box.	2.91
	Other activities like drawing.	4.85
	Not sure.	17.48
	Things related to research on dogs.	2.91
4. Do you have anything you would like to tell us about the workshop?	No.	74.76
	It was fun/I really liked it (e.g., "I really enjoyed it and I also know that it makes a dog happy").	22.33
	Add more about cats.	0.97

These responses reflect the children's positive experience of the workshop. The open-ended questions related to the intervention experience were qualitatively coded using content analysis. Children's answers were summarized for each question, and categories were inductively created (see Table 6).

Discussion

This evaluation of a canine welfare education intervention found a significant improvement in children's canine emotion recognition after the intervention. The scores on children's acceptance of intentional cruelty were maintained from pre- to post-test for the intervention group but worsened in the control group. The intervention also had an overall positive impact on children, as indicated by children's responses to their experience of the intervention. However, no significant changes were found in children's belief about canine sentience, knowledge of canine welfare needs, and attachment to pets from pre- to post-test.

Canine emotion recognition is fundamental to understanding and recognizing emotional states in dogs and was improved by Mr T's Tickles Workshop. This change is related directly to the intervention component focusing on canine and human emotion recognition, highlighting that children of this age are capable of learning about animal emotional states, a key element of the five animal welfare domains (Mellor et al., 2020). However, when children were asked about their experience of the intervention, few

mentioned the emotion-recognition task as a favorite activity. This shows that children's learning is not always driven by what they enjoy the most, but rather they can be driven by intervention materials tapping into core constructs that influence the outcome measures, in this case canine emotion recognition skills. The evidence suggests that emotion recognition helps in human–animal relationships and promotes empathetic responses among children toward animals (Stetina et al., 2011). Furthermore, recognizing emotions accurately enhances interspecies emotional understanding, which may be advantageous for both children and dogs (Scandurra et al., 2021). A mutual understanding and ability to comprehend facial expressions may be necessary for detecting threats and preventing harm (e.g., dog bites; Aldridge & Rose, 2019; Martens et al., 2016; Worsley & O'Hara, 2018). Recognizing animals' emotions can facilitate the human–animal bond (Martens et al., 2016). Thus, the improvement in canine emotion recognition indicates that canine welfare education interventions, including "Mr T's Tickles Workshop," can play a role in preventing children's harm to animals.

Unexpectedly there was no change in canine welfare knowledge following the intervention, despite the box of comfort activity focusing on the welfare needs of older dogs. Awareness of canine welfare needs was high at baseline, which reduced the possibility of improvement at post-test. Ceiling effects in animal welfare knowledge have been found in other studies (Edgar & Mullan, 2011). The lack of significant improvement in canine welfare knowledge may be due to the way canine welfare knowledge was taught in the intervention and measured in the evaluation. The intervention focused on older dogs and creating a box of comfort for a named older dog. The knowledge gains may have been very tied to this specific case and not generalized by children to dogs in general, which is what the evaluation measure was designed to gauge. There are two implications from this: (1) ensure, within interventions, that children are helped to generalize knowledge from individual cases to others; (2) make sure the evaluation tools are aligned with the learning gains – in this case, older dogs not dogs in general. Evaluation methods designed specifically to match content of interventions might be more effective in revealing post-intervention changes (Hawkins et al., 2018; Wilson & Barker, 2003).

There were no significant changes in belief in animal minds (Child-BAM), which was unexpected, but it should be noted that children were at the ceiling level on this measure at pre-test. There was no improvement in attitudes to animal harm; however, the control group showed increased acceptance of intentional cruelty at post-test. There was no change in acceptance of cruelty among the children in the intervention group; thus, attitudes were maintained at pre-test levels for the intervention group. These findings are in line with evidence suggesting that children's attitudes toward animal cruelty can be influenced by animal welfare education interventions (Hawkins et al., 2018; Lakestani et al., 2015).

Finally, the qualitative synthesis of children's feedback on the workshop revealed that children's experience of the workshop was highly positive. It is important to note that most of the children liked or enjoyed the activities that were more hands-on and interactive (Hawkins et al., 2020a, 2020b; Pratiwinindya et al., 2021; Sprinkle, 2008). Some children also drew pictures of their pets, which shows that the workshop helped them to relate the content and information learned to their own experiences. One child drew a picture of his greyhound and wrote: "I don't know why I drew this, but my old dog was a greyhound RIP Jake the doggo."

Limitations and Future Directions

The current study had a few limitations. Firstly, the sample included only Scottish children; further research is required to see the impact across diverse demographics. Secondly, the researchers were not allowed into the school owing to the restrictions imposed because of the COVID-19 pandemic. For this reason, activities of the intervention were conducted by teachers within classrooms under the guidance of the workshop lead, who was engaging with the class online. This may have impacted the implementation of the workshop as it was delivered by different teachers who may have varied in their knowledge of and attitudes toward dogs and animal welfare. Thirdly, there was a very small number of participants in the waitlist control group as compared with the intervention. For future research, it is important to make sure the number of participants in both groups is equal. Fourthly, the findings on feline emotion recognition should be treated with some caution because children were presented with fewer images of cats than dogs; this might have limited the statistical power of the tests performed. Finally, it was not possible to conduct a longer-term follow-up to assess retention of learning.

A strength of the current study was that the intervention was designed and implemented by Fostering Compassion; however, the evaluation was carried out by the researchers independently, which minimized the possibility of researcher bias (Johnson et al., 2002; Stern & Chur-Hansen, 2013). No live dogs were available for children to interact with or observe due to COVID-19, which may have benefited children who are not comfortable in the presence of live dogs. The online mode of delivering this intervention could be beneficial for future animal welfare interventions because it extends the reach of welfare organizations. This mode of delivery may be more challenging logistically, but it could facilitate delivering workshops to remote rural areas and globally to children from countries lacking animal welfare education.

Conclusions

This intervention led to improvements in children's canine emotion recognition and also to the maintenance of attitudes toward intentional cruelty as unacceptable. This highlights the importance of this intervention building an understanding of animal emotions, an important foundation in compassionate behaviors toward animals among children. However, there were no changes in welfare knowledge or belief in animal minds. Further research is required to investigate how emotion recognition skills link to other psychological factors that influence children's treatment of animals.

Acknowledgements

We thank Lesley Scullion and Fostering Compassion for collaborating in this research and delivering the workshops. We also thank all the teachers and children who participated in this research.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Funding

U. I. completed this work while enrolled in a Ph.D. in Clinical Psychology at the University of Edinburgh, funded by the Higher Education Commision (HEC) of Pakistan. The funder had no involvement in carrying out this research.

References

Aldridge, G. L., & Rose, S. E. (2019). Young children's interpretation of dogs' emotions and their intentions to approach happy, angry, and frightened dogs. *Anthrozoös*, *32*(3), 361–374. https://doi.org/10.1080/08927936.2019.1598656

Arbour, R., Signal, T., & Taylor, N. (2009). Teaching kindness: The promise of humane education. *Society & Animals*, *17*(2), 136–148. https://doi.org/10.1163/156853009X418073

Ascione, F. R. (1993). Children who are cruel to animals: A review of research and implications for developmental psychopathology. *Anthrozoös*, *6*(4), 226–247. https://doi.org/10.2752/089279393787002105

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

Animal Welfare Act. (2006). https://www.legislation.gov.uk/ukpga/2006/45/contents

Baatz, A., Anderson, K. L., Casey, R., Kyle, M., McMillan, K. M., Upjohn, M., & Sevenoaks, H. (2020). Education as a tool for improving canine welfare: Evaluating the effect of an education workshop on attitudes to responsible dog ownership and canine welfare in a sample of Key Stage 2 children in the United Kingdom. *PLoS ONE*, *15*(4), e0230832. https://doi.org/10.1371/journal.pone.0230832

Bellows, J., Colitz, C. M. H., Daristotle, L., Ingram, D. K., Lepine, A., Marks, S. L., Sanderson, S. L., Tomlinson, J., & Zhang, J. (2015). Common physical and functional changes associated with aging in dogs. *Journal of the American Veterinary Medical Association*, *246*(1), 67–75. https://doi.org/10.2460/javma.246.1.67

Bloom, T., & Friedman, H. (2013). Classifying dogs' (*Canis familiaris*) facial expressions from photographs. *Behavioural Processes*, *96*, 1–10. https://doi.org/10.1016/j.beproc.2013.02.010

Brelsford, V. L., Meints, K., Gee, N. R., & Pfeffer, K. (2017). Animal-assisted interventions in the classroom: A systematic review. *International Journal of Environmental Research and Public Health*, *14*(7), 669. https://doi.org/10.3390/ijerph14070669

Christos, C., & Buckley, L. A. (2022). Veterinary-led puppy parties: A cross-sectional survey to quantify the methods and approaches undertaken within UK veterinary practices. *Journal of Veterinary Behavior*, *58*, 1–9. https://doi.org/10.1016/j.jveb.2022.09.006

Davies, R. H., Lawes, J. R., & Wales, A. D. (2019). Raw diets for dogs and cats: A review, with particular reference to microbiological hazards. *Journal of Small Animal Practice*, *60*(6), 329–339. https://doi.org/10.1111/jsap.13000

Edgar, J. L., & Mullan, S. M. (2011). Knowledge and attitudes of 52 UK pet rabbit owners at the point of sale. *Veterinary Record*, *168*(13), 353. https://doi.org/10.1136/vr.c6191

Faver, C. A. (2010). School-based humane education as a strategy to prevent violence: Review and recommendations. *Children and Youth Services Review*, *32*(3), 365–370. https://doi.org/10.1016/j.childyouth.2009.10.006

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). SAGE.

Glanville, C., Abraham, C., & Coleman, G. (2020). Human behavior change interventions in animal care and interactive settings: A review and framework for design and evaluation. *Animals*, *10*(12), 2333. https://doi.org/10.3390/ani10122333

Hawes, S., Kerrigan, J., & Morris, K. (2018). Factors informing outcomes for older cats and dogs in animal shelters. *Animals*, *8*(3), 36. https://doi.org/10.3390/ani8030036

Hawkins, R. D., Ferreira, G. A. R. M., & Williams, J. M. (2019). The development and evaluation of "Farm Animal Welfare": An educational computer game for children. *Animals*, *9*(3), 91. https://doi.org/10.3390/ani9030091

Hawkins, R. D., Hatin, B. D., & Revesz, E. O. (2021). Accuracy of canine vs. human emotion identification: Impact of dog ownership and belief in animal mind. *Human–Animal Interaction Bulletin*, (2021). https://doi.org/10.1079/hai.2021.000

Hawkins, R. D., Hatin, B. D. M., & Révész, E. O. (2022). Accuracy of canine vs. human emotion identification: Impact of dog ownership and belief in animal mind. *Human–Animal Interaction Bulletin*, *12* (2), 1–18.

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., & 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

Hawkins, R. D., Williams, J. M., & Scottish SPCA. (2017a). Childhood attachment to pets: Associations between pet attachment, attitudes to animals, compassion, and humane behavior. *International Journal of Environmental Research and Public Health*, *14*(5), 490. https://doi.org/10.3390/ijerph14050490

Hawkins, R. D., Williams, J. M., & Scottish SPCA. (2017b). Assessing effectiveness of a nonhuman animal welfare education program for primary school children. *Journal of Applied Animal Welfare Science*, *20*(3), 240–256. https://doi.org/10.1080/10888705.2017.1305272

Hawkins, R. D., Scottish SPCA, & Williams, J. M. (2020a). The development and pilot evaluation of a "serious game" to promote positive child–animal interactions. *Human–Animal Interaction Bulletin*, *8*(2), 68–92.

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

Izard, C. E. (1971). *The face of emotion*. Appleton-Century-Crofts.

Jamieson, J., Reiss, M. J., Allen, D., Asher, L., Wathes, C. M., & Abeyesinghe, S. M. (2012). Measuring the success of a farm animal welfare education event. *Animal Welfare*, *21*(1), 65–75. https://doi.org/10.7120/096272812799129402

Johnson, R. A., Odendaal, J. S. J., & Meadows, R. L. (2002). Animal-assisted interventions research: Issues and answers. *Western Journal of Nursing Research*, *24*(4), 422–440. https://doi.org/10.1177/019459020240040009

Krippendorff, K. (2018). *Content analysis: An introduction to its methodology*. SAGE.

Lakestani, N., Aguirre, V., & Orihuela, A. (2015). Farm animal welfare and children: A preliminary study building an attitude scale and evaluating an intervention. *Society & Animals*, *23*(4), 363–378. https://doi.org/10.1163/15685306-12341370

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

Martens, P., Enders-Slegers, M. J., & Walker, J. K. (2016). The emotional lives of companion animals: Attachment and subjective claims by owners of cats and dogs. *Anthrozoös*, *29*(1), 73–88. https://doi.org/10.1080/08927936.2015.1075299

McDonald, S. E., Vidacovich, C., Ascione, F. R., Williams, J. H., & Green, K. E. (2015). The Children's Treatment of Animals Questionnaire: A Rasch analysis. *Anthrozoös*, *28*(1), 131–144. https://doi.org/10.2752/089279315X14129350722172

Mellor, D. J., Beausoleil, N. J., Littlewood, K. E., McLean, A. N., McGreevy, P. D., Jones, B., & Wilkins, C. (2020). The 2020 Five Domains Model: Including human–animal interactions in assessments of animal welfare. *Animals*, *10*(10), 1870. https://doi.org/10.3390/ani10101870

Muldoon, J. C., & Williams, J. M. (2021a). Establishing consensus on the best ways to educate children about animal welfare and prevent harm: An online Delphi study. *Animal Welfare*, *30*(2), 179–195. https://doi.org/10.7120/09627286.30.2.179

Muldoon, J. C., & Williams, J. M. (2021b). The challenges and future development of animal welfare education in the UK. *Animal Welfare*, *30*(2), 197–209. https://doi.org/10.7120/09627286.30.2.197

Muldoon, J. C., & Williams, J. M. (2021c). *The animal welfare education for children toolkit*. https://www.ed.ac.uk/sites/default/files/atoms/files/the_animal_welfare_education_for_children_toolkit.pdf

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

Muldoon, J., Williams, J., Lawrence, A., Lakestani, N., & Currie, C. (2009). *Promoting a "duty of care" towards animals among children and young people – A literature review and findings from initial research to inform the development of interventions*. Child and Adolescent Health Research Unit, University of Edinburgh, Defra. https://www.pure.ed.ac.uk/ws/portalfiles/portal/5277504/Defra_Yr1Report_Sep09.pdf

PDSA. (2022). *PAW PDSA animal wellbeing report 2022: The essential insight into the wellbeing of UK pets*. https://www.pdsa.org.uk/media/12965/pdsa-paw-report-2022.pdf

Pratiwinindya, R. A., Alfatah, N., Nugrahani, R., Triyanto, T., Prameswari, N. S., & Widagdo, P. B. (2021). The use of interactive multimedia to build awareness against animal exploitation in environmental conservation education for children. *IOP Conference Series: Materials Science and Engineering*, *1098*(3), 032019 https://doi.org/10.1088/1757-899X/1098/3/032019

RSPCA. (2021). *Understanding dog behaviour*. https://www.rspca.org.uk/adviceandwelfare/pets/dogs/behaviour/understanding

Scandurra, C., Santaniello, A., Cristiano, S., Mezza, F., Garzillo, S., Pizzo, R., Menna, L. F., & Bochicchio, V. (2021). An animal-assisted education intervention with dogs to promote emotion comprehension in primary school children—The Federico II Model of Healthcare Zooanthropology. *Animals*, *11*(6), 1504. https://doi.org/10.3390/ani11061504

Sprinkle, J. E. (2008). Animals, empathy, and violence: Can animals be used to convey principles of prosocial behavior to children? *Youth Violence and Juvenile Justice*, *6*(1), 47–58. https://doi.org/10.1177/1541204007305525

Stern, C., & Chur-Hansen, A. (2013). Methodological considerations in designing and evaluating animal-assisted interventions. *Animals*, *3*(1), 127–141. https://doi.org/10.3390/ani3010127

Stetina, B. U., Turner, K., Burger, E., Glenk, L. M., McElheney, J. C., Handlos, U., & Kothgassner, O. D. (2011). Learning emotion recognition from canines? Two for the road. *Journal of Veterinary Behavior*, *6*(2), 108–114. https://doi.org/10.1016/j.jveb.2010.11.004

Stockman, J., Fascetti, A. J., Kass, P. H., & Larsen, J. A. (2013). Evaluation of recipes of home-prepared maintenance diets for dogs. *Journal of the American Veterinary Medical Association*, *242*(11), 1500–1505. https://doi.org/10.2460/javma.242.11.1500

Thompson, K., & Gullone, E. (2003). The Children's Treatment of Animals Questionnaire (CTAQ): A psychometric investigation. *Society & Animals*, *11*(1), 1–15. https://doi.org/10.1163/156853003321618800

Veterinary Behavior Team. (2021). *The many faces of stress in dogs*. https://www.vetbehaviourteam.com/client-handouts

Wauthier, L., & Williams, J. M. (2021). Understanding and conceptualizing childhood animal harm: A meta-narrative systematic review. *Anthrozoös*, *35*(2), 165–202. https://doi.org/10.1080/08927936.2021.1986262

Westgarth, C., Boddy, L. M., Stratton, G., German, A. J., Gaskell, R. M., Coyne, K. P., Bundred, P., McCune, S., & Dawson, S. (2013). Pet ownership, dog types and attachment to pets in 9–10 year old children in Liverpool, UK. *BMC Veterinary Research*, *9*(1), 102. https://doi.org/10.1186/1746-6148-9-102

Williams, J. M., Cardoso, M. P., Zumaglini, S., Finney, A. L., Scottish SPCA, & Knoll, M. A. (2022). "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

Wilson, C. C., & Barker, S. B. (2003). Challenges in designing human–animal interaction research. *American Behavioral Scientist*, *47*(1), 16–28. https://doi.org/10.1177/0002764203255208

Worsley, H. K., & O'Hara, S. J. (2018). Cross-species referential signalling events in domestic dogs (*Canis familiaris*). *Animal Cognition*, *21*(4), 457–465. https://doi.org/10.1007/s10071-018-1181-3

Zilocchi, M., Tagliavini, Z., Cianni, E., & Gazzano, A. (2016). Effects of physical activity on dog behaviour. *Dog Behaviour*, *2*(2), 9–14. https://doi.org/10.4454/db.v2i2.34