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Development and Evaluation of the Animal Welfare Pilot Program

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Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Abstract

Purpose: This study aims to address the lack of research and intervention development specific to animal neglect offences, which are often conflated with intentional animal abuse in the literature. The study seeks to understand the psychological and behavioural factors underpinning animal neglect and evaluate the effectiveness of a newly developed Animal Welfare Pilot Intervention Programme delivered by the RSPCA.

Design/Methodology/Approach: A sample of 50 adults convicted of animal welfare offences participated in the intervention. A pre- and post-intervention design was used to assess changes in animal welfare knowledge, empathy, attitudes towards animals, impulsivity, and emotion regulation.

Findings: At baseline (Time 1), participants demonstrated difficulties in emotion regulation, empathy, and holding supportive attitudes towards animals. Post-intervention (Time 2), statistically significant improvements were observed in participants' animal welfare knowledge, attitudes toward animals, and impulsivity. No significant changes were found in measures of empathy and emotion regulation.

Practical Implications: The findings provide initial support for the RSPCA's Animal Welfare Pilot Intervention Programme in addressing knowledge gaps and attitudinal change in individuals convicted of animal neglect. However, the lack of change in empathy and emotion regulation suggests further adaptation of the programme is required to target these areas more effectively.

Originality/Value: This study contributes to a largely underexplored area of forensic psychology by focusing specifically on animal neglect rather than abuse. It is the first known evaluation of

an intervention tailored for this offence type and offers important insights for the development of targeted, evidence-based responses to animal neglect within the criminal justice system.

Keywords: Animal neglect, animal abuse, intervention, empathy, emotion regulation, impulsivity.

Development and Evaluation of the Animal Welfare Pilot Intervention Program

In the United Kingdom, nearly 200,000 reports of animal abuse are investigated each year by the Royal Society for the Prevention of Cruelty of Animals (RSPCA, 2019). Animal abuse encompasses a multitude of behaviors that fall into one of two categories: active and passive. Active animal abuse can be defined as "all socially unacceptable behavior that intentionally causes unnecessary pain, suffering or distress and/or death to an animal" (Ascione, 1993, p. 83). Examples of this type of intentional harm are beating, strangling, and stabbing an animal victim (Levitt, Hoffer, and Loper, 2016). Passive forms of animal abuse, as the word indicates, refers to the *withholding* of care required for an animal's survival (i.e., neglect). This category of animal abuse consists of denying an animal access to necessities such as food, water, shelter, and veterinary care (Levitt et al., 2016).

Research involving individuals who offend against animals is inherently challenging, as this population is difficult to access, due to factors such as the "dark figure" of crime whereby many such offences go undetected or unreported. Addington and Randour (2022) noted that even when such offences are detected, only a small proportion result in an arrest. Their examination of 2017-2018 data from the FBI's National Incident-Based Reporting System found that 35% of intentional cruelty incidents resulted in an arrest, with the proportion of arrests in neglect cases even lower (25%). Much of the existing literature has focussed on active forms of abuse (Alleyne and Parfitt, 2019), leaving practitioners without an evidence base to develop effective intervention strategies for working with individuals who engaged in passive and neglectful abuse. Oftentimes, animal neglect can be attributed to a lack of awareness of the extent of caring responsibilities. One in four owners have admitted to not conducting enough research into these responsibilities prior to acquiring their pet (PAW, 2020). However, further research is needed to

elaborate on the reasons why this animal neglect occurs and to highlight the factors that facilitate this type of offending. To this end, the aim of the current study is two-fold: (1) to examine the psychological factors associated with animal neglect, and (2) to evaluate the effectiveness of a newly developed intervention programme targeted at individuals convicted of animal welfare offences, specifically animal neglect.

The existing literature's focus on active/intentional animal abuse offers key insights and starting points to generate hypotheses regarding the psychological correlates of animal neglect. For example, Parfitt and Alleyne (2018b) theorized that the perpetration of animal abuse (active or passive) is the outcome of maladaptive emotion regulation strategies. Specifically, they argued that animal abuse is the behavioral manifestation of either under-regulation or mis-regulation. However, this conceptualization was based on the existing literature devoted to active forms of animal abuse. Nonetheless, emotion regulation has been a priority treatment target in offending rehabilitation programs more widely (Bowen et al., 2014; Garofalo et al., 2016). As such, there presents an opportunity to test the hypothesis that people who engage in animal neglect share the same/similar treatment needs as people who offend in other ways. Emotion regulation is also a suitable pivot point to investigate other, related psychological factors such as empathy, self-regulation /impulsivity, and personality traits.

Empathy – defined as "the ability to understand and share in another's emotional state or context" (Cohen and Strayer, 1996, p. 988) – has been examined extensively in the animal abuse literature (Alleyne and Parfitt, 2018b; Erlanger and Tsytsarev, 2012; Gupta, 2008; Henry, 2006). The assumption has been that people who harm animals are less likely to believe animals are sentient or that animals can feel like humans do (e.g., emotional distress, physical pain; Carlisle-Frank et al., 2004; Valtonen et al., 2023), which would neutralise or mitigate any cognitive

dissonance that would typically result from causing harm to another living being. Valtonen et al.'s (2023) study on neutralisation techniques found that one-third of defendants charged with violent animal welfare offences distorted facts and denied causing injury to the animal, and 37% denied responsibility for the harm by blaming the circumstances. There have also been some key findings that enable inferences to be made regarding the relationship between empathy and animal neglect, specifically. Henry (2006) found that empathy differentiated people who abused animals from non-abusers. Moreover, the "caregiving" subscale of the Attitudes Toward the Treatment of Animals scale (Henry, 2004) also differentiated these two groups. This subscale included items such as "How much would it bother you to think about someone failing to provide domestic stock animals or companion animals with food or water for 24 hours?" Taken together, these findings indicate that people who engage in active forms of animal abuse are lower on empathy and experience less cognitive dissonance when thinking about animal neglect (Carlisle-Frank et al., 2004; Henry, 2006; Valtonen et al. 2023). However, to date, the literature has not examined levels of empathy in a sample of people who have engaged in animal neglect.

Self-regulation, in particular impulsivity, has also received some attention in the animal abuse literature. Typically, active animal abuse has been viewed as an impulsive behavior due to an inability to regulate one's emotions (Parfitt and Alleyne, 2018b). For example, Newberry (2018) found that specific aspects of animal abuse correlated with specific elements of impulsivity. They found that people who used animal harm to retaliate against and/or control another person were more likely to beat/kick the animal. Furthermore, a proclivity to engage in severe/violent types of animal abuse has been positively correlated with impulsivity; whereas, a proclivity to engage in other types of less severe/passive forms of animal abuse (i.e., neglect) has been negatively correlated with neuroticism indicating less emotional instability (Parfitt and

Alleyne, 2018a). Taken together, these findings suggest that animal neglect might be the result of a mis-regulation of emotions and behavior. However, the directions of the correlations remain unclear and form the basis for testing hypotheses in the current study.

The Current Study

The literature on animal abuse broadly points to a series of psychological factors that facilitate the behavior, though the evidence base for factors specific to passive and neglectful animal abuse remains underdeveloped. One of the aims of this study is to examine the relationships between animal neglect and factors drawn from the animal abuse and wider offending behavior literature. Emotion regulation and related factors such as empathy, impulsivity, and personality were assessed in a sample of individuals convicted of animal welfare offences. In addition to examining these factors, this study is an evaluation of the effectiveness of the RSPCA's Animal Welfare Pilot Intervention Program (Blakey and Sullivan, 2017). This psycho-educational program was designed to increase participants' knowledge of animal welfare issues and empathy towards animals, as well as improve general attitudes towards animals. It was hypothesized that the program would also reduce impulsivity and emotion regulation issues.

Method

Participants

G*Power indicated that a minimum sample size of 40 participants was required to achieve a power of .80 for a within-subjects ANOVA. We employed purposive sampling methods and recruited 50 participants from the Probation Service. To be eligible for the study, participants had to (1) be convicted of an animal welfare offence, and (2) be on a Community

Order with a minimum of five Rehabilitation Activity Requirement (RAR)[1] days to complete the RSPCA's Animal Welfare Pilot Intervention Program. The mean age of participants was 40.32 (*SD* = 13.88, range = 18-72), and 50% were men.

Design

This study was a single arm pilot for the RSPCA's Animal Welfare Intervention Programme in which changes pre- and post-intervention were measured. The study used a within-subjects design as all participants took part in both the pre- and post-intervention measures (i.e., emotion regulation, impulsivity, empathy, attitudes toward animals, and animal welfare knowledge). The within-subject design allows for the assessment of change over time and is commonly employed in applied forensic contexts where controlled designs are often unfeasible due to ethical and logistic constraints.

Materials

Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer, 2004). This measure examines difficulties associated to emotion regulation, including problems with emotional awareness, clarity, and regulation strategies, and contains 36 items such as "I am clear about my feelings" with the following Likert-type response options: 1 (almost never) to 5 (almost always). Items were scored in accordance with published guidelines – 11 items were reverse-scored and all items were then summed to produce a total score, with higher scores reflecting greater problems with emotion regulation. The original scale has been widely used and has demonstrated excellent internal consistency (α = 0.93), with a similar level of reliability in this study (α = 0.95; Gratz and Roemer, 2004).

[1] RAR is a pre-planned activity, typically designated by the court, that addresses a specific rehabilitative need (Ministry of Justice, 2019). However, participation in the programme and study was voluntary. If a participant decided that they no longer wanted to take part, they would revert back to their normal supervision plans.

Barratt Impulsivity Scale (BIS-11; Patton, Stanford and Barratt, 1995). Impulsivity was measured using this 30 item scale, which captures attentional, motor, and non-planning aspects of impulsive behaviour. Items such as "I plan tasks carefully" are measured on a Likert-type scale (1 = rarely/never, 4 = almost always/always). Items were scored, including reverse-scoring where appropriate, and summed to produce total scores, with higher scores indicating greater levels of impulsivity. In past research, the BIS-11 scale demonstrated good reliability (α = 0.79 to α = 0.83; Patton, Stanford and Barratt, 1995), with a similar reliability level obtained in this study (α = 0.88).

Empathy Quotient (Baron-Cohen and Wheelwright, 2004). Empathy, including both cognitive and affective components, was measured using a 40 item scale consisting of items such as "I can easily tell if someone else wants to enter a conversation" (response options: 2 = strongly agree, 1 = slightly agree, slightly disagree & disagree = 0). Following the measurement guidelines, 19 items were reverse-scored before all items were summed, with higher total scores indicating higher levels of empathy. The measure has strong reliability (α = 0.97; Baron-Cohen and Wheelwright, 2004), with similar results in the current study (α = 0.87).

Attitudes towards Animals Scale (AAS-20; Herzog, Betchart and Pittman, 1991). This scale measures pro-animal welfare attitudes, including beliefs about animal use and willingness to engage in action to help animals. The AAS-20 contains 20 items such as "It is morally wrong to hunt wild animals just for sport" (1 = strongly disagree, 5 = strongly agree). Again, appropriate items were reverse-coded and all items were summed, with higher total scores indicating more pro-animal welfare attitudes. The AAS-20 has been found to be reliable (α = 0.88; Herzog, Betchart and Pittman, 1991), and this was corroborated in this study (α = .91).

Animal Welfare Questionnaire (Blakey and O'Sullivan, 2017). To assess animal welfare knowledge, a scale was designed specifically for the current study. It consists of 10 items using a combination of quantitative and qualitative items and was created to measure the extent to which individuals understand animal welfare concerns. Quantitative items include "All animals (those with a backbone) can experience feelings similar to people" (agree, unsure, disagree). The qualitative section includes items such as "For each of these pictures write down what you would change, if anything, in order to ensure the needs of the animal were being met." These qualitative items were intended for exploratory purposes; however, these were not included in the present analyses as they fell outside the scope of the study's hypotheses, which focused on quantitative changes in animal welfare knowledge. When calculating reliability for the quantitative items, results indicated poor internal consistency (α = .63).

Procedure

Ethical approval for the study design and materials was granted by the first author's University Ethics Committee. Prior to beginning the study and intervention program, information sheets and consent forms were provided by the RSPCA's Adult Intervention Facilitator which contained information on the procedures of the intervention program, the purpose of the intervention program, the right to withdraw at any point during the intervention, and contact information of the data protection team at the RSPCA. Participants were adults convicted of an animal welfare offence against their own pets/animals in their care. Once they had consented to take part in the study, they were given a series of questionnaires assessing emotion regulation, impulsivity, empathy, attitudes towards animals, and levels of understanding of animal welfare. Following the questionnaires, they took part in the RSPCA's Animal Welfare Pilot Intervention Program. The pilot program consisted of two modules completed across a total of five sessions,

delivered weekly by the RSPCA's Adult Intervention Facilitator. The format of delivery was one-to-one in an office located at the Probation Service where participants would normally have meetings as part of their Community Order.

Module one consisted of three sessions. Session one addressed the understanding of animal needs (as outlined by Section 9 of the Animal Welfare Act). The facilitator guided the discussion around participants' own offences and framed the discussion around participants' understanding of animal needs in wider contexts. Session two addressed the sentience of animals and their ability to feel a wide range of emotions (as outlined by Section 4 of the Animal Welfare Act). Session three focussed on responsible pet ownership which tied the previous two sessions together and explored what it means to be responsible when owning a pet.

Module two consisted of the final two sessions. The first session addressed the recognition and management of emotions, which included exploring the link between poor emotion recognition/control and the participant's offending behavior. This session also explored decision making/consequences and investigated the impact of past emotion and behavior on the offence. The second session focused on the offence process and how thoughts, feelings, and behaviors contributed to the participant's offending. The session explored the opportunities for problem solving and how to access helpful strategies if confronted by a similar set of circumstances in the future.

Once the program was concluded, participants were asked to complete the series of questionnaires again to assess for any changes. They were then suitably debriefed. This involved both verbal and written debriefing (i.e., explaining what the study was about, offering contacts for support services if needed, etc.).

Results

The data were entered into IBM SPSS Statistics Version 28 where all of the analyses were conducted using a $p < .05$ level of significance.

First, participants' responding at Time 1 was examined in comparison to normative data (Table 1). Although these comparison samples are not directly equivalent to the current sample, the figures offered in Table 1 provide a contextual reference point for each of the measures utilised[2]. On observation, the study sample had a pattern of responding indicating: difficulties in emotion regulation, lower levels of empathy (with similar levels to the sample of individuals with high-functioning autism in Baron-Cohen and Wheelwright's (2004) original paper), and fewer supportive attitudes towards animals. Regarding impulsivity, the study sample mean was marginally higher than normative data, but lower than a clinical inpatient mean, suggesting some potential problems with impulsivity, but not to the extent as those typically admitted to hospital.

A correlation analysis was conducted (see Table 2 for matrix) to see whether the psychological variables assessed at Time 1 (emotion regulation, impulsivity, empathy, animal attitudes, and animal welfare knowledge) were associated with the demographic variables (age and gender). Neither age nor gender were significantly correlated with the psychological variables. A significant correlation was found only between emotion regulation and impulsivity.

Finally, a series of repeated measures ANOVAs were conducted to test for differences in participants' responses on the questionnaires pre- and post-intervention (see Table 3 for *F* statistics and estimated marginal means). Results indicated that scores on both impulsivity (when controlling for age) and animal welfare knowledge were significantly lower after participants completed the intervention. Lower values on impulsivity indicated an improvement on

[2] The intention was not to imply that these groups constitute matched comparison samples, but rather to provide contextual reference points to aid interpretation of the observed scores in the absence of established forensic norms for these measures.

participants' ability to self-regulate. Equally, due to reverse coding, the lower values in animal welfare knowledge indicated *more* acquired knowledge post-intervention. Significant differences were not found between pre- and post- intervention for the other psychological variables (specifically, emotion regulation, empathy, and animal attitudes).

Discussion

The aim of the current study was to assess whether similar patterns of responding existed within a sample of individuals convicted of animal neglect offences compared to the wider literature, and to evaluate the effectiveness of the RSPCA's Animal Welfare Pilot Intervention Program. Relative to the respective measurement scores in normative samples, the data suggests that participants in this study could be characterized by higher levels of difficulties regulating emotions, lower levels of empathy, and more problematic attitudes towards animals. Although there are no universally established or validated clinical cut-off scores for the DERS, a recent review by Bartholemew et al. (2025) noted that scores of 88 and above (in the 76% percentile) would be classified as high severity, which aligns with the mean score of 87.55 obtained for the current sample. Similarly, the mean empathy score of 22.26 obtained in this sample is more strongly aligned with means in samples of individuals with high-functioning autism (M=20.4) compared to community samples (M=42.1). However, it is important to clarify that the present findings do not provide evidence that participants in the current sample had autistic characteristics, nor do they suggest that autism or autistic characteristics explain animal neglect.

These findings offer support to the hypothesis that individuals convicted of neglecting animals share similar psychological characteristics to people who offend in other ways (including lower empathy and higher emotion regulation problems as found in violent and aggressive individuals; Garofalo et al., 2016), as well as people who commit active forms of

animal abuse (Alleyne and Parfitt, 2018). These findings also provide justification for the design of the pilot intervention and its intended treatment targets - emotion regulation, empathy, and animal welfare knowledge and attitudes.

When the data were statistically analysed, no significant correlations were found between demographic variables (age and gender) and the five independent variables: animal welfare knowledge, empathy, emotion regulation, impulsivity, and animal attitudes. There was, however, a correlation between emotion regulation and impulsivity - those who scored high on emotion regulation (indicating greater issues with emotion regulation) also scored high on impulsivity. This result was consistent with the theorizing of Parfitt and Alleyne (2018b) whereby they argued that animal abuse is the outcome of maladaptive emotion regulation and that animal abuse is a likely impulsive, behavioral response.

Further, when within-subjects changes as a result of the animal welfare intervention were examined, results showed that knowledge of animal welfare significantly increased from pre-intervention to post-intervention. Based on this finding, it is possible to conclude that participants learned and retained information regarding animal welfare needs. Given that one in four owners admit to not researching enough on the caring needs of their pets prior to acquiring them (PAW, 2020), this increase in knowledge within this sample could lead to a reduction in future offending of this nature. The first module of the intervention consisted of educational and legal information on animal welfare, including information on the Animal Welfare Act (2006), as well as information regarding animal sentience and responsible pet ownership. This may also explain why participants had more positive attitudes towards animals post-intervention.

The pre- and post-intervention analysis of data also showed a reduction in impulsivity when controlling for age. There are two possible explanations for this finding, neither mutually

exclusive. It is possible that there was an age effect whereby younger participants, who are typically more impulsive (Ray and Jones, 2023), naturally became less impulsive as the programme progressed. However, given the short timeline, this conclusion is less likely. An alternative explanation is that the programme was effective in reducing impulsivity amongst younger participants. Future research should include a matched (by age) comparison group to isolate where the reduction came from.

Although the descriptive examination of participants' scores on emotion regulation and empathy suggested more problems at Time 1 relative to normative samples, it appears that the programme did not make any shifts in these areas. These findings would suggest some revisions might be needed to better target these needs. For example, the use of virtual reality (VR) has been shown to be effective in the development of adaptive emotion regulation strategies (Montana et al., 2020). In terms of increasing empathy towards animals, the use of VR could also be incorporated in relation to individuals' understanding of animal sentience, with strong evidence for the effectiveness of simulation and perspective-taking interventions in increasing both experienced and expressed empathy (Weisz and Zaki, 2017). Research suggests mood and empathy for animals positively correlate with punishment recommendations for animal abusers, because participants in better moods recommended harsher punishments for animal offenders, indicating more empathy (Waerstad et al., 2002). Thus, this intervention could combine techniques to attenuate emotion regulation difficulties and increase empathy to reduce risk of reoffending in this passive way (i.e., teaching those who have committed animal neglect offences how to regulate their emotions and manage their negative mood, in turn increasing empathy towards animals).

There is also an argument for a more preventative strategy. For example, there is a clear need to implement a strategy to increase animal welfare knowledge prior to acquiring a pet. To do this, there could be pre-purchase consultations that would raise awareness of the caring needs and responsibilities involved in pet ownership. According to veterinary professionals, the two most important issues that surround owning dogs are welfare at breeding establishments (e.g., puppy farms), and poor choice of breed for the owner's lifestyle (PSDA, 2020). If individuals are made aware of these issues beforehand, they may be able to make a more informed decision on which animal will suit their lifestyle and how to look after the animal adequately. Additionally, consistent with work by Monsalve et al. (2018; 2023) which identified socioeconomic disadvantage and vulnerability as potential risk factors for animal neglect, utilising a One Welfare perspective in preventive strategies may be beneficial. This emphasises provision of accessible support, such as pre-acquisition guidance, community resources, and integrated social and veterinary services, to address underlying challenges affecting both human and animal well-being, which may consequently help mitigate neglect while preserving the benefits of companion animal relationships.

This study is not without limitations. One limitation of the study is that, due to the recruitment approach via Probation Officer referrals, it was not possible to determine the total number of individuals who were exposed to the study invitation and therefore eligible to participate, preventing calculation of uptake rates. However, we did achieve a sample size at Time 1 above what was recommended in our a priori power analysis. It is also important to note that our sample size ($N = 50$) does still restrict our ability to generalise to the wider population. Further, statistical power was reduced due to the amount of missing data in this study. Attrition (and associated biases) is expected when conducting research with hard-to-reach forensic

populations, such as the one in the current study (Western et al., 2016). Also, there may be low internal validity due to the design of this intervention study. For example, the changes observed in animal welfare knowledge, attitude towards animal and impulsivity could be from other confounding variables rather than the intervention itself. As the Animal Welfare Questionnaire was newly developed for this study, there are no existing normative data or prior studies available for comparison, which limits the ability to contextualise findings. Also, the use of a 3-point response scale, while intended to maximise accessibility and comprehension for the study population, may have reduced sensitivity. As with all self-report measures, it must be acknowledged that responses may be influenced by factors such as self-perception and social desirability (Spaans et al., 2017). In particular, although the Empathy Quotient provides a useful and widely used measure of empathy, it may not fully capture the multidimensional nature of the construct, including distinctions between cognitive, affective, and behavioural aspects of empathy and contemporary research has cautioned against interpreting lower scores on self-report empathy measures as evidence of a general absence of empathic capacity (Kimber, Verrier and Connolly, 2023; Lima and Osório, 2017).

There are recommended improvements to study design that can control for these limitations. For example, to address the limitations with the Animal Welfare Questionnaire, future research may benefit from the use of more fine-grained response options. We would also like to see future intervention studies include a comparison group of individuals who meet the inclusion criteria for the intervention but do not complete the intervention. This would allow conclusions to be made about the intervention itself and remove concern of influence from confounds. It would also be useful to directly compare the effectiveness of the intervention for individuals who commit active animal to those who commit passive animal abuse. Given the

similarities in the psychological characteristics of individuals who commit active and passive animal abuse, it is possible that rehabilitative intervention programmes for passive animal abuse may be appropriate for individuals convicted of active animal abuse, and vice versa; though further research with direct comparison groups are required. Furthermore, future longitudinal research following up at 6-month and 12-month intervals is strongly encouraged to assess the longevity of the intervention effects.

While developing effective interventions to address animal neglect offer clear benefits for improving animal welfare, including improvements in care practices that support animals' health and quality of life, such interventions may also yield wider societal benefits. Changes in pro-animal welfare knowledge and impulsivity suggest potential mechanisms through which such interventions may reduce risk of animal neglect offending. Additionally, while broader factors such as social vulnerability were not directly addressed, future developments could usefully integrate these dimensions within a One Welfare framework to maximise impact at both the animal and societal level (Monsalve et al., 2023).

To conclude, past research into animal offending has mainly focused on intentional animal abuse and has failed to examine unintentional animal neglect. Even research that has used a measure of unintentional animal neglect has not distinguished between the two types of abuse. This means there is a severe lack of research into an offence which causes significant suffering to animals, and is largely preventable. The RSPCA's Animal Welfare Pilot Intervention Programme aimed to address the lack of treatment options for those who have committed unintentional animal neglect offences. Whilst it did show some positive shifts, the results of this study also indicate areas for future research and intervention developments. Ultimately, more

research regarding animal neglect offending needs to be done to aid the treatment of individuals who have committed this type of offending, and to prevent and reduce the suffering of animals.

Implications for practice

- Impulsivity and animal welfare knowledge show important potential as targets for rehabilitating individuals who neglect animals.
- Preventive policy should prioritise early, accessible interventions, such as pre-acquisition consultations and public education on animal care, which support pet owners by addressing knowledge gaps and increasing the accessibility of social and veterinary support.
- There is a need for further research to robustly evaluate the effectiveness of interventions targeting both passive and active forms of animal abuse, particularly focusing on empathy and emotion regulation.

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Table 1.

Time 1 mean sum scores and normative comparisons

Variables	Study Mean	Study SD	Normative Mean	Normative SD
Emotion regulation	87.55	29.12	Male = 80.66[1]	Male = 18.79
			Female = 77.99	Female = 20.72
Impulsivity	68.31	14.69	Norm = 63.82[2]	Norm = 10.17
			Clinical = 71.37	Clinical= 12.61
Empathy	22.26	22.28	Norm = 42.1[3]	Norm = 10.6
			Clinical = 20.4	Clinical= 11.6
Animal attitudes	50.10	9.01	Male = 63.8[4]	Male = 8.7
			Female = 69.5	Female = 9.1

[1]Normative data based on undergraduate sample (Gratz and Roemer, 2004).

[2]Data presented consists of an undergraduate sample (norm) and psychiatric inpatient sample (clinical; Patton et al., 1995).

[3]Data presented consists of a community sample (norm) matched by age and gender to the autism group (clinical; Baron-Cohen and Wheelwright, 2004).

[4]Normative data based on community sample (Signal and Taylor, 2006).

Table 2.

Bivariate correlations between variables

Variables	1	2	3	4	5	6	7
1. Gender	1						
2. Age	.18	1					
3. Emotion regulation	.17	.31	1				
4. Impulsivity	.25	.25	.59*	1			
5. Empathy	.07	.29	-.001	-.04	1		
6. Animal attitudes	.13	.12	-.16	-.32	-.10	1	
7. Animal welfare knowledge	.04	.24	.001	.07	.24	.35	1

*Correlation is significant at the .001 level (2-tailed).

Table 3.

Estimated marginal means for psychological variables

		M	*SE*	*F*	*df*	*p*	η^2
Emotion regulation	Pre	1.57	.40	3.12	1,29	.088	.015
	Post	1.42					
Impulsivity	Pre	1.82	.26	4.82	1,29	.036	.018
	Post	1.79					
Empathy	Pre	2.69	.19	1.39	1,18	.254	.009
	Post	2.63					
Animal attitudes	Pre	3.40	.17	45.22	1,20	<.001	.657
	Post	2.11					
Animal welfare knowledge	Pre	1.77	.14	10.61	1,37	.002	.077
	Post	1.59					