Pet Psychology: What Influence do Cats and Dogs have on our Feelings Towards Strangers?

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Abstract

By conducting this study, we wanted to find out whether we can be socially influenced by cats and dogs. This idea was tested in a vignette-based study with a sample of 462 first year psychology students and participants from the environment of the researchers. Participants were exposed to two scenarios involving an apartment viewing in which either their (imaginary) cat or dog first reacted negatively (security domain) and second positively (judgement domain) to one of two strangers. After the participants read about the pet's reaction in the Security scenario, they were asked to indicate their Liking and Roommate Preference of both strangers. This was repeated for the Judgement scenario. Furthermore, participants were assessed on the likelihood to self-categorise with their pet and their stereotypes about both cats and dogs. It was hypothesised that in the Security scenario, the dog's reaction (due to being a pack animal with strong ingroup solidarity) would be more influential than a cat's reaction. Next, it was hypothesised that in the Judgement scenario, the cat's reaction (as a stereotypical choosy and independent animal) would be more influential than a dog's reaction. Lastly, it was hypothesised that participants who genuinely owned the respective pet would be more strongly influenced by their pet's reaction. The results indicated that dogs overall had a stronger influence on the feelings towards strangers than cats do. Moreover, we found that pet-owners were influenced more by the negative reaction of the pet than non-owners. Lastly, the results showed that participants were more likely to feel like being part of the same team with a dog, than they would with a cat.

Keywords: pet animals, social influence, preference, group identity

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Strangers?

Imagine the following scenario: You are at home, where you live alone with your cat. You wait for a stranger to arrive because you sold something online and the person comes over to pick it up. The bell rings and you open the door while your cat is standing behind you. You greet the stranger and let them in. Your cat directly goes to the stranger, purring and with a straight tail. It rubs its head against their leg and strays through their legs. How may this behaviour influence your opinion of the stranger? What if your cat's reaction would have been more protective and negative towards the stranger? Would you be influenced differently if the reaction would come from a dog, rather than a cat? In this present research we will investigate these questions.

The previously told story is an example of a regular experience for pet owners. People going for a walk with their dogs, cat owners expecting new visitors, in all these situations our pets will have a reaction to strangers. The question of how animals' behaviour influences humans is not new. Spears (2021) suggested that we may share a common identity with some animals. For instance, in a foreign forest it may be natural for humans to be alert after seeing a rabbit running away from something in the bushes. Here, we share the identity of a possible predator's prey. This means that the idea of social appraisal, which is the reacting to the reaction of others, may be extended from humans to other species (Spears, 2021). This extension could also include theory of mind assumptions. The concept of theory of mind comprises assumptions about certain characteristics and skills we perceive as being human. This may also be applied to animals. Yet, we cannot assume that animals have a shared understanding of our environment. However, Spears (2021) suggests that we do have assumptions of the nature of animals which characterise the limits of our theory of mind assumptions about the animals and thus the extent of the understanding that we share with

them. Hence, we can assume that people take the point of view of animals into account, by considering their nature as a particular species, for instance like the situation in the forest, where the rabbit may know something that we do not.

In this study we will not focus on wild animals like the rabbit from the example, but on the relationship between humans and pets (specifically cats and dogs), due to the closer connection that they have with us and we have with them. On the one hand, some research suggests that their relationship is similar to an inter-human friendship, like for example Borgi and Calli (2016), who argued that there is a social bond shared between humans and pets that functions like human-human friendships. This bond has characteristics that may be perceived as friendship, such as intimacy, companionship, trust, loyalty, affection, acceptance, as well as time spent together and maintenance of the pair bond after long separations (Borgi & Cally, 2016). On the other hand, pets can be viewed as family members. They live with us in the same house, we feed them, we get them to the vet if they are sick and clean after them. Indeed, 77% of cat and dog owners say their pets are seen as family members (McConnell et al., 2019; McConnell et al., 2017; Cohen, 2002). The strength of this owner-pet relationship is accentuated by the number of people who risk being harmed to protect their pets (Melore, 2021; Smith, 2019). In that sense, one could think we not just treat our felines and canines like any family members, but rather like our own children. Indeed, studies with fMRIs showed that while looking at pictures of their dogs, mothers have similar brain activity as when looking at their own children (Stoeckel et al. 2014). These studies imply that the human-pet relationship is rather complex and there needs to be further investigation about their group dynamics, the processes implicating social hierarchy and social categorisation as well as the social influence that pets have on their owners. Currently, there is not a lot of research about this topic, which makes the present study a valuable contribution to the

research about the influence that pets have on humans and the group identity humans

perceive between them and their pets.

Plagemann (2022) previously investigated whether pets have a social influence on

humans and if this influence is based on a shared social category. Additionally, he explored

participants' assumptions about cat's and dog's characteristics/personalities. His results

showed that participants generally perceived dogs as more social and that dog's behaviour

was more influential than cat's. Moreover, the study implied that pet owners are more

strongly influenced by their respective pet's behaviour than non-owners (Plagemann, 2022).

Based on Plagemann's study this present study will further investigate the possible social

influences that pets' reactions have on human perception and feelings. More specifically, we

will focus on the following variables.

Feelings Towards Strangers

The present study will focus on the measure of the feelings a person has towards

strangers. Specifically, the very first impression one has of an unknown person. This

impression is likely influenced by many factors, such as the characteristics of a person, the

context of the situation or your past experiences, but also age, gender, occupation, and race

(*Person Perception and Impressions of Others*, 2020). The present research focuses on pets'

influence on human feelings through their reaction and behaviour towards strangers.

Particularly, we will focus on two specific behaviours portrayed by the pets: security related

and judging behaviour.

Security

First, we will focus on the independent variable "security". In this context, security

will be defined as protective behaviour displayed by the pet towards the stranger. Dogs are

known to be "(hu)man's best friend". This association may stem from their loyalty,

dedication and willingness to protect their owners. They are considered social animals due to

their group dynamics as well as their good interaction with humans, as for example dogs' good understanding of human gestures and human behaviour (Soproni et al., 2002; Kaminski & Nitzscher, 2013). In the wild, dogs' and their ancestors' group structure follows a hierarchical system (Staff, 2021). For instance, wolves stay in families together and form a strong pack mentality. They hunt together in packs to be able to kill larger prey and thus increase their chances of survival (Staff, 2021). Moreover, they form friendships and protect and nurture sick or injured pack members (*The Social Wolf*, 2021). This family dynamic is transferred to a dog's relationship with their owners. Take for example the guard dog, which serves to protect the property of farmers and warns them about possible dangers. Further, guard dogs can differentiate between in-group and out-group members. Thus, it is interesting to see if this protective behaviour of dogs has an influence on humans, regarding their relationship with the stranger the dog is reacting to.

Just as the dog is known as "(hu)man's best friend", cats are known to be "cat's best friend". For our ancestors dogs were of great use for protection and hunting purposes, and therefore had close interactions with humans. Cats, on the other hand, came to be around humans independently when they began to settle down and store crops. With crop storage came mice, which then attracted cats to stay around humans. Consequently, their relationship to humans can be interpreted as more passive and predominantly serves the cats' needs (Zax, 2007). Furthermore, it was found that cats, in contrast to dogs, show no avoidance of people who behave negatively towards the cats' owners (Boyle, 2021; Chijiiwa et al., 2015, 2021), which indicates that cats might not share the same social evaluation abilities as dogs. In the context of a situation with an outgroup member, it is interesting to see if, in case a cat shows protective behaviour, this has a smaller effect on the feelings a person has towards a stranger.

Judgement

The second independent variable that we are investigating is judgement. Judgement can be defined as the preference that the pet shows towards one of two strangers. On the one hand, cats are known to be independent, intelligent but also judgemental and picky. Often, people have the feeling that their cats can sense "bad" people and spot out the "good" ones (*Can Cats Sense Bad People—As Well As Good Ones?*, 2020). On the other hand, dogs are known to form a strong emotional bond with almost everyone that comes across their path (Gorman, 2019), which in our world is most likely a human. Based on this diversity, it is interesting to investigate if the cat's pickiness (judgement) has a stronger influence on the human perception of strangers, compared to the dog.

Additional Independent Variable: Ownership

After focusing on judgement and security the question comes up if the effects of these conditions may be different between pet-owners and non-owners. During the manipulation the non-owners have to imagine a non-existing relationship with a pet, whereas the pet owners can imagine their own relationship to their pet. Living with a pet goes along with having close interactions with pets. For instance, dog owners have regular contact with their own dog, and probably also other dogs, compared to non-owners (Westgarth, 2007). Furthermore, people who choose to adopt a pet may already have a stronger connection with animals in general. Consequently, we propose that pet owners have stronger beliefs about the nature of the pets and are thus influenced stronger by their behaviour.

Hypotheses

This present research is a valuable contribution to previous research as it connects to earlier hypotheses, findings and assumptions, and provides more data for this underexplored field of study. After Plagemann's (2022) study on pets' social influence on humans and whether this influence is based on a shared social category, the present study will continue

with this idea including a special focus on security and judgement. In the end, this resulted in four hypotheses. First, we hypothesise that pets' behaviour can influence our feelings towards other people (H1). This prediction was investigated on the basis of the earlier research by Plagemann (2022) as well as theorising of Spears (2021). Second, we hypothesise that in the Security scenario dogs are more influential (H2). This second hypothesis is based on the social characteristics of dogs who are pack animals and often motivated to defend their owner. Third, we hypothesise that in the Judgement scenario cats are more influential (H3). This prediction is grounded in cats being observed as intelligent, independent and choosier than dogs. Lastly, we hypothesise that pet owners are more strongly affected by the pet's behaviour than non-owners (H4). Pet owners should generally be more attuned to their pets and have faith in their pets' reactions than non-owners due to regular contact which fosters these stronger beliefs.

Method

Participants and Design

For this study, we collected data from 547 participants, of which 352 were first year psychology students of the University of Groningen. We collected data from 180 participants that were invited by the researchers. Overall, 85 responses were eliminated. Seventy responses of participants were removed because they did not finish the questionnaire. Thirteen participants were removed from failing the attention check. One participant failed the seriousness check, and thus was also removed. Yet, another observation was deleted as it was a test by the authors. The final sample collected for the analysis consisted of 462 participants (344 women, 108 men, nine non-binary/third gender, one preferred not to say). The participants' ages ranged from 16 to 70 years old with a mean of $M = 23.05$ and a standard deviation of $SD = 9.71$. Data from 35 different nationalities was collected. Nevertheless, most participants were Dutch (51.3%), German (21.0%), or others (27.7%). Of

all participants, 112 currently own or have owned a dog, 105 a cat, 122 both and 123 participants had never owned a cat or a dog. The study was approved by the ethics committee of the University of Groningen.

The questionnaire could be accessed online in two ways. Firstly, participants were able to enter through the SONA-system of the University of Groningen. SONA is a software developed to organise and schedule studies as well as to recruit first year psychology students as participants and to allocate participation credits. However, people could also participate by having access to a link to this questionnaire independent from the SONA-system. These participants were invited by the researchers to take part in the study. Participants who were taking part through the SONA-system were exclusively psychology students from the University of Groningen. As compensation for participation in the study via the SONA-system, participants received 0.4 SONA-Credits. Students are required to participate in studies and receive SONA-Credits as a part of the course "Practical Introduction to Research Methods". They choose freely which studies they would like to participate in from a large number of options. If they do not want to participate in studies there is an alternative of a writing assignment for the course mentioned. Participants were able to join from both the international and Dutch tracks with the requirement of understanding English to be able to complete the survey. Other participants who received the questionnaire via a Qualtrics XM link were part of the social environment of the researchers (family, friends, colleagues, etc.). Both these sampling methods make this a convenience sample.

The study has a 2 (Pet Condition: Dog vs. Cat) x 2 (Pet Ownership: participants owning the respective Pet vs. not owning the respective Pet) x 2 (domains: Judgement [positive reaction] vs. Security [negative reaction]) quasi experimental mixed design with repeated measures on the last factor. We ran the analysis in SPSS. Based on a G*power analysis, the desired sample size for the present study is 500 (RM-MANOVA allowing for

within-between interaction, power = 0.8, expected effect-size of 0.15 at α = 0.05 [Faul et. al., 2007, 2009]).

Procedure, Group Assignment and Vignettes

The questionnaire was designed and presented on the platform Qualtrics XM, which the participants had access to via SONA or an independent link that was distributed by the researchers. Participants were provided with an informed consent form and an information sheet before starting the experiment (see Appendix). In this information sheet the participants were informed that the aim of the study is to examine understanding of pet behaviour. Then, the questionnaire continues on with questions about demographics and whether the participant owns or has owned a cat, dog or another pet. Based on ownership they were assigned to either the cat or the dog condition. Two scenarios were presented, with questions following after each scenario. These questions asked participants about their feelings towards either their cat or their dog and about the people mentioned in the scenarios. Next, they were asked to answer the Inclusion of Other in the Self (IOS) Scale (Aron et al., 1992), which measures how close the participant feels to their pet. Lastly, the participants were asked about their stereotypes about cats and dogs using the adapted Pet Psychology scale (Plagemann, 2022). The study ended with a seriousness check as well as a debriefing about the goals of the present study.

Condition Assignment

In the beginning of the experiment, participants were assigned to one of two conditions. These conditions differed by the participants' ownership of a dog or a cat. If the participant owns or has ever owned a cat, they were assigned to the cat condition, and the same applied for the dog condition. In case the participant owned both a cat and a dog or neither, they were randomly assigned to one of the two conditions. If the participant did not own a cat or a dog, they were asked to imagine they own either one based on their assigned

condition. Thus, condition assignment was partly random but was also dependent on the pre-existing ownership of a cat or a dog. All in all, this left us with four conditions: cat owner/cat condition (N=162), non-owner/cat condition (N=64), dog owner/dog condition (N=177) and non-owner/dog condition (N=59).

Vignettes

In both conditions, participants were exposed to two scenarios. The first scenario featured a negative reaction from the pet (the Security scenario); the second featured a positive reaction (the Judgement scenario). In both scenarios the participants were asked to imagine that they live together with their pet. The participants were told to imagine that they were looking for a new roommate, scheduling interviews in their apartment at two times, inviting people that are applying for the room, coming in pairs. In the Security scenario, after the people come in, the pet has a negative reaction to one person (Person B) and a neutral reaction to another (Person A). In the Judgement scenario, the participants were asked to imagine another two people that came over for the viewing. Here, the pet has a positive reaction to one of the applicants (Person D) and a neutral reaction to the other (Person C). The pet's reaction was described through an explanation of its behaviour and its bodily responses to the applicants (see Appendix for complete description of both scenarios). No other information was given about the four people to keep the focus on the pet's reaction.

Measures

This study focused on the influence that a pet's behaviour can have on our feelings towards other people.

Emotions

After each vignette we asked several questions related to the scenario. These questions were the same for both scenarios. First, questions were asked in regards to the participant's perceptions of the pet's behaviour towards the two individuals. Participants

rated the pet's feelings towards each stranger on a 7-point scale from 1 "not at all" to 7 "extremely". The emotions were "Happy", "Angry", "Fearful", "Sad", "Curious", "Positive", "Negative", "Friendly" and "Hostile" (see Appendix). This was followed by questions about the participants' feelings towards their pet ("Happy", "Disappointed", "Worried", "Embarrassed", "Curious", "Surprised", "Proud", "Angry", "Amused"). Here, they again were asked to indicate the strength of the emotions on a 7-point scale from 1 "not at all" to 7 "extremely" (see Appendix).

Next, participants were asked to answer questions about their perception of the two strangers. These questions included two sliders about the preference between the two people. First there was the Liking slider ("Based on the given information, who would you like more?") with zero being in favour of Person A/C and 100 being in favour of Person B/D. The same applies for the Roommate Preference slider ("Based on this scenario, which of these first 2 persons would you pick for your second bedroom?"). Next, 7-point scale bipolar questions were asked about "Trust vs. Suspicion", "Friendly vs. Unfriendly", and "At Ease vs. Threatened" and "Compatible vs. Incompatible" (see Appendix). These questions were repeated for all four strangers.

Group Identity

As a measure of group identity, we used the Inclusion of Other in the Self Scale (IOS) (Aron et al., 1992). Participants could choose which image of two circles best represented the relationship between them and their pet. Options were given on a 7-point scale with images of circles representing the degree of closeness (see Appendix).

Pet Psychology Scale

We used a modified version of the Pet Psychology Scale developed by Plagemann (2022) to find out about the participants' stereotypes about cats and dogs. The scale consisted of 6 subscales each for cats and dogs and one item as an attention check randomly

placed. The Pet-Psychology scale consisted of the following subscales: "Care for

Owner", "Selfishness", "Group Mindedness", "Empathy", "Judgement", and "Security". An

example item would be "Cats/Dogs want their owners to be happy" (Care for owner) (See

Appendix for more example items). Participants were asked to evaluate their agreement with

these statements on a 7-point scale with answers ranging from "Not at All" to "Extremely".

Attention & Seriousness Check

To increase our data validity, we included some items in the questionnaire to evaluate

whether the participant paid attention. The last question was a seriousness check where the

participants had the chance to indicate if they had taken part seriously in this study or not. It

mentioned that there would be no consequences if participants answer with "No" to

encourage them to answer this question honestly.

Results

The software SPSS was used to analyse the results of the current study. First off, the model assumptions of normality and homogeneity were checked. For the normality assumption we conducted the Shapiro-Wilk test. The test was significant for all conditions, which indicates that the normality assumption was violated. However, we expected that lots of participants would answer at the extremes of the response scales resulting in non-normal distributions. To check the homogeneity assumption, a Levene's test was conducted. It was not significant, hence there was no evidence for a violation of the homogeneity assumption. After controlling for the model assumptions, a manipulation check was carried out through a Paired Sample t-test comparing pet emotions towards Person A and B as well as Person C and D. The manipulation was successful for both, the Security and the Judgement scenario.

Pet Psychology Scale

When checking for the reliability of the different subscales of the pet psychology scale, we mostly found affirmative results for cats. Nonetheless, the reliability of the dog scales was only acceptable for "Selfishness" and "Empathy", whereas the subscales "Care for Owners", "Group Mindedness", "Security" and "Judgement" were found to be suspect (Table 1).

To test if there is a significant difference between cats and dogs for each of the subscales, paired sample t-tests were conducted. Every subscale of the Pet Psychology Scale reported significant differences between the cat and the dog condition (Table 2). Overall, participants rated dogs higher in "Care for Owner", "Group Mindedness", "Empathy" and "Security", whereas they rated cats higher in "Selfishness" and "Judgement". Due to the assumed stereotypes of cats and dogs, this is in line with what we expected.

Table 1

Reliability of the Subscales of the Pet Psychology Scale.

	Questions	Cats Cronbach's Alpha	Dogs Cronbach's Alpha
Care for owner (1)	4	.81	.63
Selfishness (2)	5	.77	.69
Group mindedness (3)	7	.62	.63
Empathy (4)	4	.88	.77
Judgement (5)	5	.79	.64
Security (6)	5	.77	.67

Note. N = 462.

Table 2

Pet-Psychology Subscales for Dogs and Cats Respectively.

Subscales	Cats M	Cats SD	Dogs M	Dogs SD	$t_{(461)}$	Cohen's d
Care for owner (1)	4.50	1.26	6.05	.76	-26.57**	1.26
Selfishness (2)	4.44	1.13	3.16	.86	21.18**	1.07
Group mindedness (3)	2.99	.74	5.31	.65	-48.21*	1.03
Empathy (4)	4.38	1.31	5.68	.82	-22.72**	1.23
Judgement (5)	4.99	1.06	4.83	.83	2.967**	1.12
Security (6)	3.82	1.06	5.74	.74	-35.09**	1.18

*Note. N = 462. * refers to $p < .05$, ** refers to $p < .001$*

Examining the bar graphs of the subscales "Judgement" and "Security", we can clearly see differences (see Figures 1 and 2). For questions about the judgement of cats and dogs we found that people who own a cat rate cats highest on judgement, whereas people

who own a dog rate dogs highest in judgement. Moreover, cat owners rated dogs the lowest on judgement and dog owners rated cats lowest on judgement. If the participant owned both a cat and a dog, or neither, they rated cats slightly higher compared to dogs, with "neither owners" rating cats and dogs lower on judgement. Subsequently, for questions about security the overall trend of the data was the same between all four ownership levels, with dogs scoring significantly higher on security than cats. When judging cats on security, cat owners reported the highest mean. When judging dogs on security, participants who own both pets reported the highest mean.

Figure 1

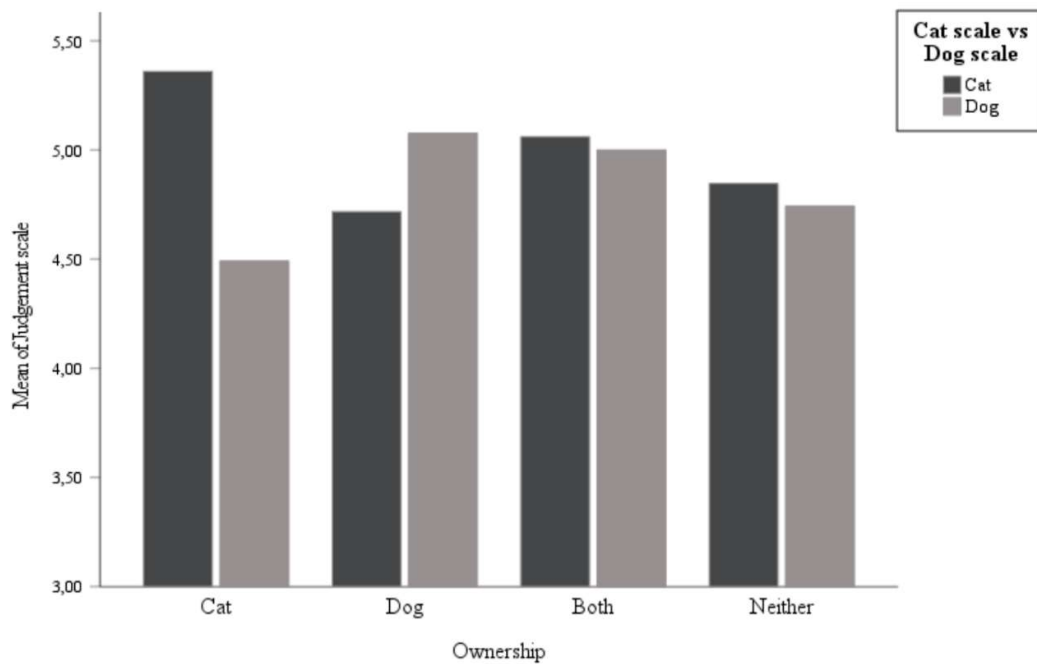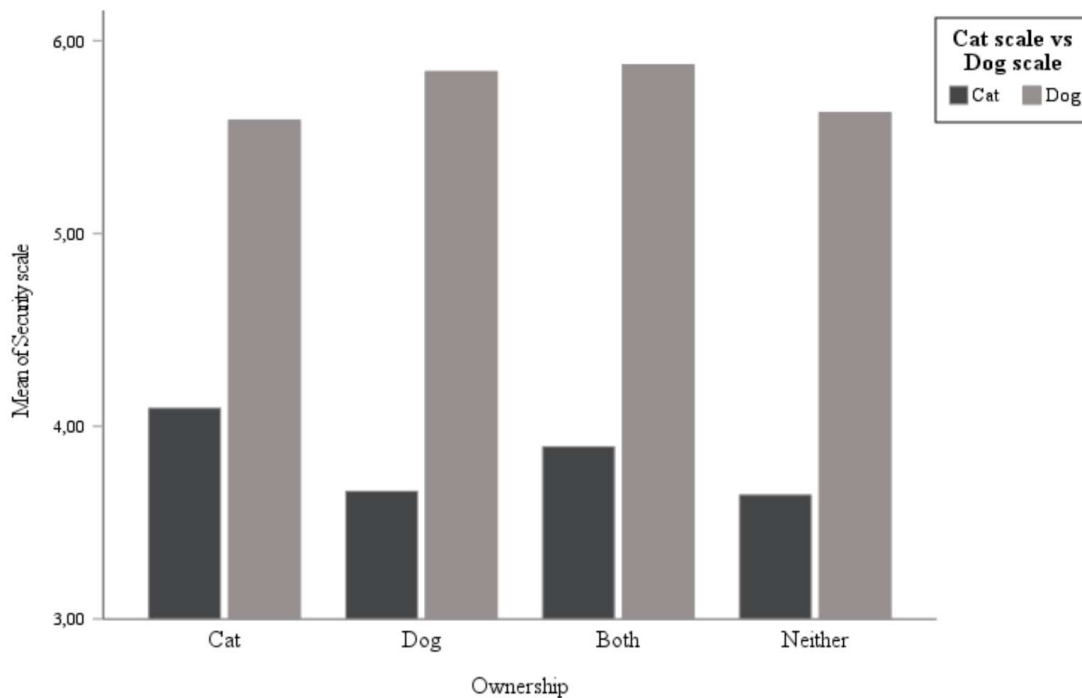*Pet Psychology Subscale Judgement for all Four Ownership Levels*

Figure 2

Pet Psychology Subscale Security for all Four Ownership Levels

Group Identity Measure

The univariate two-way ANOVA on the group identity measure was significant for both main effects, Pet condition and Ownership. Dogs scored higher than cats in the Pet condition, indicating that participants were more likely to form a distinctive group with a dog than with a cat (Table 3). For Ownership, owners scored higher than non-owners, indicating that participants were more likely to form a distinctive group identity with a pet if they own the respective pet. Furthermore, no significant interaction between Pet and Ownership on the group identity measure was detected (Table 3).

Table 3

Group Identity Measure

Condition		*M*	*SD*	$F_{(1,458)}$	*Partial η2*
Pet	Cat	4.16	0.05	7.41*	.020
	Dog	4.50	0.05	7.41*	.020
Ownership	Owner	4.52	0.03	5.85*	.013
	Non-owner	4.14	0.06	5.85*	.013
Pet*Ownership				2.24	.005

Note. N = 462. * refers to *p* < .05, ** refers to *p* < .001

Hypothesis One

This study's first hypothesis was that pets' behaviour can influence our feelings towards strangers. To evaluate this hypothesis a Paired Samples t-test was conducted. In the Security scenario the slider testing the liking of either Person A or B reported a significant difference of participants' rating from the middle of the slider, which would be the neutral answer. Furthermore, in the Security scenario the slider testing the roommate preference of either Person A or B reported a significant difference from the neutral position. In the Judgement scenario the slider testing the liking of either Person C or D reported a significant difference from the neutral position. Lastly, in the Judgement scenario the slider testing the roommate preference of either Person C or D reported a significant difference from the neutral position. Overall, this supports our hypothesis that pets' behaviour has an influence on our feelings towards strangers (Table 4).

Table 4

Sliders Comparing A&B and C&D Towards the Neutral Point.

Scenario	Slider	*M*	*SD*	$t_{(461)}$	*Cohen's d*
Security	Liking	20.78	19.42	-32.35**	-1.50
	Roommate	16.87	19.37	-36.75**	-1.71
Judgement	Liking	76.73	18.82	30.52**	1.42
	Roommate	77.93	19.86	30.22**	1.41

*Note. N = 462. * refers to $p < .05$, ** refers to $p < .001$*

Hypothesis Two

Our second hypothesis stated that dogs will be more influential than cats in the Security scenario. To test this, univariate ANOVAs for the sliders Liking and Roommate Preference of either Person A or B were conducted (Table 5). The results showed no significant difference in influence that either dogs or cats have on the liking of Person A (neutral reaction) or B (negative reaction), as well as on preference for a roommate. Nevertheless, the dog condition showed somewhat lower means in the sliders Liking and Roommate Preference compared to the cat condition, as we predicted (Table 5).

Table 5

Sliders Comparing A&B in Security and C&D in Judgement (Split by Cat and Dog Condition).

Scenario	Slider	Cat		Dog		$F_{(1,458)}$	*Partial η2*
		M	*SD*	*M*	*SD*		
Security	Liking	22.23	17.24	19.40	21.24	2.46	.005
(A vs. B)	Roommate	17.95	17.08	15.84	21.32	1.37	.003
Judgement	Liking	73.49	19.16	79.83	17.99	13.42**	.028
(C vs. D)	Roommate	74.88	19.41	80.85	19.90	10.65*	.023

Note. $N = 462$. * refers to $p < .05$, ** refers to $p < .001$

Next, the bipolar scales were analysed with a Repeated Measures ANOVA (Table 6). On the scale "Trust vs. Suspicion", a significant difference was found when comparing Person A and B in the dog and the cat condition, with Person A scoring lower and B scoring higher on "Suspicion" in the dog condition, compared to the cat condition. Similarly, on the scale "At ease vs. Threat" a significant difference was found between the dog and the cat condition when comparing Person A and B, with Person A scoring lower and B scoring higher on "Threat" in the dog condition, compared to the cat condition. The "Friendly vs. Unfriendly" scale also reported a significant difference between participants in the dog and in the cat condition when comparing Person A and B, with Person A scoring lower and B scoring higher on "Unfriendliness" in the dog condition, compared to the cat condition. Finally, on the scale "Compatible vs. Incompatible", no significant difference between participants in the cat and in the dog condition was detected when comparing Person A and B (Table 6).

Table 6

Bipolar Scales for Comparing Persons A and B in the Security Scenario.

Bipolar Scales	Person	Cat		Dog		$F_{(1,460)}$	Partial η2
		M	*SD*	*M*	*SD*		
Trust vs. Suspicion	A	2.74	.97	2.62	1.14	4.88*	.01
	B	5.48	1.14	5.74	1.35	4.88*	.01
Friendly vs. Unfriendly	A	2.54	1.02	2.41	1.22	10.74**	.02
	B	4.82	.10	5.28	1.35	10.74**	.02
At ease vs. Threat	A	2.48	1.02	2.28	1.02	6.32*	.01
	B	4.69	1.20	4.89	1.23	6.32*	.01
Compatible	A	2.65	1.13	2.57	1.34	1.22	.00
vs. Incompatible	B	5.31	1.11	5.45	1.43	1.22	.00

Note. $N = 462$. * refers to $p < .05$, ** refers to $p < .001$

Hypothesis Three

Our third hypothesis stated that in the Judgement scenario cats will be more influential than dogs. To test this, univariate ANOVAs for the sliders Liking and Roommate Preference of either Person C or D were conducted (see Table 5, p. 20). Here, a significant difference between the cat and the dog condition, with dogs being more influential than cats, was detected. However, participants in the dog condition reported higher means in the sliders Liking and Roommate Preference than in the cat condition, which is the opposite of what we expected.

Next, the bipolar scales which were analysed with a Repeated Measures ANOVA were inspected (Table 7). Overall, all scales yielded non-significant results for the difference between cats and dogs for the Judgement scenario except for "Trust vs. Suspicion". These results do not support our hypothesis that cats are more influential in the Judgement scenario in comparison to dogs.

Table 7

Bipolar Scales for Person C and D in the Judgement Scenario.

Bipolar Scales	Person	Cat		Dog			
		M	*SD*	*M*	*SD*	$F_{(1,460)}$	*Partial η2*
Trust vs. Suspicion	C	3.53	.86	3.34	1.00	4.26*	.01
	D	2.30	1.07	1.88	.984	4.26*	.01
Friendly vs. Unfriendly	C	3.32	1.09	3.07	1.15	.90	.00
	D	2.09	1.06	1.72	0.93	.90	.00
At ease vs. Threat	C	3.20	.97	2.81	1.03	.00	.00
	D	2.15	.10	1.77	.92	.00	.00
Compatible	C	3.53	1.10	3.44	1.14	2.83	0.01
vs. Incompatible	D	2.19	1.11	1.88	1.10	2.83	0.01

Note. N = 462. * refers to *p* < .05, **refers to *p* > .001

Hypothesis Four

Our fourth hypothesis stated that pet owners are more strongly influenced by their pet than non-owners. In the Security scenario univariate ANOVAs for the sliders Liking and Roommate Preference of either Person A or B, split by Ownership, was conducted. Here, we found a significant difference in the influence that the pet has between owners and non-owners. The pet owners reported a lower mean in the Security scenario than the non-owners (Table 8). This indicates that the pet in the Security scenario had a stronger influence on owners than non owners, which was what we expected. Besides the Security scenario, we focused on the influence that ownership has in the Judgement scenario. We conducted univariate ANOVAs for the sliders Liking and Roommate Preference of either Person C or D, split by Ownership. Here, no significant difference was found in the influence that the pet has between owners and non-owners. Nevertheless, the pet owners reported a lower mean in the

Judgement scenario than the non-owners (Table 8), which indicates at least a somewhat

smaller influence of the pet towards non-owners.

Table 8

Sliders Comparing A&B and C&D (Split by Ownership).

Scenario	Slider	Owner		Non-owner			
		M	*SD*	*M*	*SD*	$F_{(1,460)}$	*Partial η2*
Security	Liking	19.33	17.94	24.79	22.52	7.24*	.015
	Roommate	15.57	17.82	20.47	22.82	5.85*	.013
Judgement	Liking	76,71	18.84	76.77	18.86	.01	.000
	Roommate	77.36	20.31	79.49	18.56	1.04	.002

Note. N = 462. * refers to *p* < .05, ** refers to *p* < .001

   Finally, we had a look at the bipolar scales which were analysed with a Repeated

Measures ANOVA. For each scale no significant differences were detected for Persons A and

B in the Security scenario when split by Ownership (Table 9). Furthermore, the scales for

Persons C and D in the Judgement scenario were analysed and again, no significant

differences were found for any of the scales when split by Ownership (Table 10).

Table 9

Bipolar Scales for Person A and B in the Security Scenario (Split by Ownership).

Bipolar Scales	Person	Owner		Non-owner		$F_{(1,460)}$	Partial $\eta2$
		M	*SD*	*M*	*SD*		
Trust vs. Suspicion	A	2.63	1.03	2.82	1.13	3.27	.007
	B	5.73	1.17	5.28	1.40	3.27	.007
Friendly vs. Unfriendly	A	2.44	1.09	2.55	1.26	.00	.000
	B	5.09	1.17	4.97	1.32	.00	.000
At ease vs. Threat	A	2.37	1.14	2.39	1.08	1.81	.004
	B	4.63	1.24	4.85	1.09	1.81	.004
Compatible	A	2.57	1.25	2.72	1.22	.41	.001
vs. Incompatible	B	5.44	1.24	5.20	1.39	.41	.001

Note. $N = 462$. * refers to $p < .05$, ** refers to $p < .001$

Table 10

Bipolar Scales for Person C and D in the Judgement Scenario (Split by Ownership).

Bipolar Scales	Person	Owner		Non-owner			
		M	*SD*	*M*	*SD*	$F_{(1,460)}$	*Partial η2*
Trust vs. Suspicion	C	3.38	.93	3.57	.96	.85	.002
	D	2.09	1.04	2.06	1.05	.85	.002
Friendly vs. Unfriendly	C	3.16	1.12	3.28	1.16	.27	.001
	D	1.91	1.02	1.88	1.00	.27	.001
At ease vs. Threat	C	2.99	1.03	3.05	.97	.91	.002
	D	1.93	1.00	2.03	.92	.91	.002
Compatible	C	3.45	1.13	3.59	1.09	.42	.001
vs. Incompatible	D	2.04	1.45	2.01	1.03	.42	.001

Note. N = 462. * refers to *p* < .05 , ** refers to *p* < .001

Discussion

In the present study, it was first hypothesised that pets' behaviour can influence our feelings towards other people (H1). Our research findings were consistent with this hypothesis. It was found that participants showed significant deviation from neutral when rating the Liking and the Roommate Preference between either Person A and B or Person C and D. Specifically, in both scenarios participants did not use the neutral option of the seven-point scale to rate the preference between Person A and B or Person C and D. This indicates that the pet's reaction had an influence on the participant's feelings towards the strangers. Hence, we were able to replicate the findings of Plagemann (2022), who also used scenarios for the manipulation and found that participants perceived an acquaintance as unfriendlier when the pet reacted negatively, and friendlier when the pet reacted positively towards the acquaintance.

The second hypothesis states that in the Security scenario dogs are more influential (H2). Yet, no significant difference in Liking and Roommate Preference between the cat and the dog condition was found, meaning the findings were not consistent with our hypothesis. Still, although not significant, the results were in the expected direction. Additionally, a significant difference between the cat and the dog condition was found when rating the suspicion, the threat and the unfriendliness of Person A and B, with dogs scoring higher on every of these scales. In contrast to the sliders, this gives us supporting results for our hypothesis. Overall, this leaves us with contradictory results of our hypothesis, making it difficult to draw conclusions. However, the sliders form a stronger measure of our dependent variable, due to their measure on the preference between the two strangers. Therefore, we can say that the results were not consistent with our hypothesis.

Third, it was hypothesised that in the Judgement scenario cats are more influential (H3). A significant difference in Liking and Roommate Preference between the cat and the dog condition was found. Nevertheless, dogs scored higher on both sliders, meaning that the findings were not consistent with our hypothesis. Furthermore, no significant difference between the cat and the dog condition when rating the suspicion, the threat and the unfriendliness of Person C and D. Again, this indicates contradictory results. Still, with the results from the sliders we can say that in the Judgement scenario dogs were more influential than cats. However, this does not show support for the third hypothesis. An explanation for this might be that cats generally are known to be selfish and only serve their own needs (Table 2, Figure 1). It is possible that the dog was perceived as being friendly and really in favour of one person, whereas the cat was perceived as just wanting to be stroke without caring about who does it. The assumption that participants would trust the judgement of a dog more than judgment of a cat was also discovered in the study by Plagemann (2022).

The overall higher influence of the dog could also stem from a higher social identity that the participants share with them. It was found that participants were more likely to form a distinctive group with a dog than with a cat (Table 3). This finding is also in line with the findings of Plagemann (2022). He claimed that due to the theory of mind assumptions one has about cats and dogs, participants perceive the behaviour of dogs as more in line with shared group interests and tuned to intergroup contexts.

The last hypothesis stated that pet owners are more strongly affected by the pet's behaviour than non-owners (H4). On the one hand, for the Security scenario, a significant difference in Liking and Roommate Preference between the owners and non-owners was found. On the other hand, for the Judgement scenario, no significant difference in Liking and Roommate Preference between owners and non-owners was discovered. Furthermore, when looking at the bipolar scales, no scale obtained a significant difference. Altogether, this again delivers conflicting results. One explanation for this phenomenon could be that pet owners are more alert to the behaviour of their respective pets and treat this more seriously than non-owners. Pet-owners, for instance, tend to have a better understanding of animal behaviour in contrast to non-owners (Fidler et al., 1996). Maybe the behaviour in the Security scenario was less understandable for the non-owners than in the Judgement scenario, leading to significant differences between owners and non-owners. Nonetheless, the contrasts between owners and non-owners should be further investigated with a focus on different behaviours that the pet shows.

Limitations and Further Research

This study comes with some limitations that could be important for the results of this study and inspire future research. First, we made use of convenience sampling, which gives us disadvantages regarding generalisability. This should be considered in future research. Nevertheless, this made it possible for us to collect data from a large sample of 462

participants, with an even distribution between dog owners, cat owners, both owners and non-owners. However, this also indicates that the distribution between owners and non-owners was not equal, which is not optimal for statistical analysis and should be kept in mind while making interpretations. Idyllically, the distribution of owners and non-owners in the study should represent the real distribution. For example, in Germany about 47% of all households own a pet (26% a cat, 21% a dog), which means that approximately half of the population does not own one (*Heimtierpopulation in Deutschland,* 2021). This distribution should also be represented in the sample.

Second, we made use of vignettes in which the pet's behaviour was just described. Clearly, this is a weaker manipulation than real-world experiences with animals and it cannot adequately capture all aspects of reality. Nevertheless, the described behaviour was as natural as possible and with individual descriptions for cats and dogs, to get the strongest manipulation possible. Additionally, the use of vignettes made it possible for us to collect data from many participants and create a scenario that would be almost impossible to observe otherwise.

Third, due to having two similar and consecutive vignettes, it is possible that participants experienced fatigue and got distracted. Nevertheless, we controlled for attention with an attention check in the Pet Psychology Scale and excluded the participants who failed it from analysis. Moreover, we gave the participants the opportunity to admit not fully paying attention in the end of the study in a seriousness check.

Fourth, there could have been a downside of the bipolar scales which we used. All of them were seven-point scales from a positive emotion towards a negative. However, we expected that the participants answer towards one of the extremes, so only one pole of each scale was being used. To be specific, this would technically leave us with four-point scales, which would mean that even smaller differences would be more impactful for our results.

Future research should consider this and find a more suiting way to ask for the characteristics participants assign to the strangers.

Further research should test for differences between nationalities. In this present study, the majority of the participants were first year psychology students from European countries. The perception and stereotypes of cats and dogs are significantly different all over the world. In some Asian countries, for example, dogs are perceived as dirty and are not kept inside the house. They are usually used for work purposes like guarding and herding (NBC Universal, 2008). This difference could have an impact on the way people are influenced by this animal due to a different social categorisation. Moreover, it would be interesting to explore about a difference in the stereotypical characteristics people assign to pets across different nationalities. To test these differences, a different sampling method is recommended. This would also be useful to increase the studies external validity and generalisability.

Conclusion

In conclusion, there is evidence that pets' behaviour can influence our feelings towards strangers. Moreover, dogs were generally more influential than cats in certain aspects. Furthermore, in the Judgement scenario owners were more strongly influenced than non-owners. Additionally, participants were more likely to form a distinctive group with a dog than with a cat. The nationality of the participants could play a mediating/moderating role in this study and should be further investigated. Overall, this research is an important contribution to the existing research regarding animal influence and was able to replicate meaningful findings from Plagemann (2022).

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Appendix: complete questionnaire

Informed Consent & Research Information

INFORMATION AND INFORMED CONSENT FOR THE STUDY:

"Pet Psychology"

Research Code: PSY-2223-S-0065

You receive this information because you are invited to participate in a research study investigating people's understanding of their pet's behaviour and how that behaviour may shape our perceptions. **For this study, it is required that you use a desktop computer or a laptop, as only such devices ensure that the contents will be appropriately displayed. We kindly ask you not to participate using a tablet or a smartphone.**

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Affiliation of all researchers: University of Groningen, The Netherlands

Aim of the study:

The aim of the study is to examine understanding of Pet Behavior.

Procedure:

First, you will respond to a few questions in which you are asked to provide some demographic information (e.g. your age). After that you will read short descriptions of

situations involving a pet and answer a few questions about these situations (e.g. what you would feel in those situations). It is crucial to the successful completion of the study that you read the short descriptions of the situations completely and carefully.

It is essential that you complete this study in one go (without interruptions) when you are on your own. We kindly ask you to respond to all questions by providing the answer that best represents your opinion, thoughts, or feelings. There are no right or wrong answers.

This study takes approximately 15 minutes.

There are no risks associated with participating in this study.

Compensation: You will receive 0.4 SONA Credits for participating in this study.

Participation is voluntary:

Participating in this study is completely voluntary. It is your choice whether to participate or not. You have the right to decline to participate and withdraw from the research at any time without having to provide any reasons. Withdrawing from this research does not entail any negative consequences.

Your privacy and personal data:

The data that will be collected during this study will be treated confidentially. Data processing takes place for education/training purposes, to write a Bachelor thesis. The data will only be handled by the Researchers. Your SONA number will be recorded in this study to allow compensation. Information that could identify you as a person, such as your SONA number, will be removed after assigning you the credit and won't be shared with other researchers. Thus, only anonymized data might be disseminated such that your anonymity is guaranteed. This means that research data that may be published, for example in scientific journals, cannot identify you.

In sum: as soon as you have received your credit we will remove the SONA identifier so that your data are no longer practically traceable to you (i.e. as far as possible anonymous).

More information:

If you have any questions about this research, you can contact the researchers: Nikita Stienissen (Email: n.stienissen@student.rug.nl) or Iida Liukkonen (Email: i.v.liukkonen@student.rug.nl). If you have any complaints about this research, you can contact the Ethics Committee of the Psychology department of the University of Groningen via ecp@rug.nl mentioning the research code (PSY-2223-S-0065).

By participating in this research, you indicate that you are doing this on a voluntary basis. You also consent to the use of your data for the purposes that have been mentioned here.

If you have read the above and agree to participate in the study, please answer "Yes" to begin the study. If you do not consent or want to withdraw, you can quit the questionnaire without any consequences.

- yes

Demographics

Age	Please indicate your age. (Open Question)
Gender	Please indicate your Gender. • Female • Male • Non binary/third gender • Prefer not to say
Nationality	Please indicate your nationality. • Dutch • German • English • Other (text box)
Ownership dog	Do you own a dog now or have owned a dog? • Yes • No
Ownership cat	Do you own a cat now or have owned a cat? • Yes • No
Ownership other pet	Do you own a pet, or have you owned a pet other than a dog or a cat (for example with your family)? • Yes, a (text box) • No

Assignment to condition:

1. Dog is owned, but cat not: assignment to dog condition

2. Cat is owned, but dog not: assignment to cat condition

3. Neither is owned: random assignment

4. Both are owned: random assignment

Introduction for conditions: For the following questions, please think of your cat/dog (based on condition). If you don't own a cat/dog (or haven't owned one), please imagine you have one.

Scenario 1: Security (negative Valence)

Description (dog condition)	Imagine you are looking for a new roommate. You're conducting interviews for the day and you first invite two people to come in for a viewing in your apartment, which you share with your dog.
	On the day of the viewing, your doorbell rings. You are on your way to open the door, where your dog is sitting next to a window. When you open the door to let the first person in, Person A reaches out to shake your hand. Your dog seems uninterested.
	A few minutes later, you hear the doorbell ring once again and allow the second person to come in. Person B reaches out to shake your hand when suddenly you notice that your dog runs in between you and Person B. It bares its teeth, starts barking and has its tail down between its legs.
	Please answer the following questions about this situation:
Description (cat condition)	Imagine you are looking for a new roommate. You're conducting interviews for the day and you first invite two people to come in for a viewing in your apartment, which you share with your cat. On the day of the viewing, your doorbell rings. You are on your way to open the door, where your cat is sitting next to a window. The first person arrives and you open the door to let them in, Person A reaches out to shake your hand. Your cat is not interested.
	After a few minutes, the doorbell rings once again and Person B arrives. You open the door and Person B reaches out to shake your hand when suddenly you notice that your cat starts hissing at Person B. Its tail is held down close to its body and the fur on its back stands up. Its ears are now turned backwards and are flat on the head.

	Please answer the following questions about this situation.
Emotions pet towards acquaintance	How do you think your cat/dog feels towards Person A in this situation? (7-point scale: not at all to extremely) • Happy • Angry • Fearful • Sad • Curious • Positive • Negative • Friendly • Hostile
Emotions pet towards acquaintance	How do you think your cat/dog feels towards Person B in this situation? (7-point scale: not at all to extremely) • Happy • Angry • Fearful • Sad • Curious • Positive • Negative • Friendly • Hostile
Emotions Participant towards pet	How do you feel towards your cat/dog in this situation? (7-point scale: not at all to extremely) • Happy • Disappointed • Worried • Embarrassed • Curious • Surprised • Proud • Angry • Amuse

Cognitive Empathy (about Person A)	Do you understand the feelings of your cat/dog? (7-point scale: not at all to extremely)
Affective Empathy (about Person A)	Do you share the feelings of your cat/dog? (7-point scale: not at all to extremely)
Cognitive Empathy (about Person B)	Do you understand the feelings of your cat/dog? (7-point scale: not at all to extremely)
Affective Empathy (about Person B)	Do you share the feelings of your cat/dog? (7-point scale: not at all to extremely)
Slider Liking	Who do you like more? (100-point slider, from A to B)
	The following questions refer to Person A.
Bipolar Scale Trustful vs. Suspicion	How does your cat/dog behaviour make you feel towards Person A (7-point scale: Trustful to Suspicious)
Bipolar Scale At ease vs. Threat	How does your cat/dog behaviour make you feel towards Person A (7-point scale: At ease to Threat)
Bipolar Scale Friendly vs. Unfriendly	Based on your cat/dog behaviour could Person A be potentially friendly or unfriendly? (7-point scale: Unfriendly to Friendly)
Bipolar Scale Compatible vs. Incompatible	Based on your cat/dog behaviour could Person A be potentially compatible or incompatible? (7 point scale: Compatible to Incompatible)

	The following questions refer to Person B.
Bipolar Scale Trustful vs. Suspicion	How does your cats/dogs behaviour make you feel towards Person B? (7-point scale: Trustful to Suspicious)
Bipolar Scale At ease vs. Threat	How does your cats/dogs behaviour make you feel towards Person B? (7-point scale: At ease to Threat)
Bipolar Scale Friendly vs. Unfriendly	Based on your cats/dogs behaviour could Person B be potentially friendly or unfriendly? (7-point scale: Unfriendly to Friendly)
Bipolar Scale Compatible vs. Incompatible	Based on your cats/dogs behaviour could Person B be potentially compatible or incompatible? (7 point scale: Compatible to Incompatible)
Slider Roommate Preference	Based on this scenario, which of these first 2 persons would you pick for your second bedroom? (100-point slider, from A to B)

Scenario 2: Judgement (positive Valence)

Description (dog condition)	Later the same day, Person C comes in for a viewing in your apartment. A few minutes later another person rings the doorbell and you invite Person D in. You show both persons the apartment.
	Later you go into the living room, where your dog is lying in its bed. You invite the two people to sit on your couch, to have small talk. You ask them if they want something to drink. After both answer with yes, you go to the kitchen counter to prepare the drinks. From the kitchen you can still see the room, as well as your dog.
	Suddenly, you notice that your dog walks by Person C and is approaching Person D, wagging its tail fast, the ears upright. Then it lays down in front of Person D, displaying their belly.
	Please answer the following questions about this situation

Description (cat condition)	Later the same day, another two people come in for a viewing in your apartment. Person C arrives first and you show them the apartment. Later you go into the living room, where your cat is laying in its bed. The doorbell rings once again and Person D arrives. You let the two people sit down on your couch. You ask them if they want something to drink. After both answer with yes, you go to the kitchen counter to prepare the drinks. From the kitchen you can still see the room, as well as your cat. Suddenly, your cat walks by Person C, ignoring them, and approaches Person D, purring and rubbing its head against their leg. Then it jumps on their lap and lays down. Please answer the following questions about this situation.
Emotions pet towards acquaintance	How do you think your cat/dog feels towards the acquaintance in this situation? (7-point scale: not at all to extremely) • Happy • Angry • Fearful • Sad • Curious • Positive • Negative • Friendly • Hostile
Emotions Participant towards acquaintance	How do you feel towards Person A in this situation? (7-point scale: not at all to extremely) • Happy • Angry • Fearful • Sad • Curious • Positive • Negative • Friendly • Hostile

|	
Emotions Participant towards acquaintance	How do you feel towards Person B in this situation? (7-point scale: not at all to extremely) • Happy • Disappointed • Worried • Embarrassed • Curious • Surprised • Proud • Angry • Amuse
Cognitive Empathy (about Person C)	Do you understand the feelings of your cats/dogs? (7-point scale: not at all to extremely)
Affective Empathy (about Person C)	Do you share the feelings of your cats/dogs? (7-point scale: not at all to extremely)
Cognitive Empathy (about Person D)	Do you understand the feelings of your cats/dogs? (7-point scale: not at all to extremely)
Affective Empathy (about Person D)	Do you share the feelings of your cats/dogs? (7-point scale: not at all to extremely)
Slider Liking	Who do you like more? (100-point slider, from C to D)
	The following questions refer to Person C.
Bipolar Scale Trustful vs. Suspicion	How does your cats/dogs behaviour make you feel towards Person C? (7-point scale: Trustful to Suspicious)

|	
Bipolar Scale At ease vs. Threat	How does your cats/dogs behaviour make you feel towards Person C? (7-point scale: At ease to Threat)
Bipolar Scale Friendly vs. Unfriendly	Based on your cats/dogs behaviour could Person C be potentially friendly or unfriendly? (7-point scale: Unfriendly to Friendly)
Bipolar Scale Compatible vs. Incompatible	Based on your cats/dogs behaviour could Person C be potentially compatible or incompatible? (7 point scale: Compatible to Incompatible)
	The following questions refer to Person D.
Bipolar Scale Trustful vs. Suspicion	How does your cats/dogs behaviour make you feel towards Person D? (7-point scale: Trustful to Suspicious)
Bipolar Scale At ease vs. Threat	How does your cats/dogs behaviour make you feel towards Person D? (7-point scale: At ease to Threat)
Bipolar Scale Friendly vs. Unfriendly	Based on your cats/dogs behaviour could Person D be potentially friendly or unfriendly? (7-point scale: Unfriendly to Friendly)
Bipolar Scale Compatible vs. Incompatible	Based on your cats/dogs behaviour could Person D be potentially compatible or incompatible? (7 point scale: Compatible to Incompatible)
Slider Roommate Preference	Based on this scenario, which of these first 2 persons would you pick for your second bedroom? (100-point slider, from C to D)

Group Identity measure:

Pictorial measure of Group Identity	The images you see below represent yourself and your pet as well as much how much you see the both of you as a group. The more the circles overlap, the closer you see your relationship with your cat/dog.

Which image best represents the relationship you have with your Pet?

Self   Pet

Self   Pet

Self   Pet

Self   Pet

Self   Pet

Self   Pet

Self   Pet
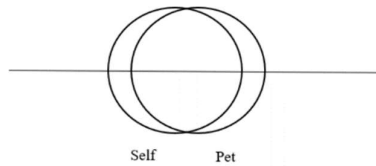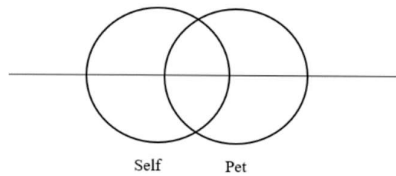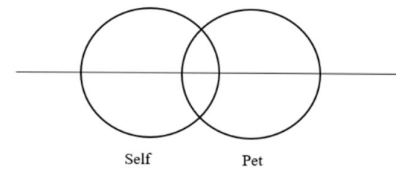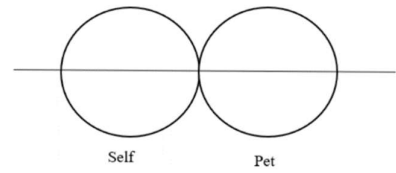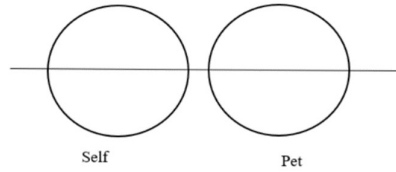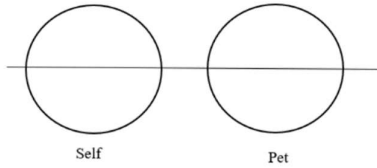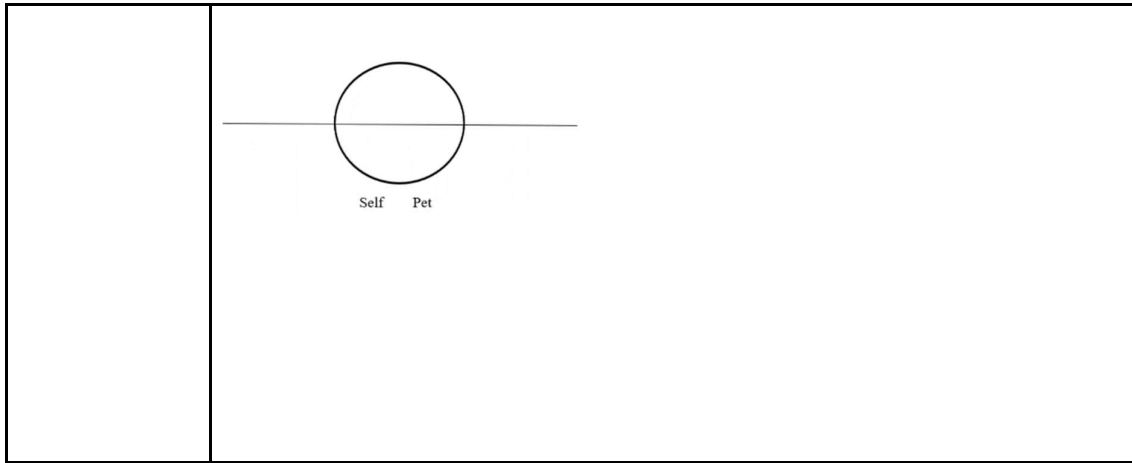
Pet psychology scale

Subscale	Item name	In my view…
Care for Owner	PPS_CareOwner_C_1	Cats care for their owners (7-point scale: not at all to extremely)
Care for owner	PPS_CareOwner_D_1	Dogs care for their owners (7-point scale: not at all to extremely)
Care for owner	PPS_CareOwner_C_2	Cats want their owners to be happy (7-point scale: not at all to extremely)
Care for owner	PPS_CareOwner_D_2	Dogs want their owners to be happy (7-point scale: not at all to extremely)
Care for owner	PPS_CareOwner_C_3	Cats like their owners more than strangers (7-point scale: not at all to extremely)
Care for owner	PPS_CareOwner_D_3	Dogs like their owners more than strangers (7-point scale: not at all to extremely)
Care for owner	PPS_CareOwner_C_4 (Reversed)	Cats don't care about their owners (7-point scale: not at all to extremely)

Carelessness check		Pick number 3 (7-point scale: not at all to extremely)
Care for owner	PPS_CareOwner_D_4	Dogs don't care about their owners (7-point scale: not at all to extremely)
Selfishness	PPS_Selfish_C_1	Cats behaviour serves only their own needs (7-point scale: not at all to extremely)
Selfishness	PPS_Selfish_D_1	Dogs behaviour serves only their own needs (7-point scale: not at all to extremely)
Selfishness	PPS_Selfish_C_2	Cats are selfish (7-point scale: not at all to extremely)
Selfishness	PPS_Selfish_D_2	Dogs are selfish (7-point scale: not at all to extremely)
Selfishness	PPS_Selfish_C_3	Cats are manipulative (7-point scale: not at all to extremely)
Selfishness	PPS_Selfish_D_3	Dogs are manipulative (7-point scale: not at all to extremely)
Selfishness	PPS_Selfish_C_4	Cats are sly (7-point scale: not at all to extremely)
Selfishness	PPS_Selfish_D_4	Dogs are sly (7-point scale: not at all to extremely)
Selfishness	PPS_Selfish_C_5	Cats know how to get what they want (7-point scale: not at all to extremely)
Selfishness	PPS_Selfish_D_5	Dogs know how to get what they want (7-point scale: not at all to extremely)
Group mindedness	PPS_GroupMind_C_1	Cats are cooperative (7-point scale: not at all to extremely)

Group mindedness	PPS_GroupMind_D_1	Dogs are cooperative (7-point scale: not at all to extremely)
Group mindedness	PPS_GroupMind_C_2	Cats act on behalf of their owner (7-point scale: not at all to extremely) +
Group mindedness	PPS_GroupMind_D_2	Dogs act on behalf of their owner (7-point scale: not at all to extremely) +
Group mindedness	PPS_GroupMind_C_3	Cats prefer being in a group (7-point scale: not at all to extremely)
Group mindedness	PPS_GroupMind_D_3	Dogs prefer being in a group (7-point scale: not at all to extremely)
Group mindedness	PPS_GroupMind_C_4	Cats see themselves as part of a household(7-point scale: not at all to extremely)
Group mindedness	PPS_GroupMind_D_4	Dogs see themselves as part of a household (7-point scale: not at all to extremely)
Group mindedness	PPS_GroupMind_C_5 (reversed coded)	Cats prefer being on their own (7-point scale: not at all to extremely) +
Group mindedness	PPS_GroupMind_D_5 (reversed coded)	Dogs prefer being on their own (7-point scale: not at all to extremely) +
Group mindedness	PPS_GroupMind_C_6 (reversed coded)	Cats are independent (7-point scale: not at all to extremely) +
Group mindedness	PPS_GroupMind_D_6 (reversed coded)	Dogs are independent (7-point scale: not at all to extremely) +

Group mindedness	PPS_GroupMind_C_7 (reversed coded)	Cats like to go their own way (7-point scale: not at all to extremely)
Group mindedness	PPS_GroupMind_D_7 (reversed coded)	Dogs like to go their own way (7-point scale: not at all to extremely)
Empathy	PPS_Empathy_C_1	Cats understand the emotions of humans (7-point scale: not at all to extremely)
Empathy	PPS_Empathy_D_1	Dogs understand the emotions of humans (7-point scale: not at all to extremely)
Empathy	PPS_Empathy_C_2	Cats can perceive what somebody feels (7-point scale: not at all to extremely)
Empathy	PPS_Empathy_D_2	Dogs can perceive what somebody feels (7-point scale: not at all to extremely)
Empathy	PPS_Empathy_C_3	Cats are affectionate (7-point scale: not at all to extremely)
Empathy	PPS_Empathy_D_3	Dogs are affectionate (7-point scale: not at all to extremely)
Empathy	PPS_Empathy_C_4	Cats show compassion (7-point scale: not at all to extremely)
Empathy	PPS_Empathy_D_4	Dogs show compassion (7-point scale: not at all to extremely)
Judgment	PPS_Judge_C_1	Cats show if they like someone. (7-point scale: not at all to extremely)
Judgment	PPS_Judge_D_1	Dogs show if they like someone (7-point scale: not at all to extremely)
Judgment	PPS_Judge_C_2	Cats are picky about who they like (7-point scale: not at all to extremely)

Judgment	PPS_Judge_D_2	Dogs are picky about who they like (7-point scale: not at all to extremely)
Judgment	PPS_Judge_C_3	Cats vary in their preferences about people (7-point scale: not at all to extremely)
Judgment	PPS_Judge_D_3	Dogs vary in their preferences about people (7-point scale: not at all to extremely)
Judgment	PPS_Judge_C_4	Cats are good judges of character (7-point scale: not at all to extremely)
Judgment	PPS_Judge_D_4	Dogs are good judges of character (7-point scale: not at all to extremely)
Judgment	PPS_Judge_C_5	Cats have a good intuition about people (7-point scale: not at all to extremely)
Judgment	PPS_Judge_D_5	Dogs have a good intuition about people (7-point scale: not at all to extremely)
Security	PPS_Security_C_1	Cats sense which strangers are a potential threat (7-point scale: not at all to extremely)
Security	PPS_Security_D_1	Dogs sense which strangers are a potential threat (7-point scale: not at all to extremely)
Security	PPS_Security_C_2	Cats are motivated to protect their owners (7-point scale: not at all to extremely)
Security	PPS_Security_D_2	Dogs are motivated to protect their owners (7-point scale: not at all to extremely)
Security	PPS_Security_C_3	Cats are loyal (7-point scale: not at all to extremely)
Security	PPS_Security_D_3	Dogs are loyal (7-point scale: not at all to extremely)

Security	PPS_Security_C_4	Cats are willing to take risks to protect their owner (7-point scale: not at all to extremely)
Security	PPS_Security_D_4	Dogs are willing to take risks to protect their owner (7-point scale: not at all to extremely)
Security	PPS_Security_C_5 (reverse coded)	Cats do not worry about their owner's safety (7-point scale: not at all to extremely)
Security	PPS_Security_D_5 (reverse coded)	Dogs do not worry about their owner's safety (7-point scale: not at all to extremely)

Seriousness check

Seriousness	We would like to know if you answered this questionnaire seriously. There will be no consequences for you if you answer the following question with no. You still get your SONA-credits! Did you answer the questions in this questionnaire seriously? • Yes • No