

Interspecies Social Influence: Humans and Their Cats and Dogs

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Abstract

This study aims to find out about interspecies social influence focusing on how cats' and dogs' influence humans. The sample consisted of 462 participants and was collected mainly from first year university students residing in the Netherlands. The study was conducted as a repeated measures vignette study containing two domains, namely Security and Judgement. In both vignettes the pet reacts to pairs of strangers coming in for a viewing of a room and after which the participant is to indicate who they would choose as a roommate and who they like more. In the Security scenario the pet reacts to one person aggressively and have a neutral reaction to the other person present, we hypothesized that dogs would be more influential in this scenario based on the assumption that dogs are considered more as a group animal opposed to cats. In the Judgement scenario the pet reacts to the strangers favouring one person over the other, for this scenario we expected cats to be more influential. Furthermore, we wanted to examine whether owners and non-owners of cats and dogs would differ in the extent of influence. No significant difference was found between cats and dogs in the Security domain in terms of Liking or Roommate preference. Dogs were found to be more influential than cats in the Judgement domain contrary to our hypothesis. Furthermore, no significant difference was found between Owners and Non-Owners. The main hypothesis was supported, cats' and dogs' behaviours did impact people's feelings and decision making towards strangers.

Keywords: Social Identity Approach, Interspecies Social Influence, Pet Psychology scale, Self-Categorization Theory, Social Identity Theory, Group Identity

Interspecies Social Influence: Humans and Their Pets

Humans are known to be group animals, we like to do things with other people and with our pets. Dogs have been called “Man’s best friend” and cats have been worshipped in the ancient Egypt, both of these examples show how important and close these interspecies friendships have developed to be for both humans and pets. Nowadays our pets are not only useful to us as hunters or keeping rat populations down, but also as companions providing emotional support and joy. Pets can improve one’s wellbeing, help with tasks and keep us company during lockdowns. Intrigued by the interactions between human and non-human species we wanted to examine the possibility of our pets having influence over our decisions. This study aims to find out more about interspecies influence in the direction of cats’ and dogs influencing humans.

There exists a plethora of research about how humans interact and influence each other in anthropology, social psychology and sociology. Social influence is a broad topic, there are several domains that explain why and how we are influenced by other people, both ingroup and outgroup (Spears, 2021). To understand how groups are formed and how they behave, the Social Identity Approach has been applied in the realm of social influence (Turner et al., 1999). The Social Identity Approach combines two similar but distinct theories Social Identity Theory (SIT) and Self-Categorization Theory (SCT) and it is widely researched and cited in the field of social psychology (Turner et al., 1999). According to SCT, there are different levels of abstraction in terms of how humans self-categorize, we can categorize ourselves in the sense of self as in “I” or in groups as in “we” and differentiate outgroup as “them”, these categorizations modify how we perceive things (Spears, 2020). People often belong to several different groups, some being more distinctive “animal lover” than others “cat person” (Turner et al., 1999, Spears, 2021). Humans are more prone to be influenced by people that are in the same category as themselves (Turner et al., 1999, Spears, 2021). After

people have self-categorized themselves as belong in to a group, they self-stereotype, this means that they adopt principles and characteristics of that group as a part of their Social Identity (Tajfel et al., 1971). When people categorize themselves as a part of a group, it leads to depersonalization which means that their personal identities become diluted and they become more homogenous to fit in with their ingroup members (Turner et al., 1999, Tajfel 1971). The more stereotypical a person is within their own ingroup, the better group member they are seen to be (Turner et al., 1999).

Perhaps the idea of Social Identity Approach can be extended to animals too, namely cats and dogs. It is known that owning a cat or dog is known to be beneficial for the well-being of humans, these animal companions can even be perceived as closely bonded as family members (Menchetti et al., 2020, Corkran, 2015). There are a few instances where we might trust an animal's judgement, relating to social influence. Most people have heard of service dogs such as drug detection dogs at the airport or dogs that are trained to help humans that have an illness such as diabetes. There is a long list of duties where dogs are thought to have more expertise than humans due to their heightened olfactory sense or the ability to learn and to fulfil tasks for humans, for example hunting (Corkran, 2015). Although not as common, in Canada cats can also be trained and serve as emotional support animals, even though they cannot get the status of a service animals (MSAR, 2022). Perhaps people can include their service animals and pets into their ingroup, and therefore these animals can influence us.

In this paper we aim to find situations when cats and dogs behaviours can influence people's emotions towards strangers, decision making processes and judgement. There is already some evidence of cats and dogs potentially influencing humans from an earlier vignette study by Plagemann (2022). In his study dogs were found to be more influential than cats, therefore we wanted to design two different scenarios, or domains, with the idea to find a situation where cats could prove to be more influential than dogs.

Humans and cats and dogs have a long history together and we have developed stereotypes about the species based on the history and interactions we have shared. Overall, a common stereotype about dogs is that they are seen as a group animal and they exhibit behaviours that are seen as protective and helpful to humans. It is known that dogs have long been aiding humans in hunting, protection and as companions (Koyasu et al., 2020). On the other hand, the stereotype about cats is that they have been seen as independent and maybe even selfish in their behaviour. It is believed that cats were domesticated for their tendency to keep rat populations and other pests in the minimum around humans (Koyasu et al., 2020). Even though cats and dogs have been domesticated for different reasons, they do have similar abilities to communicate with humans, they can both communicate by using distinct sounds, eye movements and behaviours (Koyasu et al., 2020). Both cats' and dogs use human signalling, which means that they use gaze to communicate with humans and can understand when humans pointing at objects or looking at objects as a cue to look at that object as well (Koyasu et al., 2020). In their study, Koyasy et al., (2020) could not find any significant differences between cats and dogs human signalling, both can follow their owners gaze and can perform actions based on instructions from their owners. The only difference they found was that dogs might ask for more cues from their owner if they could not locate something, while cats' were not inclined to do this and will try to solve a problem without their owner (Koyasu et al., 2020). Cats asking for no extra clues from owner fits the stereotype of cats being more independent than dogs.

On top of having the ability to communicate with humans, it seems that cats and dogs might have Theory of Mind. In an experiment by Koyasy et al. (2020) they conducted experiments about the Theory of Mind assumptions of pets. Especially dogs understood to choose objects to play with based on whether their owners could also see this object, instead of an object only the dog could see, indicating Theory of Mind. Attributing these human like

characteristics such as Theory of Mind to animals is called anthropomorphism.

Anthropomorphising animals is connected to humans seeing non-humans as social beings (Sevillano & Fiske 2017). When one anthropomorphises their pet and includes them in their ingroup, having a pet can increase the owners wellbeing (McConnell et al., 2019).

In a different study by Duranton & Gaunet (2018), they found that dogs prefer people that attempt to synchronize with them behaviourally. Behavioural synchronization is a common phenomenon for humans, it is an adaptive ability to perform actions simultaneously with one other person or multiple people (Duranton & Gaunet, 2018). In their study they introduced strangers to dogs and recorded the dogs' reactions to these new people. They saw that when a stranger would synchronize their behaviour with the dogs, the dogs would prefer the synchronizing person over the other (Duranton & Gaunet, 2018). This is another example of human like communication that pets and in this particular case, dogs can exhibit.

Interestingly, also the humans liked a dog that synchronized with them (Duranton & Gaunet, 2018). These results might also be interpreted as a form of social influence that we can have on animals and animals can have on us.

Nowadays, cats and dogs are both seen as popular pets at least in the Western world and people are often divided in choosing one over the other as their preferred pet. In 2019, there were over 27 million pets in the Netherlands (Nederlandse Voedingsindustrie Gezelschapsdieren, 2020).

Moving along to the hypotheses, our first hypothesis is that pets' behaviour can influence our feelings towards other people. Furthermore, our first hypothesis is based on the underlying idea that when we self-categorize with someone, in this case, our pet, we can be influenced by them. Due to differences in stereotypes and typical behaviours of cats and dogs, we wanted to test the influence these two species can have in humans within two domains, Security and Judgement, which will be explained in detail in due course. Our belief is that

dogs could be more influential in a scenario when they intend to protect the human, in this situation the human might believe there is a reason why the dog does not like this person when it happens in a typical security context. Therefore, we have hypothesized that in the Security scenario dogs are more influential due to the history with dogs providing protection to humans. Furthermore, we thought that in a situation where a cat chooses one person over another, the owner might believe that the cat sees something special about this person as cats are seen to make individual judgements. Hence, we have hypothesized that in the Judgement scenario cats are more influential. The third hypothesis is based on a common stereotype that cats are more fickle and do not like everyone, and when they do, it has more weight. Finally, our fourth hypothesis states that Pet-Owners having more interaction with cats and/or dogs and especially their own pet, they might be more prone to include their pets in their ingroup and anthropomorphise with their pets more, therefore they would be more strongly affected by the pets' behaviours than Non-Owners.

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, one 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 took 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. 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 $\alpha = 0.05$ [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 (See Appendix A). Participants were provided with an informed consent form and an information sheet before starting the experiment. 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 applies 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 (See Appendix A). 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 A). 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” (Appendix A).

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” (Appendix A). 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 (Appendix A).

Pet Psychology Scale

We used a modified version of the Pet Psychology Scale developed by Victor 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 B 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”.

Table 1

Reliability of subscales of Pet Psychology scale.

	Questions	Cats	Dogs
		Cronbach's α	Cronbach's α
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

Attention & Seriousness Check

To improve our data validity we included some items in the questionnaire to evaluate whether the participant paid attention. The last question is a seriousness check where the participants have a chance to indicate if they have taken part seriously in this study or not. It mentions that there will be no consequences if participants answer with “No” to encourage them to answer this question honestly.

Results

Assumptions

The analysis was conducted by using SPSS Statistics 26 software. To test the normality assumption, a Shapiro-Wilk test was conducted and it yielded significant results for all groups, indicating that normality is violated. This result was expected due to the nature and design of the study. Secondly, a Levene's test was conducted to check for a violation of homogeneity assumption which yielded non-significant results. Furthermore, a manipulation check was carried out by comparing Pet Emotions Towards neutral Person A and negative Person B in the Security domain and neutral Person C and positive Person D in the Judgement domain by using a Paired Samples t-test. We expected to see in the Security domain that the neutral Person (A) will be rated higher on positive emotions when they are compared with the results of Person B, who was reacted negatively to. In the Judgement domain we expected that neutral Person (C) is rated less positively than the Person D who got a favourable reaction from the pet. The results of the t-tests indicate that the manipulation was successful in both domains as the results followed our expectations (Appendix B).

Table 2

Group Identity measure

Pet condition		<i>M</i>	<i>SD</i>	<i>F</i> (1, 458)	<i>Partial η</i> ²
Pet	Cat	4.16	0.05	7.41*	.02
	Dog	4.50	0.05	7.41*	.02
Ownership	Owner	4.52	0.03	5.85*	.013
	Non-owner	4.14	0.06	5.85*	.013
Pet*Ownership				2.24	.005

*refers to $p < .05$, ** refers to $p < .001$

Group Identity Measure

The Group Identity Measure was analysed with a Two-Way ANOVA and it yielded significant results for both main effects, Pet condition and Ownership. Dogs scored higher than cats in the Pet condition, which means participants were more likely to form a distinctive group with a dog than with a cat (Table 2). In the Owner condition Pet Owners scored higher than Non-Owners, indicating that participants were more likely to form a distinctive group with a pet if they own one. No interaction effect between Pet and Ownership on the Group Identity Measure was found (Table 2).

Pet Psychology Scale

The reliability of subscales of the Pet Psychology Scale had generally conclusive reliabilities for cats. On the other hand, reliability of the dog scales were acceptable for only “Selfishness” and “Empathy”, whereas the reliability of the subscales “Care for Owner”,

Table 3

Pet Psychology Scale for dogs and cats respectively.

	cats		dogs		<i>t</i> (462)	<i>Cohen's D</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Care For Owner (1)	4.50	1.26	6.05	.76	-26.57**	-1.24
Selfishness (2)	4.44	1.13	3.16	.86	21.18**	.99
Group Mindedness (3)	2.99	.74	5.31	.65	-48.21*	-2.24
Empathy (4)	4.38	1.31	5.68	.82	-22.72**	-1.06
Judgement (5)	4.99	1.06	4.83	.83	2.967**	.14
Security (6)	3.82	1.06	5.74	.74	-35.09**	-1.63

*refers to $p < .05$, ** refers to $p < .001$

“Group Mindedness”, “Security” and “Judgement” were at a questionable level (Table 1 in Method section). Paired t-tests were conducted to compare cats and dogs in the different subscales. All comparisons showed significant differences between cats and dogs (Table 3). Dogs scored higher on social domains, Care For Owner, Group Mindedness, Empathy and Security, while cats scored higher on Selfishness and Judgement (Table 3).

Hypothesis One

The first hypothesis was that pets’ behaviour can influence our feelings towards other people. This hypothesis was tested by comparing the means of the two sliders Liking and Roommate Preference to a neutral answer option. The slider is a measure where we have put the neutral person on one end and the negative or positive person on the other end and participant can choose a spot on a line to indicate their preference. In the Security domain we expected to see lower means as people would choose neutral Person A over the negative Person B. First, in the Security scenario we tested Liking and Roommate Preference of either the neutral Person A or Person B who received a negative reaction, the comparison yielded a significant difference, people were more eager to choose the neutral person as a roommate

Table 4

Sliders comparing the neutral and negative Persons’ in the Security domain and neutral and positive Persons’ in the Judgement domain towards the neutral point.

Scenario	Slider	<i>M</i>	<i>SD</i>	<i>t</i> (461)	<i>Cohen’s D</i>
Security	Liking	20.78	19.42	-32.35**	-1.50
(Neut. vs. Neg.)	Roommate	16.87	19.37	-36.75**	-1.71
Judgement	Liking	76.73	18.82	30.52**	1.42
(Neut. vs. Pos.)	Roommate	77.93	19.86	30.22**	1.41

*refers to $p < .05$, ** refers to $p < .001$

and liked them more as was expected (Table 4). In the Judgement scenario we expected to find higher means when people would prefer Person D who received the positive reaction from the pet over Person C, who received a neutral reaction. Similarly in the Judgement scenario the Liking and Roommate Preference of either neutral Person C or positive Person D yielded a significant difference meaning that people chose the positive Person D as their roommate and liked them more (Table 4). Overall, these results support our hypothesis that pets' behaviour can influence our feelings towards other people.

Hypothesis Two

The second hypothesis stated that dogs are more influential than cats in the Security domain. A MANOVA was conducted for testing of the sliders measuring Liking and Roommate Preference of either the neutral Person A or the negative Person B and did not exhibit a significant difference between the cats and dogs (Table 5). The means were higher for dogs than cats, although it did not reach the significant level. These results do not support our hypothesis, although are in the predicted direction.

Table 5

Sliders comparing the Neutral (A) vs. Negative (B) Persons in the Security domain and Neutral (C) vs. Positive (D) Persons in the Judgement domain (split by cat & dog condition).

Scenario	Slider	Cat		Dog		$F(1,458)$	Partial η^2
		M	SD	M	SD		
Security	Liking	22.23	17.24	19.40	21.24	2.46	.005
(Neut. vs. Neg.)	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
(Neut. vs. Pos.)	Roommate	74.88	19.41	80.85	19.90	10.65*	.023

*refers to $p < .05$, ** refers to $p < .001$

Table 6

Bipolar Scales for comparing neutral (A) and negative (B) Persons' in the Security scenario and neutral (C) and positive (D) Person's in the Judgement scenario.

Bipolar Scales	Person	Cat		Dog		<i>F</i> (1, 460)	<i>Partial</i> η^2
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
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Security (A & B)							
Trust vs. Suspicion	Neutral	2.74	.97	2.62	1.14	4.88*	.01
	Negative	5.48	1.14	5.74	1.35	4.88*	.01
Friendly vs. Unfriendly	Neutral	2.54	1.02	2.41	1.22	10.74**	.02
	Negative	4.82	.10	5.28	1.35	10.74**	.02
At ease vs. Threat	Neutral	2.48	1.02	2.28	1.02	6.32*	.01
	Negative	4.69	1.2	4.89	1.23	6.32*	.01
Compatible	Neutral	2.65	1.13	2.57	1.34	1.22	.00
vs. Incompatible	Negative	5.31	1.11	5.45	1.43	1.22	.00
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Judgement (C & D)							
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Trust vs. Suspicion	Neutral	3.53	.86	3.34	1.00	4.26*	.01
	Positive	2.30	1.07	1.88	.984	4.26*	.01
Friendly vs. Unfriendly	Neutral	3.32	1.09	3.07	1.15	.90	.00
	Positive	2.09	1.06	1.72	0.93	.90	.00
At Ease vs Threat	Neutral	3.20	.97	2.81	1.03	.00	.00
	Positive	2.15	.10	1.77	.92	.00	.00
Compatible vs.	Neutral	3.53	1.10	3.44	1.14	2.83	0.01
Incompatible	Positive	2.19	1.11	1.88	1.10	2.83	0.01

*refers to $p < .05$, ** refers to $p < .00$

Furthermore, the bipolar scales of “Threat”, “Suspicion”, “Unfriendly” and “Compatible” were analysed by using a repeated measures ANOVA. These seven-point scales

asked the participants to rate each stranger on a scale ranging from “Unfriendly” (1) to “Friendly” (7). All scales were significant for the difference between the neutral Person A and negative Person B when also taking into account the Pet Condition (Table 6). The means show that people in the dog conditions have higher means towards the person who received the negative reaction than people in the cat condition, supporting the hypothesis.

Hypothesis Three

The third hypothesis stated that cats are more influential than dogs in the Judgement domain. Again a MANOVA was conducted for testing of the sliders measuring Liking and Bedroom Preference of either neutral Person C or positive Person D, the difference was significant with dogs being more influential. The result of the sliders do not support our hypothesis (Table 5).

Furthermore, the bipolar scales were analysed with a repeated measures ANOVA taking into account Pet Condition. In the Judgement domain, all scales but Trust vs. Suspicion yielded non-significant results (Table 6). These results do not support our hypothesis that cats would be more influential in the Judgement domain.

Table 7

Sliders comparing neutral Person A and negative Person B in Security and neutral Person C and Positive Person D in Judgement split by ownership.

Scenario	Slider	Owner		Non-owner		$F(1, 460)$	Partial η^2
		M	SD	M	SD		
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

*refers to $p < .05$, ** refers to $p < .001$

Table 8

Bipolar Scales comparing neutral Person A and negative Person B in the security scenario and neutral Person C and positive Person D in Judgement scenario (split by ownership).

Bipolar Scales	Person	Owner		Non-owner		<i>F</i> (1, 460)	<i>Partial</i> η^2
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Security (A & B)							
Trust vs. Suspicion	Neutral	2.63	1.03	2.82	1.13	3.27	.007
	Negative	5.73	1.17	5.28	1.40	3.27	.007
Friendly vs. Unfriendly	Neutral	2.44	1.09	2.55	1.26	.003	.000
	Negative	5.09	1.17	4.97	1.32	.003	.000
At ease vs. Threat	Neutral	2.37	1.14	2.39	1.08	1.81	.004
	Negative	4.63	1.24	4.85	1.09	1.81	.004
Compatible vs. Incompatible	Neutral	2.57	1.25	2.72	1.22	.411	.001
	Negative	5.44	1.24	5.20	1.39	.411	.001
Judgement (C & D)							
Trust vs. Suspicion	Neutral	3.38	.93	3.57	.96	.85	.002
	Positive	2.09	1.04	2.06	1.05	.85	.002
Friendly vs. Unfriendly	Neutral	3.16	1.12	3.28	1.16	.27	.001
	Positive	1.91	1.02	1.88	1.00	.27	.001
At Ease vs. Threat	Neutral	2.99	1.03	3.05	.97	.91	.002
	Positive	1.93	1.00	2.03	.92	.91	.002
Compatible vs. Incompatible	Neutral	3.45	1.13	3.59	1.09	.42	.001
	Positive	2.04	1.45	2.01	1.03	.42	.001

*refers to $p < .05$, ** refers to $p < .001$

Hypothesis Four

The final hypothesis stated that Pet-Owners would be more influenced by pets than Non-Owners of pets. To test this hypothesis we conducted a MANOVA for the two scenarios. In the Security domain Liking and Roommate Preference of either neutral Person A or negative Person B split by ownership yielded a significant result. Pet Owners reported lower means than Non-Owners which supports our hypothesis as we expected that people choose the neutral Person (A) in the Security scenario over the negative Person (B) reaction (Table 7). Contrary to the Security domain, the Judgement domain was not significant for Liking and Roommate Preference for either neutral Person (C) or positive Person (D) (Table 7). Then the bipolar scales for were analysed with repeated measures ANOVA comparing the groups by ownership. For each scale no significant differences were found for Persons A and B in the Security scenario or Persons C and D in the Judgement scenario (Table 8). These results are not consistent with our final hypothesis.

Discussion

General conclusions

In this study we aimed to find out whether cats and dogs can influence our decision making and our emotions towards other people. Based on the Social Identity Approach, when we self-categorize with someone, we can be influenced by that someone (Turner et al., 1999, Spears 2021, Tajfel et al., 1971). In our study we wanted to examine if social influence applies to cats and dogs too.

The analysis yielded some contradicting results in so far as some hypotheses were partly supported and partly not. According to the analysis on the Group Identity Measure, the pictorial representations participants chose seem to be overlapping, indicating that they find their pets close to them and that they form a distinctive group with their pets, which is one of the requirements to have this kind of social influence (Turner et al., 1999).

The Pet Psychology scale measures stereotypes and perceived social behaviour of cats' and dogs'. The extent to which humans perceive non-humans as social is culturally dependent (Sevillano & Fiske 2016). The sample of this study consisted of mainly European participants and therefore the Pet Psychology might yield very different results in a different cultural context such as in Asia or Africa. The results of the Pet Psychology scale were not surprising but they show that indeed we see cats and dogs differently and that can explain that dogs were found significantly more influential in one domain. We found that dogs were assumed to have more sociable or positive character traits than cats. Dogs scored significantly higher on Care For Owner, Group Mindedness, Empathy and Security, whereas cats scored significantly higher on Selfishness and Judgement. The scales Security and Judgement relate to our hypotheses two and three and the results on these scales indicate that people do assume that dogs provide security and that cats are better judges of character, in line with our hypotheses.

Our first hypothesis stated that pets can influence our feelings towards other people. We indeed found evidence that animals can influence our feelings towards other people. When we compared Person A who received a neutral reaction and Person B who received a negative reaction in the Security scenario and Person C who also received a neutral reaction and Person D who received a positive reaction in the Judgement scenario against a neutral answer option, we found all these comparisons to be significant. The result indicates that indeed cats' and dogs' have the potential to influence humans emotions towards strangers. The first hypothesis is in line with the theoretical background of Social Identity Approach combined with the results we received from the Group Identity Measure.

The implications became more complicated when looking at the Security domain, we had two different kinds of measures that yielded contradicting results. The second hypothesis stated that dogs would have more influence on humans when acting in a protective way,

hence, reacting negatively towards one of the strangers. The sliders asking the participants to choose between the persons who received a neutral and a negative reaction did not show a significant difference when compared between the Pet conditions. The result might indicate that cats might be overlooked as providing security, or cat owners did not interpret the negative reaction inherently as protective, but take in to account also their cats dislike towards Person B who received a negative reaction. On the other hand the bipolar scales (“Trust vs. Suspicion”, “Friendly vs. Unfriendly”, “At Ease vs. Threatened” and “Compatible vs. Incompatible”) did find a significant difference in favour for dogs, when comparing the neutral Person A and negative Person B providing support for our hypothesis. Therefore it is difficult to say which pet is more influential in the Security domain as the different tests did not yield similar results.

For our third hypothesis we were surprised to find out that dogs were seen more influential in the Judgement scenario when looking at the slider measures. We expected cats to be more influential in a situation when their pet chooses one person over another due to common stereotypes about cats as being discerning or choosy. When we developed the study, we started from the initial idea to find a situation when a cat could be more influential and the Judgement scenario came about. It is interesting to find out that even when the pet reacts positively, dogs are more influential. This might be just our stereotype that dogs would react positively to anyone, therefore it would not mean much to people if their dog likes someone, but this turned out not to be the case. Furthermore, the bipolar scales were not significant when comparing cats and dogs in the Judgement scenario on all measures but “Trust vs Suspicion”. This significant difference between people in the dog and in the cat condition was found when comparing neutral Person C and negative Person D with dogs having higher means. The result does not provide support for the hypothesis. Again it is difficult to draw conclusions about Judgement with the contradictory results from the sliders and bipolar

scales. It might simply mean that in both Security and Judgement domain, cats and dogs are not that much different in the extent of influence, even though dogs have scored significantly higher on some bipolar scales, indicating an influence on emotions rather than Liking or Roommate preference.

Our last hypothesis expected to find that Pet-Owners would be more influenced than the Non-Owners, but this result was not fully supported by the data. The only significant results between the Owners and Non-Owners was found in the Security domain. The reason could be that Pet-Owners take the situation more seriously than Non-Owners. It might be more difficult for Non-Owners to imagine this scenario for themselves than the scenario where the pet just picks one person over the other. A study by Tami and Gallagher (2009) did not find a significant difference between dog owners and non-owners in interpreting negative emotions exhibited by dogs. Fidler et al. (1996) on the other hand found that Non-Owners were less capable of interpreting the dogs' behaviours than dog Owners. The results of these two studies show that even when the Non-Owners might detect the dogs emotions accordingly, they might not interpret the behaviour as seriously or correctly as an Owner might (Tami & Gallagher, 2009, Fidler et al., 1996). The Pet- Owners scored higher on the Group Identity Measure which indicates that the participants felt that they form a distinct group with their pets, more than Non-Owners. It makes sense that Non-Owners do not find their imaginary pet as close as a Pet-Owner would find their real pet to be, even though they did have surprisingly high means. It is interesting that this assumption was not confirmed by the results on the sliders Liking and Roommate preference.

Our results replicated some of the results of an earlier study by Plagemann (2022). Plagemann (2022) found dogs to be more influential in a similar vignette study. Our results showed that dogs in general had higher means in the Security and Judgement domain in comparison to cats. Another aspect of Plagemann's (2022) study was not fully replicated

which was that the Pet-Owners would be more influenced by their pets behaviour than Non-Owners. We could not find conclusive evidence for this difference.

Implications

The theoretical implications of this study are that cats and dogs do have the potential to influence humans. We found that people did form a distinct group with their pet when using the Group Identity measure and the general hypothesis was supported, cats' and dogs' behaviours can influence humans emotions and decision making. Furthermore, the results support the idea that the Social Identity approach can be extended to cats and dogs.

Limitations of the study

As in every study, there are some limitations. We noticed that most of the significance tests had low effect sizes, in a future study, a larger sample size can help determine whether or not we had a sample size too small, or it could be that the effects in general are small.

A further downside of this study is its design. In a quasi-experiment, random assignment is not possible and therefore some inherent differences between the groups are likely. There were far more participants that fell into the category of Pet-Owner ($n = 339$) owning either a cat or a dog or both than Non-Owners ($n = 123$), making these groups unequal making the comparisons between Owners and Non-Owners less reliable.

This study was conducted as a vignette study due to time and budget limitations. The external validity of vignette studies might be questionable, although vignette studies have several positive aspects, such as good level of construct and internal validity (Steiner 2017 et al., 2017). We aimed to find scenarios that would be as realistic as possible for both cats and dogs and adjusted the behaviour of the pets to fit their species. Therefore the vignettes had slight differences in the descriptions based on species, we attempted to make the dog scenario seem like a typical description of dog like behaviour in both scenarios and adjusted the cat scenarios to be realistic for cat behaviour (See Appendix A).

Future Research

This area of Social Influence, namely influence between humans and pets, generally seems to lack research. Interspecies social influence should be further studied to find out more about how this influence happens and to what extent. Continuing from this study and the study by Plagemann (2022) a bigger sample size and a more realistic setting could provide more information and support for the hypotheses in both studies. The possibility to test the hypotheses with actual cats and dogs and their owners could provide more generalizable information and nuance than a vignette study could (Steiner 2017). The study of interspecies social influence could be extended to different domains and to different species to find out more about animals' potential to influence humans. Interesting animals to further study could be for example other pets such as pet birds.

Final Conclusions

Our study shows that cats' and dogs' behaviours can indeed influence our emotions and decision making, and in our case, choosing of a potential roommate. Overall, dogs seem to be more influential than cats, as shown by Plagemann (2022) earlier. Cats do have influence, but seemed to fall short of that of dogs. Hopefully in future research this difference in social influence between cats and dogs can be further explored. Additionally, we found that people in the dog condition were more likely to form a distinctive group with their pets, even though also people in the cat condition rated quite high. Furthermore, our findings support the idea that Social Identity Approach can be extended to animals, at least to our furry friends, cats and dogs.

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Appendix A

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.**

Researchers:

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Liukkonen, Iida

Ostendorf, Lucie

Restuccia, Annabel

Stienissen, Nikita

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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. <ul style="list-style-type: none"> • Female • Male • Non binary/third gender • Prefer not to say
Nationality	Please indicate your nationality. <ul style="list-style-type: none"> • Dutch • German • English • Other (text box)
Ownership dog	Do you own a dog now or have owned a dog? <ul style="list-style-type: none"> • Yes • No
Ownership cat	Do you own a cat now or have owned a cat? <ul style="list-style-type: none"> • 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)? <ul style="list-style-type: none"> • 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

-

Intro 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)	<p>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.</p> <p>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.</p> <p>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.</p> <p>Please answer the following questions about this situation:</p>
Description (cat condition)	<p>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.</p> <p>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.</p>

	<p>Please answer the following questions about this situation.</p>
<p>Emotions pet towards acquaintance</p>	<p>How do you think your cat/dog feels towards Person A in this situation? (7-point scale: not at all to extremely)</p> <ul style="list-style-type: none"> • Happy • Angry • Fearful • Sad • Curious • Positive • Negative • Friendly • Hostile
<p>Emotions pet towards acquaintance</p>	<p>How do you think your cat/dog feels towards Person B in this situation? (7-point scale: not at all to extremely)</p> <ul style="list-style-type: none"> • Happy • Angry • Fearful • Sad • Curious • Positive • Negative • Friendly • Hostile
<p>Emotions Participant towards pet</p>	<p>How do you feel towards your cat/dog in this situation? (7-point scale: not at all to extremely)</p> <ul style="list-style-type: none"> • 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)	<p>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.</p> <p>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.</p> <p>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.</p> <p>Please answer the following questions about this situation</p>
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Description (cat condition)	<p>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.</p> <p>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.</p> <p>Please answer the following questions about this situation.</p>
Emotions pet towards acquaintance	<p>How do you think your cat/dog feels towards the acquaintance in this situation? (7-point scale: not at all to extremely)</p> <ul style="list-style-type: none"> • Happy • Angry • Fearful • Sad • Curious • Positive • Negative • Friendly • Hostile
Emotions Participant towards acquaintance	<p>How do you feel towards Person A in this situation? (7-point scale: not at all to extremely)</p> <ul style="list-style-type: none"> • 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) <ul style="list-style-type: none"> • 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)

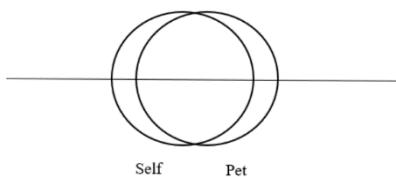
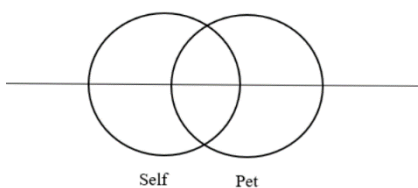
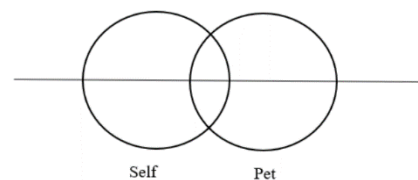
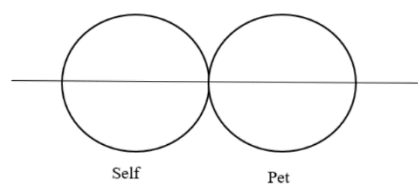
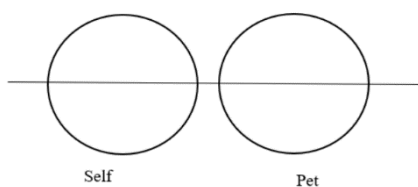
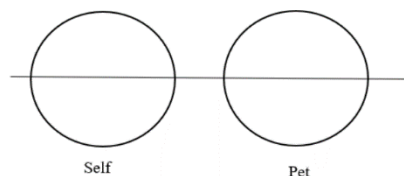
Bipolar Scale At ease vs. Threat	How does your cats/dogs behaviour make you feel towards Person C? (7-point scale: At ease to Threat)
Bipolar Scale Friendly vs. Unfriendly	Based on your cats/dogs behaviour could Person C be potentially friendly or unfriendly? (7-point scale: Unfriendly to Friendly)
Bipolar 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)

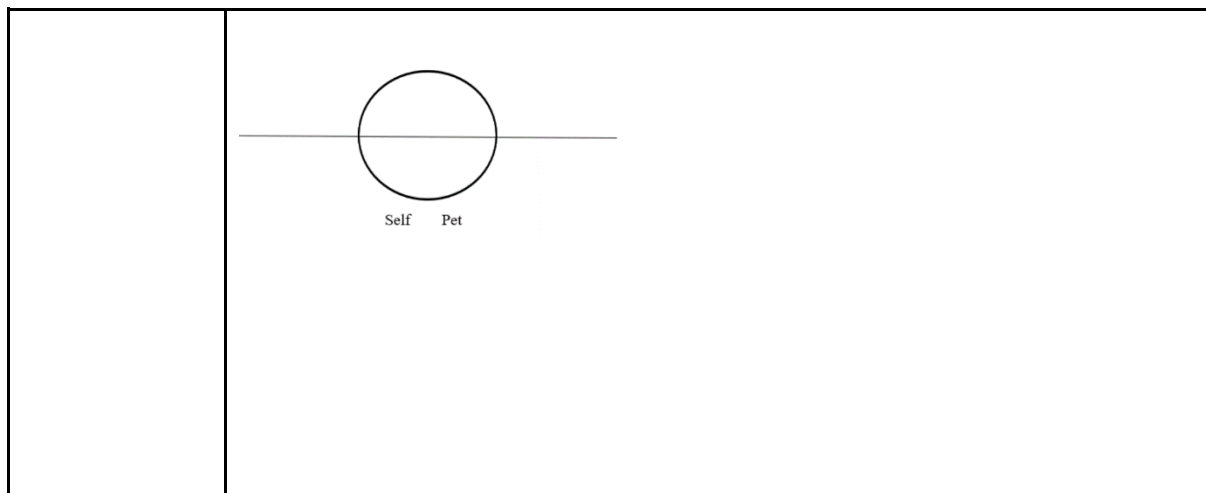
Group Identity measure:

Pictorial
measure of
Group Identity

The images you see below represent yourself and your pet as well as 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?





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	<p>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!</p> <p>Did you answer the questions in this questionnaire seriously?</p> <ul style="list-style-type: none"> • Yes • No
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Appendix B*Perceived Emotion of Pet Towards Strangers A & B and C & D*

	Emotions	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Person A x B	Happy	1.77	1.49	25.63	461	<.001
	Angry	-3.76	1.84	-43.89	461	<.001
	Fearful	-3.73	1.87	-42.93	461	<.001
	Sad	-.94	1.64	-12.41	461	<.001
	Curious	-1.24	1.73	-15.43	461	<.001
	Positive	1.83	1.65	23.83	461	<.001
	Negative	-3.97	1.70	-50.18	461	<.001
	Friendly	1.64	1.64	21.40	461	<.001
	Hostile	-3.97	2.26	-37.79	461	<.001
Person C vs. D	Happy	-2.76	1.67	-35.58	461	<.001
	Angry	.36	.90	8.62	461	<.001
	Fearful	.50	1.10	9.79	461	<.001
	Sad	.35	.95	7.90	461	<.001
	Curious	-3.69	1.94	-40.91	461	<.001
	Positive	-2.88	1.71	-36.21	461	<.001

Negative	.84	1.24	14.70	461	<.001
Friendly	-3.17	1.77	-38.55	461	<.001
Hostile	.25	1.27	4.22	461	<.001
