From Pets to Pests: Testing the Scope of The 'Pets as Ambassadors' Hypothesis

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Abstract

Positive relationships with pets can sometimes foster more positive judgments of other animals. The present study sought to examine the scope of this 'Pets as Ambassadors' effect in relation to four meaningful animal categories (companion, farmed, predators, and pests) derived from the Animal Images Database (Animal.ID). The Animal.ID contains ratings from 376 Portuguese individuals on pet attachment and several dimensions related to animal attributes and moral concern for 120 different animals, which offered insights into the scope and nature of the pets as ambassadors effect. Pet attachment was related positively to ethical concern for animals and lower levels of speciesism. The relationship between pet attachment and animal attributions were expressed, beyond companion animals, most consistently for predators and farmed animals, and least of all pests. The benefits of pet attachment centered mostly on aesthetic judgments and benevolent feelings towards predators and farmed animals, sentience attributions for pests, and concerns about the killing of all animal groups for human consumption. Pet attachment did not reliably relate to the attributions individuals made about the intelligence or dangerousness of animals, or their similarity to humans. The findings help clarify how pets might serve as ambassadors for other animals.

Keywords: pet attachment, human-animal relationships, human-animal interaction; Pets as Ambassadors, attitudes toward animals

Introduction

Several lines of research have converged on the finding that prolonged contact with an animal in one's care has the potential to engender and expand concern for other animals more generally (Auger & Amiot, 2017; Paul & Serpell, 1992, 1993). This is sometimes referred to as the Pets as Ambassadors hypothesis (Serpell & Paul, 1994). Studies into this phenomenon have at times yielded mixed findings. Some studies have demonstrated positive benefits of owning a pet on, for example, attributions of sentience and emotion to animals (Hawkins & Williams, 2016; Morris et al., 2012) or concern for their treatment (Prokop & Tunnicliffe, 2010). However, other studies have observed little to no effects of owning a pet on such measures (Knight et al., 2004; Taylor & Signal, 2005).

Arguably, the most far-reaching outcomes of owning a pet seem to occur for individuals who have formed emotional attachments with their pets (Budge et al., 1998; Hawkins et al., 2017; Poresky & Hendrix, 1990). For instance, Rothgerber and Mican (2014) observed among an adult sample that owning a pet was unrelated to meat avoidance (arguably, a measure of concern for farmed animals), yet pet attachment did predict meat avoidance via empathy for animals. Likewise, Hawkins and Williams (2016) found that belief in animal minds was particularly great among children who formed deep bonds with their pets.

The emotional bond people experience towards their pets might generalize to other animals by way of *animal identification*, whereby individuals come to identify more deeply with 'animals' as a broader, relational category (Auger & Amiot, 2017, 2019a, 2019b). For instance, Auger and Amiot (2019a) found that individuals who reported frequent contact with pets reported lower anxiety about interacting with animals and were more likely to see animals as an organizing feature of their own

identity. Perceiving a common identity with animals, in turn, predicted feeling positively about animals as a general category (see also Auger & Amiot, 2017).

Exploring the Scope of the Pet as Ambassadors Hypothesis

It is thus becoming increasingly clear that forming an emotional bond with a companion animal can have several generalizing benefits for other animals. Here we sought to explore in a more nuanced way how pet attachment might shape the attributions individuals form of other animals and the scope of the animals affected.

As alluded to above, most studies interested in pets as ambassadors have examined the impact of pet contact or attachment with the aim of determining whether contact with a particular animal or class of animals might foster positive attitudes with 'animals' as a superordinate category. For example, Auger and Amiot (2019b) examined the role of imagined contact in fostering a greater level of identification with 'animals' in this broad sense. Participants who imagined a positive interaction with a dog or cow, relative to a neutral task, were more likely to include the target animal class (i.e., companion or farmed animals) within the self (i.e., they viewed themselves as sharing an identity or overlapping properties with these animals) and they displayed more positive attitudes towards animals in general.

What remains unclear about the pets as ambassadors hypothesis is whether all animals might benefit equally from the conceptual and emotional spill-over that occurs when forming an attachment to a pet. It is possible that the generalization effects observed in past studies are limited to certain animal categories. At present, no systematic test of the scope of the hypothesis has been made, though several notable studies have utilized measures that extend beyond evaluations of 'animals' as a general category.

Paul and Serpell (1993) collected attitude ratings from UK-based university students using a treatment of animals questionnaire with subscales pertaining to the treatment of farmed, wild, and laboratory animals. They found positive relationships between the number of "important pets" a person reported and greater concern for the treatment of all three categories of animals. More extensively, Prokop and Tunnicliffe (2010) examined the knowledge and attitudes of Slovakian children towards three animal categories: pests, predators, and "disgusting animals" (associated with disease). They used a single animal exemplar for each category (potato beetle, wolf, and mouse, respectively), and contrasted children's knowledge and attitudes of these animals with that of animal counterparts for each target (i.e., ladybug for potato beetle, rabbit for wolf, squirrel for mouse). Children who owned pets tended to rate the animal targets more favorably, across all three animal comparisons than children without pets. Finally, Bjerke et al. (2003) surveyed Norwegian pet owners and non-pet owners about their like or dislike for 24 different urban animal species. Pet owners tended to report greater liking for each animal than non-pet owners, but this did not hold true for certain animals, such as mosquitoes, snails, and wasps, that were rated as highly "problematic" species.

The Present Study and Hypotheses

The present study sought to add to the current understanding of the scope of the Pets as Ambassadors Hypothesis. We capitalized on a large, pre-existing set of animal image ratings from the Animal Image Database (Animal.ID; Possidónio et al., 2019), and we allowed findings from the animal attribution literature to guide our thinking about which animals exemplify four psychologically meaningful and distinctive categories of animals: (1) companion animals, (2) predators, (3) farmed animals, and (4) pests. We sought to investigate the relationship pet attachment has

with attributions made of these four categories of animals, each of which elicit a mixture of emotions and attributions.

Research shows that conceptions of animals often fall into four categories. For instance, Sevillano and Fiske (2016) had participants rate sets of animals on traits relating to warmth (e.g., friendly, good-natured) and competence (e.g., intelligent, skillful), and via hierarchical cluster analysis observed four emergent categories that related to animals treated as companions (e.g., dog), that are farmed (e.g., cow), wild predatory animals (e.g., bear), and pests (e.g., rat). Similarly, Leite et al. (2019) had participants rate their moral concern for a set of 20 animals, and via factor analysis observed a four-factor solution that corresponded closely to that of Sevillano and Fiske. Both research teams found that companion animals tended to receive the most flattering attributions. These animals were attributed traits related to both warmth and competence and were met with feelings of delight, tenderness, and high moral concern (see also Amiot et al., 2019; Piazza et al., 2014). By contrast, predators—animals such as lions and wolves—were viewed as highly competent, but low on warmth (Sevillano & Fiske, 2016). Predators tended to evoke ambivalent emotions, a mixture of fear and awe, on account of the potential threat they pose to others and their considerable strength and ability. Farmed animals, such as cows, sheep, and pigs, tended to be rated in the middle on both warmth and competence, and the emotions they evoked were neutral. The least desirable category of animals was pests—animals such as spiders and cockroaches—who tended to be seen as low in competence and warmth. These animals are often the objects of disgust, fear and loathing, likely due to their association with disease and physical harm (Curtis et al., 2004; Serpell, 2004). Because predators, farmed animals, and pests have been shown to attract relatively

lower ratings of moral concern, and generate either mixed or negative emotions, they make suitable candidates to test the scope of pets as ambassadors hypothesis.

In the current study, we also sought to explore how pet attachment might shape the *kinds of attributions* individuals make of different animals. Pet attachment might promote broader concern for animals by enhancing the views people have about the richness of animals' mental and emotional lives, as has been found in some studies of children with pets (e.g., Hawkins & Williams, 2016). Pet attachment might further operate by reducing fears about the threat posed by different animals, as suggested by Prokop and Tunnicliffe (2010) who observed a relatively greater liking for "undesirable" animals among pet-owning children. Additionally, individuals with pets might come to appreciate the aesthetic qualities of animals more readily. Aesthetics is an important predictor of concern for animals – for instance, having cute or baby-like features enhances the likelihood of certain dogs being selected as pets (Weiss et al., 2012) and empathy for animals slaughtered for food (Piazza et al., 2018; Zickfeld et al., 2018). Finally, cultivating a bond with a pet might enhance the perception that animals share some overlapping properties with humans. Research suggests that appraisals of human similarity can promote concern for, for example, farmed animal lives (Bastian et al., 2012). Thus, it is possible that pets might operate as ambassadors by enhancing judgments of human-animal similarity.

To offer a rich, nuanced investigation into the hypothesis, we utilized ratings from Animal.ID database (Possidónio et al., 2019), which provides measurements of 120 animals on several attributional dimensions, including the extent to which an animal is thought to possess (a) thoughts and feelings (i.e., "mind"), (b) is similar to humans, (c) edible, (d) harmful, and (e) cute. The Animal.ID also provides ratings of the moral standing of animals connected to (f) the perceived acceptability of killing

animals for human consumption, and (g) feelings of care and protection, and it offers basic affective ratings related to (h) valence and (i) arousal, and (j) familiarity.

We hypothesized, consistent with past research (e.g., Auger & Amiot, 2017; 2019a) that pet attachment would relate to more positive attitudes towards animals in general. However, moving beyond more general measures, we expected that the benefits of pet attachment would apply differentially across animal categories. We speculated that predators and farmed animals would be the main beneficiaries of generalized pet attachment, as a function of their mixed attributional profile, whereas we did not expect pests to benefit as much from pet attachment, given their largely negative profile as an undesirable animal group. We made no predictions about what *form* the generalization effect would take for each animal category. Instead, we sought, in an exploratory manner, to elucidate which attributional dimensions are significantly related to pet attachment for each animal group. Central to this aim was exploring the extent to which pet attachment predicts the moral attitudes people hold of different animals. If pets are to be ambassadors for other animals, ultimately, this should be observable in the way animals are treated and held in regard (e.g., Paul & Serpell, 1993). Here, we considered whether pet attachment might relate to moral concern for certain animals more than others. To this end, the aforementioned items (f) and (g), related to the acceptability of killing animals and feelings of care, were of particular significance, and therefore, in our main analysis, were treated as our principal outcome variables.

Finally, as ancillary concerns, we tested the role of individual characteristics such as gender and diet alongside pet attachment. We expected women and meat avoiders (e.g., vegetarians) to overall exhibit more positive attitudes toward animals than men and meat consumers since past research has consistently found that, women

and meat avoiders hold more empathic attitudes towards animals (e.g., Graça et al., 2018; Herzog et al., 1991; Knight & Barnett, 2008; Knight et al., 2004; Piazza et al., 2015).

Method

Participants

The present study was considered by the host institution to be exempt from ethical review from the IRB. The sample was taken from Possidónio et al. (2019). The original report did not make use of pet attachment data. Therefore, the present study provides a new use of the data with four sub-groups of animal ratings. Our data includes a sub-set of 376 Portuguese participants (54% female), aged between 18 and 71 years old ($M = 28.23$, $SD = 10.09$). More than half of our sample (52.1%) had a higher education degree. Most participants reported including animals (meat or fish) in their diets (84.6%; *meat eaters*), whereas 5.4% followed a vegetarian diet and 2.2% followed a vegan diet (*meat avoiders*). Furthermore, participants reported living in predominantly urban areas ($M = 5.08$, $SD = 1.95$), $t(372) = 10.63$, $p < 0.001$. Participants reported having fairly frequent contact with farmed animals during childhood ($M = 4.74$, $SD = 2.02$), $t(374) = 7.19$, $p < 0.001$, though current contact with these animals was less frequent ($M = 3.07$, $SD = 1.91$), $t(374) = -9.40$, $p < 0.001$ (*t*-tests performed against scale midpoint, 4.00). Most participants reported having had a companion animal during childhood (87.5%), including dogs (49.1%), cats (24.2 %), and Guinea pigs (1.6%). Similarly, most participants reported to currently have a companion animal (73.1%). Once again, dogs (49.8%) and cats (36.3%) were the most frequent animals. Guinea pigs were also mentioned (1.1%).

Procedure and Instruments

The research was conducted in compliance with all APA Ethical Guidelines for the treatment of human participants. Participants were invited via social networking websites and institutional e-mail to take part in a web survey (hosted at Qualtrics©) on the "perception and evaluation of animal pictures". In addition to providing sociodemographic information, participants evaluated a subset of animals on 11 subjective dimensions using 7-point rating scales (for detailed instructions for each dimension, see Table 1). A practice trial was included to familiarize participants with the task. To prevent fatigue, participants were asked to rate a subset of 12 animal pictures which were randomly selected from the 120 available. Each trial corresponded to the evaluation of one animal photograph, with each image centered on the page and the rating scales below it. After the animal evaluation task, participants completed three trait measures: the Animal Attitudes Scale—short form (Herzog et al., 2015), the Speciesism Scale (Caviola et al., 2019), and an adapted version of Attachment to Pets Scale—short form (Marsa-Sambola et al., 2016), in that order.

The Short Attachment to Pets Scale constituted our primary measure of the extent to which participants had formed an emotional attachment to a pet, whether this was in the past or present. The scale includes nine items aimed at measuring an individuals' emotional connection to a specific, meaningful companion animal. Participants were instructed to think of a specific pet that in some manner participants had meaningful contact, in their past or present. They were instructed that this could be their own pet or a family pet. Participants answered items concerning the particular animal they had in mind (e.g., "I consider this pet to be a friend") and used 7-point rating scales to provide their level of agreement/disagreement (1 = *Completely*

disagree; 7 = *Completely agree*). In the current sample, the scale had high internal reliability (α = 0.93). The full scale can be viewed at https://osf.io/mdpt6/.

The Animal Attitudes Scale—short form is composed of five items (e.g., "It is morally wrong to hunt wild animals just for sport") that were assessed in terms of the level of agreement or disagreement using a 7-point rating scales (1 = *Completely disagree*; 7 = *Completely agree*). This scale provides a measure of people's attitudes regarding how different animals are treated within society, where higher scores indicate greater levels of ethical concern for animals. The scale's internal consistency was adequate (α = 0.69).

The Speciesism Scale consists of six items designed to measure beliefs about the right to treat animals differently or inferior to humans based on species membership (e.g., "Humans have the right to use animals however they want to"). The items were assessed in terms of the level of agreement/disagreement (1 = *Completely disagree*; 7 = *Completely agree*), with higher scores representing greater endorsement of speciesism. The scale had good reliability (α = 0.79).

Additional details of the recruitment procedures and a full description of methods are reported in Possidónio et al. (2019).

Animal Selection

For the present study, we utilized ratings of a subset of exemplars derived from the Animal Images Database (Animal.ID). This database includes 120 open-source color animal images, that were collected from open-source online databases (e.g., Pixabay; Pxhere) and then edited to depict a single animal, with the full-body visible, against a white background, with 300 x 225 pixels. The selection of exemplars to compose the animal categories for the present study was guided by Sevillano and Fiske's (2016) findings. Our four categories coincided with their four clusters of

animals, based on measures of warmth and competence: (1) companion animals (dog, cat, Guinea pig), (2) farmed animals (pig, cow, sheep), (3) predators (tiger, bear, lion) and (4) pests (cockroach, spider, tick). The criteria we used to select the animals for each category were as follows: (a) we selected animals that belong *predominantly* to a single category with respect to the cultural background of our sample. For example, rabbits can be companion animals, but they are also widely farmed to use as food, therefore, they were excluded. By contrast, we selected Guinea pigs as companion animals because they are not farmed or eaten in Portugal. Likewise, although spiders could be considered companion animals for some people, we reasoned that most Portuguese adults would classify them more as pests; (b) we created categories with animals from the same biological class if possible (e.g., pests were all invertebrate); (c) we aimed to have the same number of animals in each category. Since we only could obtain three ostensible companion animals from the Animal.ID, all categories were populated with three animals.

Analysis Plan

Our main analysis involved correlating our measure of pet attachment with the eleven evaluative dimensions for all four categories of animals. This was followed up with a more targeted regression analysis, which focused on the two moral standing measures as outcome variables and included pet attachment, gender, and diet as predictors.

Results

Pet Attachment: Descriptive Results

Overall, participants reported moderately high levels of pet attachment ($M = 5.84$, $SD = 1.32$), one-sample $t(369) = 26.84$, $p < 0.001$, $d = 1.4$, 95% CI [1.71, 1.98] and moderately high, ethical concern for animals ($M_{AAS} = 5.38$, $SD = 1.10$), one-

sample $t(372) = 24.12$, $p < 0.001$, $d = 1.25$, 95% CI [1.27, 1.49], based on scale midpoint comparisons. Moreover, on average, participants reported fairly low levels of speciesism ($M = 2.34$; $SD = 1.10$), one-sample $t(362) = -27.20$, $p < 0.001$, $d = -1.4$, 95% CI [-1.78, -1.54].

Gender, Diet and Attitudes toward Animals

Table 2 presents descriptive and inferential statistics for the animal attitude measures by gender and diet. As can be seen, women reported significantly higher pet attachment than men, as well as greater ethical concerns for animals, and lower levels of speciesism. Regarding diet, meat avoiders reported lower levels of speciesism when compared to meat eaters, and greater ethical concern for animals. However, no significant differences were found between meat avoiders and meat eaters with regards to pet attachment. Thus, different from gender, diet was not included in our main analysis as a covariate of pet attachment.

Correlations between pet attachment and general animal attitudes. As expected, pet attachment and ethical concern for animals were positively correlated, $r(499) = 0.33$, $p < 0.001$, and pet attachment and speciesism were negatively correlated, $r(487) = -0.42$, $p < 0.001$. Thus, consistent with pets as ambassadors, people who reported stronger emotional bonds with pets also reported overall greater concern for how animals are treated in society and endorsed speciesism less.

The Animal Attitudes Scale and the Speciesism Scale were highly negatively correlated, $r(490) = -0.70$, $p < 0.001$; that is, greater ethical concern for animals was associated with lower levels of speciesism.

Animal Attributions: Descriptive Results by Animal Category

Table 3 presents the mean attribution ratings by animal category. Companion animals were rated highly positive, familiar, and cute, they elicited great feelings of

care and were rated highly unacceptable to kill for human consumption. Farmed animals were perceived as quite familiar, not very dangerous, highly edible, quite acceptable to kill for human consumption, and elicited moderate feelings of care. Predators were perceived as highly dangerous, rated quite high on the capacity to think, elicited moderate feelings of care, and were perceived as unacceptable to kill for human consumption. Finally, pests were rated as highly negative, moderately familiar and dangerous, not edible, cute, or similar to humans, having a low capacity to think and feel, and evoked low feelings of care.

Pet Attachment and Animal Attributions

Zero-order correlations between pet attachment and the attributions participants made of the four animal categories can be seen in Table 4.

Companion animals. As one would expect, pet attachment most consistently related to participants' attributions of companion animals. Companion animals are the central focus of pet attachment, thus, it is not surprising that pet attachment correlated with valence, arousal, familiarity, feelings of care and protection for companion animals, disapproval of killing companion animals for consumer purposes, attributions of mind (thoughts and feelings), benevolence, cuteness, and the belief that companion animals are not edible. Pet attachment was unrelated to the perception that companion animals share similarities with humans.

Predators and farmed animals. Relative to companion animals, pet attachment was less consistently associated with attributions made of predators and farmed animals. As with companion animals, pet attachment correlated with arousal, greater feelings of care and protection for these animals, and disapproval of killing predators and farmed animals for consumer purposes. Like companion animals, pet attachment was associated with aesthetic attributions of cuteness and judgments of the

inedibility of predators and farmed animals. However, unlike companion animals, pet attachment was unrelated to judgments that predators and farmed animals are not dangerous or can feel. Pet attachment was weakly associated with attributions of cognitive ability in predators, but unrelated to mind attributions for farmed animals. Like companion animals, pet attachment was related to positive valence and familiarity towards farmed animals, but unrelated to judgments of the similarities between humans and predator, and humans and farmed animals. Thus, we observed some evidence of an ambassador effect within predatory and farmed animals, and the nature of this effect was largely connected to aesthetic judgments and moral concern for these animals.

Pests. As expected, pet attachment was related to judgments of pests in a limited manner. Pet attachment was not related to feelings of care or protection for pests, but it did relate to judgments that it was unacceptable to kill pests for consumer purposes and that pests are an inedible animal group. The only other judgment that linked pet attachment with pests was the attribution that pests have the capacity to feel. Participants who formed strong bonds with their pets tended to see such animals as having a greater capacity for sentience.

Pet Attachment (and Gender and Diet) Predicting Moral Attitudes towards Animals

We performed two step-wise regression analyses with the two moral standing measures for each animal category: (1) acceptability to kill animals for human consumption and (2) feelings of care and protection. In the first model, we included pet attachment as the sole predictor of moral attitudes. In the second model, we included pet attachment along with gender and diet as predictors. Because Model 2 included three predictors, we applied an adjustment of alpha of $p = 0.05/3 = 0.017$, to

reduce concerns about type I error. The results of these analyses can be viewed in Tables 5-6. As can be seen, when accounting for gender and diet, pet attachment remained an independent, negative predictor of judgments that it is acceptable to kill animals, for all animal groups. When accounting for gender and diet, pet attachment remained a significant, positive predictor of feelings of care towards companion animals, but not for the other, non-companion animal groups. Diet emerged as a significant negative predictor of care for farmed animals and pests, with meat eaters reporting less concern for these animals than meat avoiders. No single predictor in Model 2 emerged as an independent predictor of care towards predators, at least not at the $p < 0.017$ level.

Discussion

The present study examined how different classes of animals benefit from a person forming an attachment with a pet, to test the scope of the Pets as Ambassadors hypothesis. Previous work has demonstrated that individuals who interact frequently with pets, and develop attachments with them, often exhibit more positive attitudes towards animals in general (e.g., Amiot & Bastian, 2017, 2019a, 2019b; Hawkins & Williams, 2016; Paul & Serpell, 1993; Prokop & Tunnicliffe, 2010). Here, we wanted to advance the current understanding of the hypothesis by focusing on specific animal categories and specific attributions people make of animals, moving beyond assessments of general attitudes towards "animals" as a basic category. Using the Animal.ID database (Possidónio et al., 2019), we identified four meaningful categories of animals to serve as suitable targets. We probed evaluations of these four animal groups along eleven dimensions and examined how these evaluations related to pet attachment. Our findings both replicate and extend past research into the idea that pets can serve as ambassadors.

First, we replicated past findings that individuals who report higher pet attachment also report more positive attitudes toward animals in general and lower levels of speciesism (e.g., Auger & Amiot, 2017; Auger & Amiot, 2019a; Paul & Serpell, 1993; Serpell & Paul, 1994). Second, we replicated several gender and dietary-based findings regarding animal attitudes. Consistent with prior observations, women and meat avoiders in our sample reported lower levels of speciesism and greater concern for the ethical treatment of animals, compared with men and meat eaters, respectively (e.g., Herzog et al., 1991; Knight & Barnett, 2008; Piazza et al., 2015). In our study, women also reported greater levels of pet attachment than men. A previous review of gender differences in human-animal interactions found negligible to small effect sizes with regards to gender and pet attachment (Herzog, 2007). However, whenever differences were found, they were usually in the direction of females reporting higher pet attachment than males (e.g., see Vidović et al., 1999).

More critically, the present study advances work on pets as ambassadors hypothesis by exploring which types of animals benefit from pet attachment and *in what ways* they benefit. Our findings highlight the importance of considering both the targets of the hypothesis and the variety of attributions people engage in. Unsurprisingly, attributions of companion animals had the most consistent relationship with pet attachment. Except for one attribution dimension (human-animal similarity), pet attachment correlated significantly with all attributions made of companion animals. This observation aligns with the main premise of the phenomenon: companion animals provide a base for expanding outward concerns for other animals.

The animals that benefitted most from pet attachment, beyond companion animals, were farmed animals and predators. The benefits conferred by pet attachment

related mostly to enhanced aesthetic judgments of these animals—specifically, viewing farmed animals and predators as cute. These findings highlight a potential benefit of pet attachment for these animal groups insofar as previous research has shown that appraisals of cuteness are an important predictor of how animals are treated (e.g., Piazza et al., 2018; Weiss et al., 2012; Zickfeld et al., 2018). Pet attachment was less consistently related to attributions of harmfulness, cognitive ability, and the similarities farmed animals and predators share with humans. Nonetheless, pet attachment did relate to some degree to an enhanced belief in the cognitive capacities of predators. Importantly, pet attachment correlated consistently with moral concern for the treatment of non-companion animals. However, once we accounted for covariance with gender and diet, this relationship between pet attachment and moral attitudes remained only with regards to evaluations of animal slaughter, and not feelings of care towards these animals. Diet emerged as the strongest predictor of care for farmed animals and pests.

The benefits pests conferred from pet attachment were constrained to attributions of sentience (e.g., capacity for feelings) and moral attitudes towards killing such animals. Thus, although pet attachment had the least bearing on the attributions people made of pests, even this undesirable class of animals benefitted in some ways from the positive experiences of pet owners.

That pet attachment related extensively with moral concern for animals and appraisals of their inedibility aligns with previous findings that pet ownership and attachment is associated with greater empathy towards animals in general (Paul, 2000), greater liking for both popular and unpopular animals (Prokop & Tunnicliffe, 2010), and avoidance of meat in adulthood (Paul & Serpell, 1993; Rothgerber & Mican, 2014). Pet attachment had little relationship to the attributions individuals held

regarding the dangerousness of animals, the types of minds they have, or their similarity with humans. One way to interpret these results is through the lens of affective versus cognitive processes (e.g., Caviola & Capraro, 2019). Pet attachment might relate with concern for animals predominantly by enhancing people's affective evaluations of animals (e.g., by enhancing aesthetic judgments), as opposed to updating beliefs regarding the type of proclivities animals possess (e.g., the threat they pose) or their perceived similarity to humans. Nevertheless, it is important to point out that we found some exceptions to this trend: pests did benefit from pet attachment in terms of being seen as having greater sentience, and predators were also ascribed more cognitive ability among those scoring high in pet attachment. Thus, it seems likely that forming an attachment to a pet enhances a range of evaluative and attributional processes, though the aesthetic and emotional enhancements appear especially prominent, particularly towards predatory mammals and farmed animals.

Limitations and Future Directions

One of the limitations of this study is that the selection of three animal exemplars used for each animal category was guided by previous taxonomic findings (e.g., Sevillano & Fiske, 2016) rather than having participants themselves classify the animals. We believe that the animal groupings have *prima facie* validity, but future research could adopt a more bottom-up approach to animal classification when testing the scope of the hypothesis, as some animals may relate to multiple categories for some people (e.g., individuals with spiders as pets). Future studies should continue to test the scope of the phenomenon with additional, meaningful animal categories and expand the set of exemplars used for each category and the number of images per species, as there is likely to be meaningful variability in the way animals are perceived not only across species but within as well.

Additionally, our study focused exclusively on appraisals of animals, but future work should consider employing behavioral measures, particularly with regards to the moral dimensions we studied (e.g., willingness to take protective action on behalf of animals). Finally, future studies should compare our findings with those derived from other cultural samples to assess for convergence and variation in how pets can serve as ambassadors for other animals.

Conclusion

The present study found that pets can indeed be ambassadors for other animals. Forming meaningful attachments to pets appears to benefit companion animals most, yet farmed animals and predatory mammals also benefited substantially in terms of the aesthetic and moral judgments of pet owners. Animals considered 'pests' benefitted little. Nonetheless, even pests were ascribed somewhat richer minds by individuals who formed pet attachments, and such individuals also showed greater concern for their treatment. Thus, our findings highlight the unique and nuanced ways in which pet attachment can shape the beneficial attributions people make of different animal species.

Conflict of Interest

The authors declare that there is no conflict of interest.

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Table 1

Instructions and scale anchors for each evaluative dimension (Possidónio et al., 2019).

Dimension	Instruction: Indicate to What Extent	Scale
Valence	… this animal is negative or positive.	*1 = Very negative* to *7 = Very positive*
Arousal	… this animal makes you feel activated or excited.	1 = *Does not at all make me feel activated* to 7 = *Makes me feel very activated*
Familiarity	… this animal is familiar.	1 = *Not at all familiar* to 7 = *Extremely familiar*
Similarity to humans	… this animal is similar to humans.	*1 = Not at all similar to humans* to 7 = *Extremely similar to humans*
Cuteness	… this animal is cute.	1 = *Not at all cute* to 7 = *Extremely cute*
Dangerousness	… this animal is dangerous or harmful to humans.	1 = *Not at all dangerous* to 7 = *Extremely dangerous*
Edibility	… you find meat from this animal edible.	1 = *Not at all edible* to 7 = *Extremely edible*
Capacity to think	… this animal has cognitive capacities, such as thought, imagination and memory.	1 = *Not at all capable of thinking, imagining, remembering* to 7 = *Very capable of thinking, imagining, remembering*
Capacity to feel	… this animal is capable of feeling and	1 = *Not at all capable of experiencing sensations, such as pleasure and pain* to 7

Dimension	Instruction: Indicate to What Extent	Scale
	experiencing sensations, such as pleasure and pain.	*= Very capable of experiencing sensations, such as pleasure and pain.*
Acceptability to kill for human consumption	… it is acceptable or unacceptable to kill this animal for human consumption.	*1 = Completely unacceptable to kill the animal for human consumption* to 7 *= Completely acceptable to kill the animal for human consumption.*
Feelings of care and protection	… you desire to care for or protect this animal.	*1 = I do not at all desire to care for/protect the animal* to 7 = *I strongly desire to care for/protect the animal*

Table 2

Descriptive and Inferential Statistics: Attitudes toward Animals by Gender and Diet

	Gender	*N*	*M*	*SD*	Inferential Statistics
Pet	Men	172	5.60	1.29	$t(368) = -3.38, p = 0.001$
Attachment	Women	198	6.06	1.32	$d = 0.35$, 95% CI [-0.73, -0.19]
Animal	Men	172	5.05	1.09	$t(371) = -5.54, p < 0.001$
Attitudes	Women	201	5.66	1.04	$d = 0.57$, 95% CI [-0.83, -0.39]
Speciesism	Men	167	2.69	1.21	$t(361) = 5.56, p < 0.001$
	Women	196	2.03	1.04	$d = 0.58$, 95% CI [0.42, 0.89]
	Diet	*N*	*M*	*SD*	Inferential Statistics
Pet	Meat eaters	341	5.82	1.32	$t(367) = -1.52, p = 0.129$
Attachment	Meat avoiders	28	6.21	1.33	$d = 0.30$, 95% CI [-0.91, 0.12]
Animal	Meat eaters	342	5.30	1.05	$t(33,616) = -5.90, p < 0.001$
Attitudes	Meat avoiders	28	6.50	0.88	$d = 1.24$, 95% CI [-1.56, -0.85]
Speciesism	Meat eaters	335	2.43	1.16	$t(58,446) = -10.54, p < 0.001$
	Meat avoiders	27	1.28	0.46	$d = 1.30$, 95%, CI [0.93, 1.37]

Table 3

Means and Standard Deviations of the Attribution Ratings by Animal Category.

	Companion		Farmed		Predators		Pest	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Evaluative Dimensions								
Valence	5.55	1.58	5.21	1.43	4.88	1.54	2.40	1.48
Arousal	4.97	1.91	4.53	1.50	4.92	1.76	3.67	2.18
Familiarity	5.95	1.62	5.90	1.52	5.00	1.86	4.22	2.20
Edibility	1.93	1.65	5.56	1.83	2.14	1.71	1.82	1.39
Cuteness	5.95	1.35	4.73	1.59	5.85	1.27	1.82	1.47
Dangerousness	2.83	1.56	2.63	1.52	6.12	1.23	4.35	2.00
Similarity to humans	3.64	1.84	3.71	1.83	3.64	1.67	1.61	1.10
Capacity to feel	5.75	1.58	5.81	1.42	5.85	1.54	3.68	1.97
Capacity to think	5.19	1.84	4.81	1.66	5.26	1.59	2.83	1.73
Acceptability to kill	1.64	1.24	4.77	2.02	1.70	1.37	2.58	2.04
Feelings of care	5.76	1.55	4.72	1.70	5.38	1.70	2.25	1.67

*Note. N*s ranged from 129 (companion animals) to 147 (predators).

Table 4

Correlations between Pet Attachment and Animal Ratings for each Animal Category.

	Evaluative Dimensions										
Animal Category	Valence	Arousal	Familiarity	Edibility	Cuteness	Dangerousness	Similarity to humans	Capacity to feel	Capacity to think	Acceptability to kill	Feelings of care
Companion	0.31***	0.34***	0.28**	-0.27**	0.35***	-0.22*	0.12	0.18*	0.27**	-0.32***	0.29***
Farmed	0.18*	0.17*	0.24**	-0.25**	0.29***	-0.02	0.04	0.05	0.12	-0.35***	0.20*
Predators	0.15	0.23**	-0.02	-0.26**	0.26**	-0.01	0.04	0.14	0.19*	-0.37***	0.19*
Pests	0.06	0.03	0.01	-0.19*	0.01	-0.01	-0.05	0.21*	0.07	-0.37***	0.15

*Note. N*s ranged from 123 (companion animals) to 143 (predators).

* *p* < 0.050; ** *p* < 0.010; *** *p* < 0.001.

Table 5

Step-Wise Regression Models with Acceptability to Kill for Human Consumption as the Outcome Measure.

	Model 1	Model 2
Animal Category	Pet attachment	Pet attachment, gender, diet
Companion	R^2_{adj} = 0.09, F = 14.19, p <.001 $\beta_{pet\ attachment}$ = -0.32, t = -3.77, p < 0.001	R^2_{adj} = 0.13, F = 7.11, p < 0.001 $\beta_{pet\ attachment}$ = -0.29, t = -3.45, p = 0.001 β_{gender} = -0.19, t = -2.23, p = 0.028 β_{diet} = -0.09, t = -1.05, p = 0.296
Farmed	R^2_{adj} = 0.11, F = 19.13, p <.001 $\beta_{pet\ attachment}$ = -0.35, t = -4.47, p < 0.001	R^2_{adj} = 0.29, F = 19.96, p < 0.001 $\beta_{pet\ attachment}$ = -0.29, t = -3.97, p < 0.001 β_{gender} = -0.24, t = -3.31, p = 0.001 β_{diet} = -0.33, t = -4.62, p < 0.001
Predators	R^2_{adj} = 0.13, F = 22.95, p <.001 $\beta_{pet\ attachment}$ = -0.37, t = -4.70, p < 0.001	R^2_{adj} = 0.15, F = 9.18, p < 0.001 $\beta_{pet\ attachment}$ = -0.34, t = -4.28, p = 0.001 β_{gender} = -0.17, t = -2.16, p = 0.032 β_{diet} = -0.03, t = -0.36, p = 0.721
Pests	R^2_{adj} = 0.13, F = 21.83, p < 0.001 $\beta_{pet\ attachment}$ = -0.37, t = -4.67, p < 0.001	R^2_{adj} = 0.13, F = 7.85, p < 0.001 $\beta_{pet\ attachment}$ = -0.34, t = -4.10, p = 0.001 β_{gender} = -0.05, t = -0.56, p = 0.574 β_{diet} = -0.09, t = -1.09, p = 0.278

Table 6

Step-Wise Regression Models with Feelings of Care and Protection as the Outcome
Measure.

	Model 1	Model 2
Animal Category	Pet attachment	Pet attachment, gender, diet
Companion	$R^2_{adj} = 0.08$, $F = 11.44$, $p = 0.001$ $\beta_{pet\ attachment} = 0.29$, $t = 3.38$, $p = 0.001$	$R^2_{adj} = 0.83$, $F = 4.78$, $p = 0.004$ $\beta_{pet\ attachment} = 0.30$, $t = 3.42$, $p = 0.001$ $\beta_{gender} = -0.12$, $t = -1.39$, $p = 0.167$ $\beta_{diet} = 0.09$, $t = 1.07$, $p = 0.285$
Farmed	$R^2_{adj} = 0.03$, $F = 5.92$, $p = 0.016$ $\beta_{pet\ attachment} = 0.20$, $t = 2.43$, $p = 0.016$	$R^2_{adj} = 0.10$, $F = 6.01$, $p = 0.001$ $\beta_{pet\ attachment} = 0.17$, $t = 2.10$, $p = 0.037$ $\beta_{gender} = 0.10$, $t = 1.27$, $p = 0.205$ $\beta_{diet} = 0.24$, $t = 3.02$, $p = 0.003$
Predators	$R^2_{adj} = 0.03.$, $F = 4.98$, $p = 0.027$ $\beta_{pet\ attachment} = 0.18$, $t = 2.23$, $p = 0.027$	$R^2_{adj} = 0.03$, $F = 2.27$, $p = 0.083$ $\beta_{pet\ attachment} = 0.19$, $t = 2.21$, $p = 0.029$ $\beta_{gender} = 0.010$, $t = 0.09$, $p = 0.931$ $\beta_{diet} = 0.11$, $t = 1.34$, $p = 0.184$
Pests	$R^2_{adj} = 0.01$, $F = 2.94$, $p = 0.088$ $\beta_{pet\ attachment} = 0.15$, $t = 1.70$, $p = 0.088$	$R^2_{adj} = 0.18$, $F = 10.70$, $p < 0.001$ $\beta_{pet\ attachment} = 0.12$, $t = 1.48$, $p = 0.141$ $\beta_{gender} = -0.18$, $t = -2.21$, $p = 0.029$ $\beta_{diet} = 0.41$, $t = 5.17$, $p < 0.001$