A Cross-Cultural Comparison of Cat-Human Relationships in the United States and Japan

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Abstract

Across the world, more and more cats are being kept in captive spaces such as homes, animal shelters, and newly emerging cat cafés. There is a growing need to understand whether cross-cultural differences influence human-animal interactions in these human-controlled environments. Cats are one of the world's most popular companion animals and both the United States and Japan have high rates of cat ownership. However, cultural differences may account for differences in how people feel about cats and how humans and cats behave toward one another. The research aim was to examine whether differences exist between the United States and Japan across multiple facets of the human-cat relationship. Study 1 examined each country's public attitude toward pet cats. Results indicate U.S. citizens have significantly more positive attitudes toward pet cats than Japanese citizens. Study 2 examined owner attachment to their cat and pet cat social behavior. Results indicate owners in both countries were highly attached to their cats. In the United States, but not Japan, owner attachment level predicted pet cat sociability toward the owner. Study 3 also examined cat social behavior in cat cafés. The results of Study 2 and Study 3 indicate that pet cats and café cats in the United States spend a greater proportion of testing time in proximity to people compared to pet and café cats in Japan. In all, differences and similarities were seen between the United States and Japan. In humans, differences in childhood cat experiences and lower rates of cat ownership may impact attitudes toward cats. In pet cats, owner characteristics, the size of the cat's environment, cat care practices, and attitudes toward cats may impact cat social behavior. Future exploration in this area can benefit our understanding of cross-cultural human-animal interactions and how to apply these findings to improve

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captive cat welfare.

Keywords

Felis catus; cat; companion animal; human–animal interaction; cross-cultural

Introduction

The domestic cat (*Felis catus*) has lived in association with humans for thousands of years. The earliest evidence of human-cat relationships appears approximately 9,500 years ago (Vigne, 2004) and has persisted into the modern day. Domestic cats are ubiquitous in human spaces and live in our homes, on our streets, on our farms, and within our many unique cultural contexts. Domestic cats display flexible social behavior that is greatly dependent on environment and life experiences (Izawa & Doi, 1993; Vitale, 2022). Some cats live in a free-roaming state, where the cat has no human-imposed constraints on their movement (Vitale, 2022). Other cats are kept in a captive state, where the cat is constrained to a location and dependent on their human caregiver for survival (see Boice, 1981). Cats are also kept by humans for a variety of purposes. Some cats are kept for their utility, such as their ability to hunt for mice (i.e., barn cats). Other cats are kept as companion animals (i.e., pet cats) and live in close association with humans with the primary goal being enjoyment or companionship rather than utility (Jorgenson, 1997). Cats may also live in animal shelters temporarily with the purpose of finding a permanent home. Finally, cats are kept in other captive settings, such as cat cafés, with the purpose of attracting people to visit and at times to adopt the cats. With around a quarter of global households owning at least one cat (Growth from

Knowledge, 2016) and businesses such as cat cafés becoming more common across the world (Banks, 2020), there is a great need for research about cultural differences in perceptions of cats and in interactions between humans and cats living in human-controlled environments.

Because cats that live in captive spaces (e.g., homes, shelters, cat cafés) may experience the greatest amount of human influence or control, they may also be susceptible to sociocultural factors in terms of human-cat interactions as well as perceptions about the animal's role in society (Mueller, 2014). One study examined staff perspectives at Indian animal shelters and compared those to the perspectives of staff in Western shelters. Although some issues were similar across cultures, distinct issues were identified in Indian animal shelters that were related to that country's culture-specifically to religious beliefs, governmental support, and community-based care issues within the country. These included challenges such as conflict with governmental policy, inability to solicit donations, and community conflict (Srinivasa et al., 2022). Another study conducted in the United States examined attitudes toward domestic cats, specifically whether cats should be kept indoors only (i.e., fully in captivity) or be allowed to free-roam. Researchers found that a person's attitudes toward captive and free-roaming cats differed based on the characteristics of the person (Lord, 2008). Key characteristics included whether they were a cat owner or non-owner and the location where the person lived (i.e., urban, suburban, rural). Rural residents more often reported allowing their cats to free-roam whereas urban residents more often reported that free-roaming cats were a problem. Cat owners were more likely to disagree with

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implementing laws that forbid cats to free-roam. In all, characteristics of the human, which includes their culture or experience with cat ownership, have the potential to impact cat care practices and welfare.

A person's attitude toward animals can also be shaped by cultural factors. The amount or quality of animal-related experiences encountered by an individual can vary cross-culturally and impact a person's attitude toward animals. In a cross-cultural comparison of university students in the United States and Japan, U.S. students rated animal intelligence higher than Japanese students (Nakajima et al., 2002). A positive association has been found between having childhood experiences with animals and viewing pets favorably as an adult (Miura et al., 2002). Compared to Japanese students, university students in the United Kingdom had significantly more pets and animal-related experiences as children as well as more positive attitudes toward pets and a greater interest in animal welfare issues as adults (Miura et al., 2002). Despite having fewer childhood pet experiences, many Japanese still show high levels of commitment to their pets. The rate of relinquishment of pets to shelters is low for Japanese owners, especially compared to owners with equivalent pet experience in the United States (Hart et al., 1998). Additionally, Japanese citizens found euthanasia of dogs to be less acceptable than British citizens (Miura et al., 2000). With notable similarities and differences between Japan and Western countries such as the United States and United Kingdom, further exploration of cross-cultural factors is needed.

Both the United States and Japan are ranked in the top ten countries with the highest

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rate of cat ownership. However, there are proportionally fewer pet cats owned in Japan than in the United States. In 2020, there were approximately 60 million cats in U.S. homes, with 26% of U.S. households owning a cat (AVMA, 2022). Alternatively, in 2023 in Japan, there were approximately 9 million cats in Japanese households with 8.69% of households in Japan owning a cat (Japan Pet Food Association, 2023). Additionally, both countries have cat cafés. Japan has more than 150 of these cafés, more than any other country in the world (Lemmin-Woolfrey & Lastoe, 2019). In the United States the idea has quickly caught on, with approximately125 cafés currently in operation in the country, 44 of which opened in 2017 alone (Banks, 2020; Lemmin-Woolfrey & Lastoe, 2019).

Although cats are common companion animals in both countries, demographic differences in family structure exist between Japan and the United States which may affect the way people interact with their cats. The estimated 2023 birth rate in Japan is low compared to the US (6.9 vs. 12.21 births during a year per 1,000 persons) (Central Intelligence Agency, 2023). In homes without children, the cat may more often fill the role of a child (Veldkamp, 2009). A study of Japanese pet owners found significant differences in self-reported attachment level between respondents in homes with children and without children (Volsche et al., 2023). This suggests that relationships with companion animals may differ based on the structure of the family. Distinct cultural differences may account for differences between the countries in terms of how people feel about cats as pets, how people feel about their own cat, and how humans and cats behave toward one another.

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The current research was comprised of three studies examining cultural differences in the human-cat relationship:

The aim of **Study 1** was to characterize public attitudes toward pet cats in Japan and in the United States based on participant responses to the *Pet Attitude Scale* (Templer & Arikawa, 2011). It was expected that participants from both countries would report having a positive public attitude toward cats, but that higher scores on the Pet Attitude Scale would be found within the culture where the greatest proportion of people own pets and have had the most animal-related childhood experiences, which at the time of this publication was the United States (Miura et al., 2002).

The aim of **Study 2** was to determine whether differences in both owner attachment and cat social behavior were observed between the two countries based on participant responses to the *Lexington Attachment to Pets Scale* or *LAPS* (Johnson et al., 1992) and participation in a behavioral test (Paired Attachment Test or PAT). The LAPS provided data on the strength of owner reported attachment and the PAT provided social behavior data on the proportion of time pet cats spent in proximity to an owner and a stranger. It was expected that both owner-reported attachment and pet cat social behavior would be higher in cultures that more often view their pet as a member of the family. Finally, owner attachment and pet cat sociability should mirror differences found in the Pet Attitude Scale in Study 1. Specifically, if on average, one country is found to have lower scores on the PAS, then this country would also be predicted to have lower LAPS

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scores among cat owners and pet cats would be expected to display less proximity-seeking behavior toward people.

Finally, the aim of **Study 3** was to determine whether differences between the countries exist for cats in another captive setting, cat cafés. Café cat social behavior was based on participation in a behavioral test. The Sociability Test provided social behavior data on the proportion of time café cats spent in proximity to a stranger. We expected that café cat social behavior would be higher in cultures in which humans initiate more social interactions. Individuals who choose to visit cat cafés may be more motivated to initiate interactions with cats, possibly creating a rich social reinforcement history.

Materials and Methods

Ethical Considerations

This research was conducted in compliance with regulations set forth by Oregon State University's Institutional Animal Care and Use Committee (IACUC), under ACUPs #4837, #2019-0013 and #2022-0286 as well as Oregon State University's Institutional Review Board (IRB), under IRB #8391.

Subjects

Study 1 Subjects

Citizens of the United States and Japan were solicited via social media (Reddit, Instagram, Lab Website, etc.) and word of mouth. Surveys were collected March 2018-November 2019. A total of 116 PAS responses were collected from the Japanese version of the survey and 201 PAS responses from the English version of the survey.

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Only those who indicated a country of citizenship were included in the data analysis. One hundred and eleven Japanese citizens participated, and 197 U.S. citizens participated. The demographics of PAS participants are included in Results, Table 1.

Study 2 Subjects

People with pet cats were recruited from areas primarily in and around Kyoto from January 2018 – March 2018. Twenty people and their pet cats participated in the research. However, 3 videos were dropped from the dataset due to testing inconsistencies (see Results). Of the 17 cats with usable data, the cats' ages ranged from 8 months to 10.8 years old (mean = 5.5 years, SD = 2.9 years) and included 8 female and 9 male cats from 10 different households. The length of time the cat had been in the household ranged from 2 months to 10 years (mean = 5 years, SD = 2.9 years), with 2 cats of unknown length in the home. People with pet cats were also recruited from the United States in areas surrounding Corvallis, Oregon from June 2018 – November 2019. Seventeen pet cats participated in the research with their owner. However, two videos were dropped from the dataset due to testing inconsistencies. Of the 15 cats with usable data, the cats' ages ranged from 1.3 years to 11.8 years old (mean = 6.7, SD = 3.3) and included 7 female cats and 8 male cats from 10 different households. The length of time in the household ranged from 8 months to 11.55 years (mean = 5.8 years, SD = 3.5 years), with 1 cat of unknown length in the home.

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Study 3 Subjects

Twenty-three cats from three Japanese cat cafes in Kyoto were tested between January 2018 – March 2018. Café cats ranged in age from 9 months to 8.5 years old (mean = 3.8, SD = 2.7) and included 8 female and 15 male cats. The length of time in the cafe ranged from 2 months to 3 years (mean = 0.67 years, SD = 0.83 years), with four cats of unknown length in cafe. Twenty-three cats from one U.S. cat café in Washington State were tested in February 2023. Cats ranged in age from 1 year to 10 years old (mean 3.1, SD = 2.4) and included 13 female cats and 10 male cats. The length of time in the U.S. cafe ranged from 1 month to 3 years (mean = 0.94 years, SD = 0.8 years).

Survey & Behavioral Methods

Study 1 Methods

The Pet Attitude Scale (PAS) was translated from English to Japanese by a U.S. based professional translator. The surveys were then translated from Japanese back into English by native Japanese speakers to ensure the meaning of the questions stayed the same. The PAS was provided in Japanese and English via Google Forms and open to any Japanese or U.S. citizen, independent of cat ownership. Study information was provided on the first page of the survey, at which time participants were asked to consent to study involvement prior to participating in the survey. Scoring of surveys followed as described in Templer and Arikawa (2011). Items 4, 6, 9, 12, 13, 15, and 17 were reverse scored (i.e., a response of 1 is scored as 7) and the sum of all 18 questions was taken. The highest possible score was 126. Higher scores indicate more positive attitudes toward cats as pets.

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Study 2 Methods

The Lexington Attachment to Pets Scale (LAPS) was translated from English to Japanese by a U.S. based professional translator. The surveys were then translated from Japanese back into English by native Japanese speakers. Each owner was provided with the LAPS either in Japanese or English. Study information was provided on the first page of the survey, at which time participants were asked to consent to study involvement prior to participating in the survey. The LAPS was completed either on paper immediately following the behavioral test or on Google Forms. Surveys were collected January 2018- November 2019. Scoring of surveys followed as described in Johnson et al. (1992). Items 8 and 21 were reverse scored and the sum of all 23 questions was taken. The highest possible score was 46.

The Paired Attachment Test (PAT) occurred in a room of the owner's home. The testing room had two circles of 1 m circumference with an X in the center of each circle marked out in tape on the ground. The two circles were spaced 0.5 m from each other (end to end). A start line was placed 0.5 m away from the center of the space between the circles (Figure 1). The owner and a stranger (both citizens of the country being represented) each sat on an X marked in the center of one of the circles. The side in which the stranger and owner sat (left circle or right circle) was counterbalanced across subjects. Both people were instructed to stay on the X in their designated circle for the full duration of the testing session. The same cats, humans, and experimenters were used for both phases of the test.

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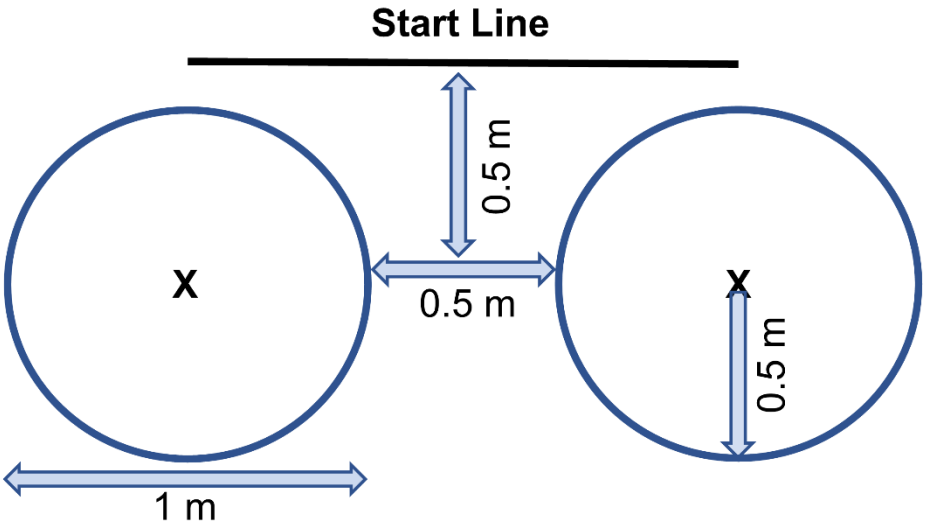

Figure 1: The testing set-up for the Paired-Attachment Test. The X indicates the location where a human sat; one human per circle.

The PAT was composed of two phases, each lasting two minutes:

1) Inattentive Phase: An experimenter placed the cat behind the start line. Both the owner and stranger remained quiet, ignoring the cat and looking at the floor. Each time the cat entered a circle the person was permitted to touch the cat two times but could have no further interaction with the cat (no talking, looking at the cat, or further interactions except for the two strokes whenever the cat entered the circle).

2) Attentive Phase: The experimenter placed the cat behind the start line. At the start of the active phase, both humans call the cat and tried to attract the cat into their circle. Once the cat made its initial choice and entered a circle (cat had at least two paws within the circle) the human sitting within that circle could continue to freely interact

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with the cat while the other human was required to sit passively. Once the cat left the experimenter's circle, both people were required to sit passively for the rest of the phase, unless/until the cat entered one of the human proximity circles again, at which point the human in that circle could freely interact with the cat. The only exception being that neither human was allowed to pick up or restrain the cat at any time.

The inattentive phase always came before the attentive phase for all cats and the attentive phase always occurred immediately following the end of the inattentive phase, with just a short duration of time passing for the experimenter to set the cat back behind the line. All tests were video recorded and cat behavior was coded from video at a later date by one of the study authors (K.V.). In order to ensure no coding bias, 30% of the videos (a standard number for inter-rater reliability, in this case 19 videos) were viewed and analyzed by a second, independent coder who was blind to the purpose of the experiment.

Study 3 Methods

The Sociability Test followed the procedure of Vitale and Udell (2019) except for variation in the circle set-up to accommodate smaller testing spaces. The test occurred within the cat café, in a testing area blocked off from other cats. An X was placed on the floor against the wall and a 1 m radius half circle marking of tape placed out from around the X (Figure 2). A research assistant, who was a citizen of the country being tested in and was a stranger to the cat, sat on the X marked in the circle.

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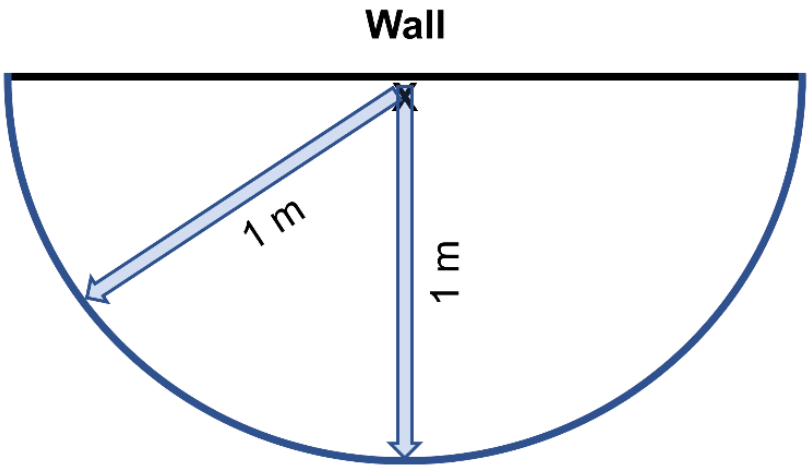

Figure 2: The testing set-up for the Sociability Test.

The sociability test was composed of two phases, the inattentive phase and the attentive phase, that were each two minutes long.

1) Inattentive Phase: The stranger sat on the floor on the X inside the circle and remained quiet, ignoring the cat and looking at the floor. Each time the cat entered the 1 m radius circle the person could touch the subject two times, but the person had no further interaction with the cat (no talking, looking at the cat, or further interactions except for the two strokes when the cat first entered the circle).

2) Attentive Phase: The stranger now called the cat by name and tried to make contact with it (trying to keep the cat's attention and coaxing it to come into the circle to be petted) for as much of the two minutes as possible. The stranger was free to interact. However, they were not allowed to restrain the cat. If the cat moved out of reach, the

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person continued to try to attract the cat's attention for the entire two minutes but the person never got up or left the X on the floor.

Both phases were video recorded and the cat's behavior was coded from video at a later date by one of the study authors (K.V.). Thirty percent of the videos (28 videos) were viewed and analyzed by a second, independent coder blind to the purpose of the experiment.

Statistical Analysis

Mann–Whitney U tests were used for comparisons between groups and were run using the Social Science Statistics Calculator (Stangroom, 2024). The U value was reported if both group sample Ns were less than 20, the z value was reported if one or both sample group N were greater than 20. Linear regression analyses were used to compare owner data to pet cat data and were run in GraphPad (GraphPad Software, 2024). All statistical tests had an alpha level of 0.05 with the exception of cases in which multiple pairwise comparisons were conducted in Study 1 with PAS data. In this case a Bonferroni Corrected alpha of 0.017 was used for average comparisons and a corrected alpha of 0.0028 was used for comparison of individual PAS questions. The raw data from the study are available in the online supplemental file.

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Results

Study 1 Results

Only survey responses which indicated a country of citizenship were included in the data analysis. In all, 111 Japanese citizens participated and 197 U.S. citizens participated. The demographics of PAS participants are included in Table 1 and includes details about participant age, gender, and cat ownership for surveys which included these responses. 'Other Gender Identity' included responses such as Agender, Transgender, and Non-binary. 'Other Cat Relationship' included responses such as feeding feral cats or knowing cats of family members that live in different households. As seen in Table 1, both populations were skewed toward more female respondents, with this being seen more in the U.S. population. The U.S. sample was also heavily skewed toward participants who owned cats, whereas the Japanese sample was more balanced between cat owners and non-owners.

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Table 1. Pet Attitude Scale demographics from Japanese and U.S. citizens. Includes age range, mean age and standard deviation, counts and percentages of gender, and counts and percentages of cat ownership.

Japanese Citizen PAS Demographics

Age Range	Mean Age & SD	Female	Male	Other Gender Identity	Owns Cat	Does Not Own Cat	Owned Cat in Past	Other Relationship
Age N= 106			*Gender N = 111*			*Ownership N = 111*		
(18 – 84)	Mean = 37.3, SD = 12.8	72 **64.9%**	39 **35.1%**	0 **0%**	56 **50.5%**	54 **48.6%**	1 **0.9%**	0 **0%**

U.S. Citizen PAS Demographics

Age Range	Mean Age & SD	Female	Male	Other Gender Identity	Owns Cat	Does Not Own Cat	Owned Cat in Past	Other Relationship
Age N=182			*Gender N = 195*			*Ownership N = 197*		
(19 – 89)	Mean = 40.4, SD = 14.2	165 **84.6%**	25 **12.8%**	5 **2.6%**	172 **87.3%**	17 **8.6%**	5 **2.6%**	3 **1.5%**

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The overall PAS scores of 111 Japanese citizens and 197 U.S. citizens were examined. Japanese scores ranged from 51-122 (median = 105, SD = 15.6) and U.S. scores ranged from 78-126 (median = 113, SD = 8.9). A Mann-Whitney U test was run to evaluate whether PAS score differed by country. U.S. citizens had significantly higher overall PAS scores than Japanese citizens (z = 7 .4, p < 0.00001).

The overall PAS score was also sorted by ownership type, ownership vs. non-ownership. The PAS responses of 56 Japanese cat owners (median = 109.5, SD = 11.8) and 172 U.S. cat owners (median = 113, SD = 8.8) were compared. A Mann-Whitney U test was performed to assess whether PAS scores for cat owners differed by country. U.S. cat owners had significantly higher overall PAS scores than Japanese cat owners (z = 3.5, p = 0.00046). The overall PAS responses of 54 Japanese cat non-owners (median = 97, SD = 16.1) and 17 U.S. non-owners (median = 113, SD = 10) were also compared. A Mann-Whitney U test was run to evaluate whether PAS scores for cat non-owners differed by country. U.S. non-owners had significantly higher overall PAS scores than Japanese non-owners (z = -3.8, p = 0.00012).

Mann-Whitney U tests were also run to assess whether overall PAS scores within each country differed by ownership type (ownership vs. non-ownership). For Japanese responses, cat owners had significantly higher overall PAS scores than non-cat owners (z = 5.4, p < 0.00001). However, no significant difference was found when comparing U.S. cat owners and non-owners (z = 0.88, p = 0.38).

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Individual questions on the PAS were also compared between countries. Significant differences were not seen on questions Q1, Q2, Q4, Q7, Q9, Q10, and Q18 (Mann–Whitney U, all $p > 0.0028$). However, significant differences between Japanese and U.S. citizens were seen on the remainder of the PAS questions (Table 2) with U.S. responses having higher values than Japanese responses for these questions.

Table 2. Pet Attitude Scale significant results for individual questions. †Indicates a reverse scored question.

Question	Median	SD	Mann–Whitney U Results
3. I would like to have a cat in my home.	US = 7 JPN = 7	U.S. = 0.79 J. P. = 1.8	$z = 4.7$, $p < 0.00001$
5. House cats add happiness to my life (or would if I had one).	US = 7 JPN = 7	U.S. = 0.57 J. P. = 1.1	$z = 5.3$, $p < 0.00001$
6. I feel that cats should always be kept outside.†	US = 7 JPN = 6	U.S. = 0.83 J. P. = 1.1	$z = 5.1$, $p < 0.00001$
8. I have occasionally communicated with my cat and understood what it was trying to express (or would if I had one).	US = 7 JPN = 6	U.S. = 0.92 J. P. = 1.3	$z = 8.3$, $p < 0.00001$
11. I love cats.	US = 7 JPN = 7	U.S. = 0.59 J. P. = 1.5	$z = 4.9$, $p < 0.00001$
12. Animals belong in the wild or in zoos, but not in the home.†	US = 7 JPN = 6	U.S. = 1.2 J. P. = 1.3	$z = 7.2$, $p < 0.00001$

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13. If you keep cats in the house you can expect a lot of damage to furniture.†	US = 5 JPN = 2	U.S. = 1.8 J. P. = 1.5	$z = 10.4$, $p < 0.00001$
14. I like housecats.	US = 7 JPN = 6	U.S. = 0.47 J. P. = 1.4	$z = 8.0$, $p < 0.00001$
15. Cats are fun but it's not worth the trouble of owning one.†	US = 7 JPN = 7	U.S. = 0.84 J. P. = 1.4	$z = 3.6$, $p = 0.00026$
16. I frequently talk to my cats (or would if I had one).	US = 7 JPN = 6	U.S. = 0.66 J. P. = 1.6	$z = 7.5$, $p < 0.00001$
17. I hate animals.†	US = 7 JPN = 7	U.S. = 0.16 J. P. = 0.9	$z = 3.3$, $p = 0$ .00086

Study 2 Results

In the United States, 17 LAPS surveys were collected from cat owners. In Japan, 19 surveys were collected. The LAPS scores of 17 U.S. citizens ranged from 20 – 44 (median = 31, SD = 7.6). The LAPS scores of 19 Japanese citizens ranged from 5 – 39 (median = 29, SD = 10.2). A Mann-Whitney U test found no significant difference in overall LAPS score between U.S. and Japanese owners ($U = 131.5$, $p = 0.35$)

As far as behavioral data from the Paired Attachment Test, 17 pet cats from Japan and 15 pet cats from the United States were included in the dataset. A total of 5 cats were

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dropped from the data set due to testing inconsistencies. Inconsistencies included deviations from the experimental procedure, (e.g., person failed to pay attention to the cat in the attentive phase), or if there was a problem with the testing video (e.g., unable to fully see the circle in the video frame to accurately code the video). The proportion of time spent in proximity to the owner and stranger in the PAT were analyzed. Agreement was found on all 19 videos with an inter-observer reliability score of 100%.

Mann-Whitney U tests were run to evaluate whether the proportion of time the cat spent in proximity to each person in each phase of human attentional state differed by country. For the inattentive owner phase, no significant difference in time spent in proximity was found when comparing cats in Japan and the United States (J.P. Median = 0, J.P. SD = 0.05; U.S. Median = 0.11, U.S. SD = 0.10; $U = 79$, $p = 0.07$). However, in the attentive owner phase, cats in the U.S. spent significantly more time in proximity to the owner than pet cats in Japan (J.P. Median = 0, J.P. SD = 0.06; U.S. Median = 0.08, U.S. SD = 0.29; $U = 60.5$, $p = 0.01$, Figure 3a). When examining behavior toward the stranger on the PAT, U.S. cats spent significantly more time in proximity to the inattentive stranger than pet cats in Japan (J.P. Median = 0, J.P. SD = 0.08; U.S. Median = 0.13, U.S. SD = 0.12; $U = 51.5$, $p = 0.004$, Figure 3b). However, no significant difference was seen in the attentive stranger condition (J.P. Median = 0, J.P. SD = 0.21; U.S. Median = 0, U.S. SD = 0.24; $U = 123$, $p = 0.9$).

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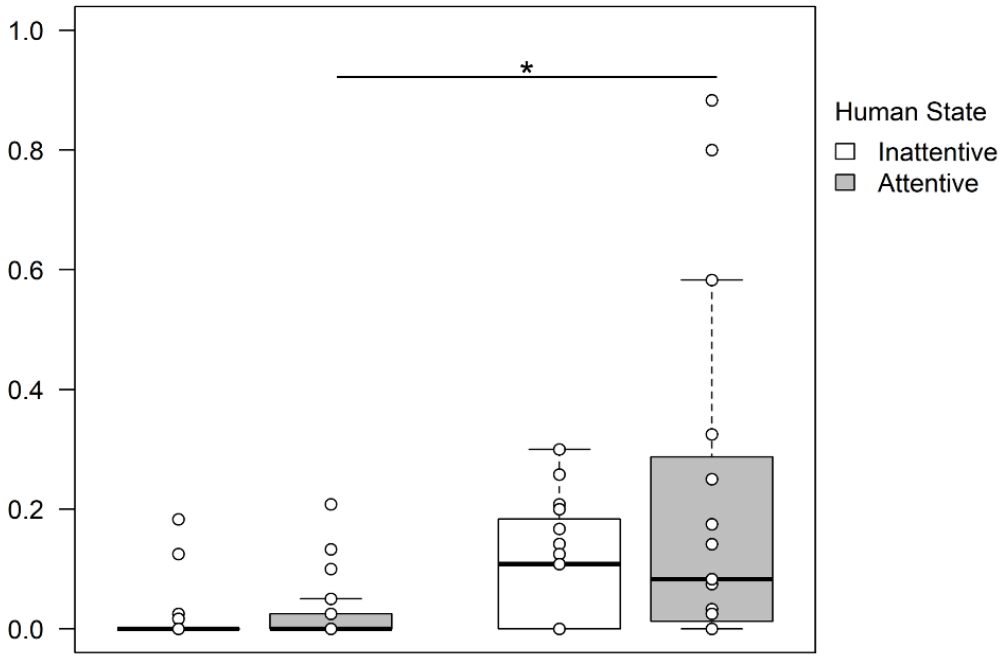
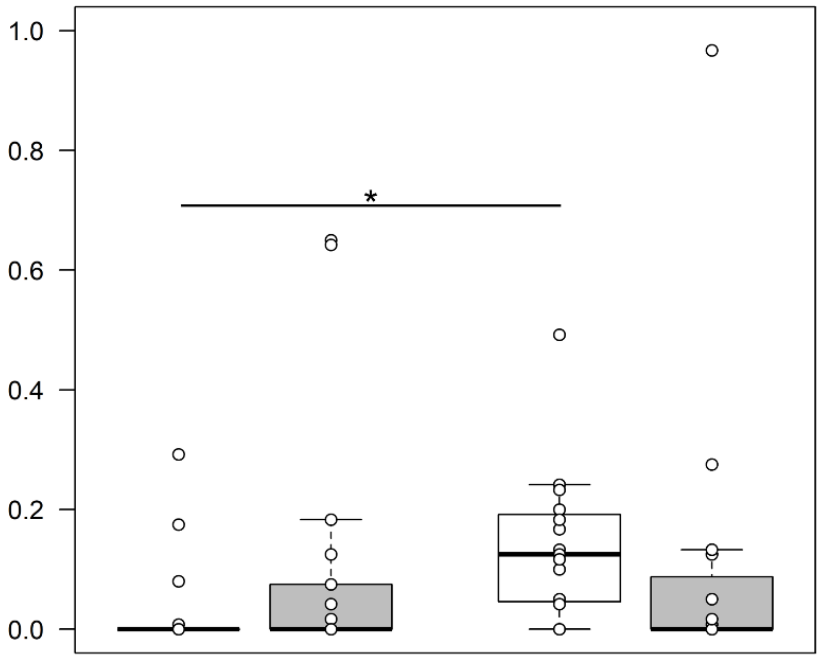


(a) Owner



(b) Stranger

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Figure 3: The proportion of time spent in proximity to the (a) owner (left 4 bars) and the (b) stranger (right 4 bars) in Japan and the United States. White bars mark the inattentive phases and gray bars mark the attentive phases. Each dot represents an individual cat. The box indicates the interquartile range with the upper whisker indicating scores above the middle 50% of the data and the lower whisker indicating scores below the middle 50% of the data. The bolded line indicates the median. * $p < 0.05$

Data were also combined to examine total time spent with either person in both phases (i.e., inattentive owner score + inattentive stranger score and attentive owner score + attentive stranger score). The results of the Mann-Whitney U tests indicated that U.S. pet cats spent significantly more time in proximity to a person than pet cats in Japan, in both the inattentive phase (J.P. Median = 0, J.P. SD = 0.09; U.S. Median = 0.26, U.S. SD = 0.19 ; $U = 51$, $p = 0.004$) and attentive phase (J.P. Median = 0, J.P. SD = 0.25 ; U.S. Median = 0.16, U.S. SD = 0.35; $U = 73$, $p = 0.04$). See Figure 4.

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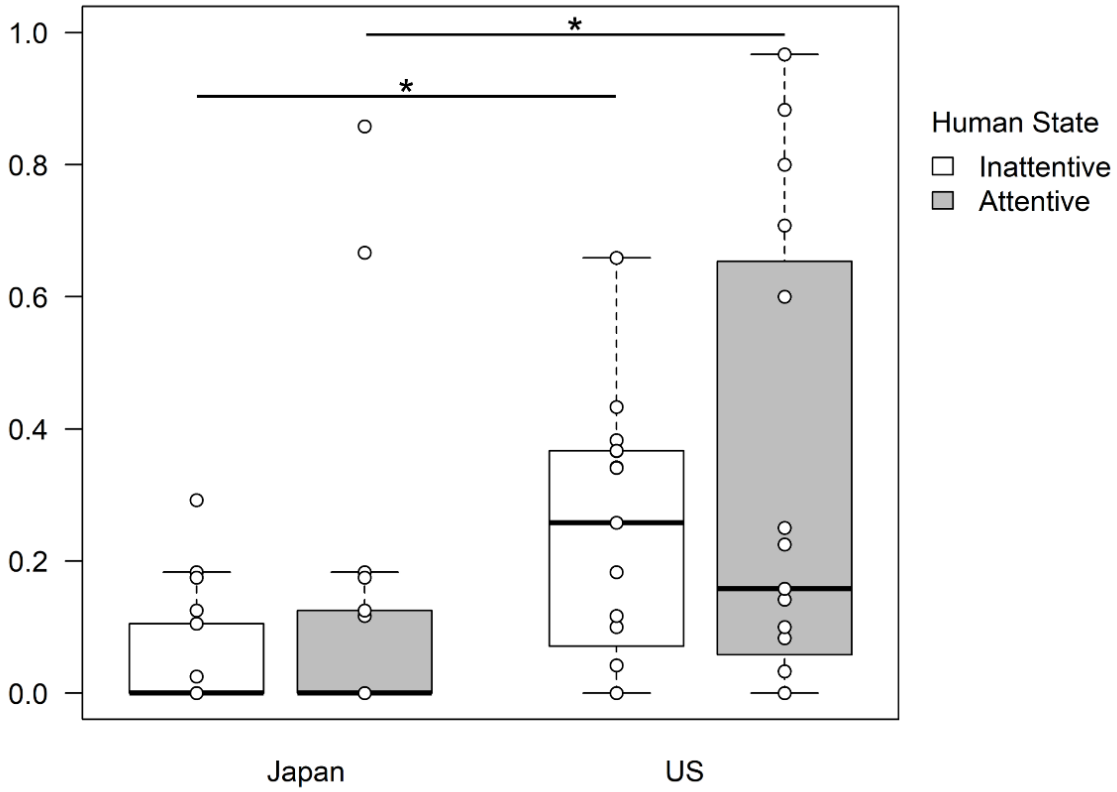

Figure 4: The total proportion of time spent in proximity to either person (owner and stranger) in Japan and the United States in the inattentive (white bars) and attentive (gray bars) phases. Each dot represents an individual pet cat. The box indicates the interquartile range with the upper whisker indicating scores above the middle 50% of the data and the lower whisker indicating scores below the middle 50% of the data. The bolded line indicates the median. * $p < 0.05$

Finally, linear regression analyses were run to examine if owner-reported attachment impacts level of cat sociability. Level of cat sociability toward the owner was obtained from adding the scores together in both phases (i.e., inattentive owner score + attentive

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owner score). For U.S. cats and owners, owner-reported LAPS scores significantly predicted pet cat proximity-seeking behavior ($R^2 = 0.36$, $p = 0.023$), as seen in Figure 5. U.S. owners with higher reported LAPS scores have cats that seek to be in proximity to them less. In Japan, owner reported LAPS scores did not significantly predict pet cat proximity-seeking behavior ($R^2 = 0.074$, $p = 0.33$).

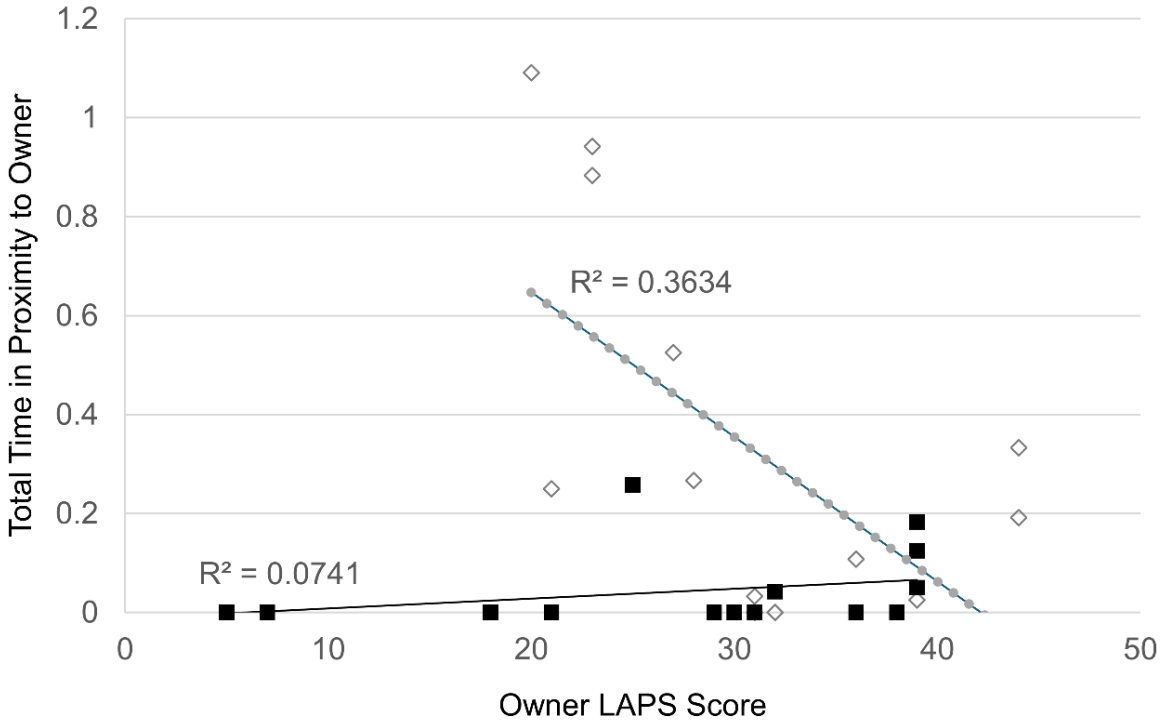

Figure 5: Linear regression for U.S. and Japan data comparing owner LAPS scores to the total proportion of time cats spent in proximity to the owner. U.S. data displayed in gray dotted line with open diamond dots, Japan data displayed in solid black line with square black markers.

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Study 3 Results

For café cats, all 23 cats from Japan and all 23 cats from the U.S. were included in the dataset. The proportion of time spent in proximity to the stranger in the sociability test was analyzed by coders. Agreement was found on 27 of the 28 videos with an inter-observer reliability score of 96.4%.

Mann-Whitney U tests were run to evaluate whether the proportion of time the cat spent in proximity to a stranger differed by country. Compared to café cats in Japan, café cats in the U.S. spent significantly more time in proximity to a stranger in both the inattentive (J.P. Median = 0.08, J.P. SD = 0.2; U.S. Median = 0.3, U.S. SD = 0.29; z = 3.2, p = 0.001) and attentive conditions (J.P. Median = 0.03, J.P. SD =0.29; U.S. Median = 0.58, U.S. SD = 0.39; z = 2.7, p = 0.007, Figure 6).

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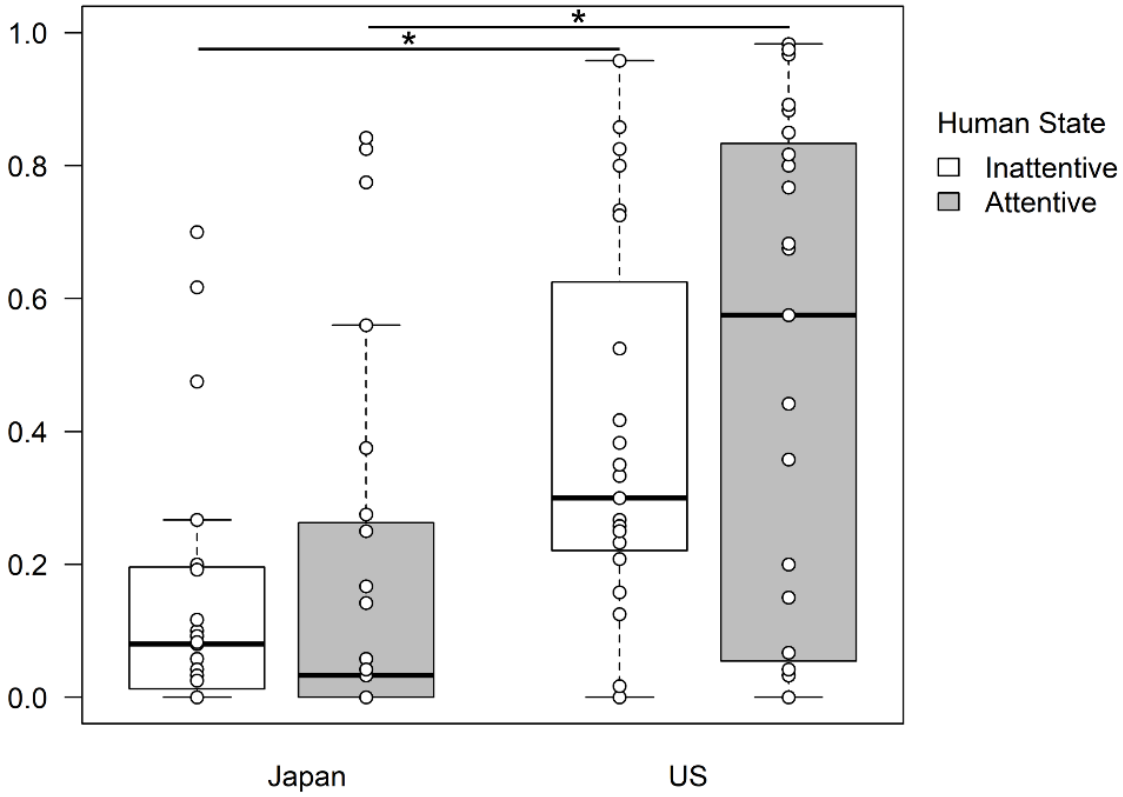

Figure 6. The total proportion of time café cats spent in proximity to a stranger in Japan and the United States in the inattentive (white bars) and attentive (gray bars) phases. Each dot represents an individual cat. The box indicates the interquartile range with the upper whisker indicating scores above the middle 50% of the data and the lower whisker indicating scores below the middle 50% of the data. The bolded line indicates the median. * $p < 0.05$

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Discussion

The results of **Study 1** indicate that U.S. citizens had significantly more positive attitudes toward cats as pets (i.e., higher PAS scores) than Japanese citizens. This was true for the overall PAS score as well as for 11 individual questions. This difference held when comparing ownership and non-ownership in each country. U.S. owners had more positive attitudes than Japanese owners and the same was true for non-owners. Given that animal experience can impact attitudes toward animals, it is not surprising that a more positive public attitude toward pet cats was found for U.S. citizens. The United States has a culture in which many people own pets and have had many animal-related childhood experiences. Many U.S. parents have reported that they acquired a companion animal for their children specifically (Melson, 2003). Most U.S. homes with children also have a pet, and over a quarter of U.S. households own a cat (AVMA, 2022). Although Japanese children can encounter animals in school settings (Nakajima, 2017), fewer Japanese may have a personal childhood experience with a pet. Compared to university students in the United Kingdom, fewer Japanese university students reported growing up with pets (Miura et al., 2002). Additionally, just under ten percent of Japanese households personally own a pet cat (Japan Pet Food Association, 2023). This lower rate of cat ownership was also captured in the PAS data, with 87.3% of U.S. respondents owning a cat compared to only 50.5% of Japanese respondents owning a cat.

Additionally, the finding that whether one owned a cat or not influenced results within the Japanese population also supports the idea that animal experience affects animal

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attitudes (Lord, 2008), especially in the Japanese sample. Japanese cat owners, who would be expected to have more cat experience, had significantly more positive attitudes toward cats as pets (higher overall PAS score) than Japanese cat non-owners, who would be expected to have less cat experience. However, no significant difference was found when comparing U.S. cat owners and non-owners. This highlights that cultural differences exist not only between the countries, but in patterns within each country. Future research should compare animal-related experiences for children in the United States and Japan to determine how quantity, quality, or species involved may impact future animal attitudes.

Although it was predicted that owner attachment would mirror differences found in the Pet Attitude Scale, the results of **Study 2** indicate that no significant difference exists in the level of attachment Japanese and U.S. owners had toward their pet cat. Although differences in family structure between Japan and the United States may exist, in Japan, concerns over pet health, owner-pet bonding, and pet welfare have grown and pets are increasingly being regarded as family members (Veldkamp, 2009). Additionally, the majority of U.S. citizens with and without children still consider their pet to be a member of the family. In a 2022 survey of U.S. citizens, for people without children, 80-96% of respondents indicated that they considered their pet as a family member and for U.S. citizens with children, 61% indicated they considered their pet as a family member (AVMA, 2022). Cat owners in both countries reported high levels of attachment to their cats.

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Finally, the results of **Study 2 and Study 3** indicate that there are significant differences in the proximity-seeking behavior of pet cats in the two countries. Both pet and café cats in the United States spent a greater proportion of testing time in proximity to people compared to pet and café cats in Japan. Additionally, for owners and pet cats in the United States (but not in Japan), owner reported LAPS scores significantly predicted pet cat proximity-seeking behavior toward the owner. At least in the United States, cat owners who are more strongly bonded to their cat have cats that seek to be in proximity to them less. Prior research supports the idea that characteristics of the owner can impact companion animal sociability. Dog owners with high expectations for their dogs and that are highly attentive to their dog's needs (i.e., authoritative parenting style) also had dogs that were highly social with their owner (Brubaker & Udell, 2023). Although one may expect that owners who are more strongly bonded to their cat may enact more social interactions, leading to more social reinforcement and greater proximity-seeking toward the owner, it is also important to remember that human-cat interactions last longer when the interaction is initiated by the cat, rather than the person (Turner, 1991). It is also possible that strongly bonded owners more often have cats that are securely attached to them. Secure attachment is characterized by a cat's ability to use their owner as a source of stress-reduction and comfort (Behnke et al., 2021; Vitale et al., 2019). In novel situations, a secure cat displays a balance of exploratory behavior toward their environment and social behavior toward their owner. Given the novelty of the experimental set-up, secure cats may feel more confident venturing out from their owner to their surroundings (e.g., toward the stranger or camera equipment).

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Additional factors may differ between the United States and Japan that could account for observed differences in cat social behavior and cat-human interactions. For example, housing conditions are known to influence animal behavior. In Japan the average house size is 95 sq. meters (1,023 sq. feet) whereas in the United States the average house size is more than twice that at 201 sq. meters (2,164 sq. feet) (Wilson, 2024). Although data were not collected on the size of the houses or the cafés surveyed in this study, in general, homes were smaller in Japan and all Japanese cat cafes were substantially smaller than the cat café surveyed in the United States. In unowned captive cats, less enclosure space can lead to elevated stress levels (Blasco et al., 2021) and both activity level and conspecific social behavior increase with the amount of space available to the cat (Loberg & Lundmark, 2016). Similarly, in captive shelter dogs, dogs displayed an increase in activity level as well as an increase in affiliative social interactions toward humans after moving to a larger enclosure (Normando et al., 2006). The effects of housing size are less well studied in pet and café cats. However, as Loberg and Lundmark (2016) suggest, in smaller spaces it is harder to avoid being near social partners while in larger spaces cats have more choice and control over when they engage in social interactions and with which social partners. Smaller spaces may lead to satiation on social interactions or increased stress due to lack of control over social engagement. Future research should explore whether housing size is a significant factor in human-directed social behavior for captive pet and café cats.

Another possibility for the differences in cat social behavior between the two countries is that Japanese cats may be more nervous around strangers and therefore more likely to

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hide. Although not a comparison with cats in the United States, one study noted that some Japanese cats seemed unable to complete research tests due to fear (Arahori et al., 2023). In this case, our results, especially for Study 2, may not reflect differences in sociability toward humans but may rather reflect differences in fear toward strangers. This may also be exaggerated by the smaller housing sizes in Japan, visits from strangers may be especially stressful for cats due to the closer proximity between cat and stranger. Future research should assess cats in the United States and Japan to determine if differences in levels of fear toward strangers exist through the collection of behavioral or physiological data.

In addition to these considerations, other housing conditions or life experiences may differ between the United States and Japan that could impact cat social behavior. For café cats, this could include the number of conspecifics in the café, the layout of resources within the café, or the volume of patron traffic through the café. For pet cats, this could include access to the outdoors (Spangenberg et al., 2006), the presence or absence of conspecifics in the home (Ramos et al., 2013), or the level of training or human socialization provided to the cat (for review see Vitale Shreve & Udell, 2015). The idea of cat training is not commonplace, especially compared to the prevalence of training opportunities for dogs. However, given the importance of life experience in shaping cat social behavior (Vitale, 2022), and the fact that kittens and cats can readily participate in training and socialization classes (see Vitale et al., 2019, Supplemental Information), this is a valid area of future research. Although there is a lack of research in this area, prior research found that, compared to dog owners in Japan, dog owners in

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the United States rated their dogs as having higher levels of trainability (Nagasawa et al., 2016). Whether this finding is due to actual differences in dog behavior, differences in human perception of dog behavior, or other factors, such as preferences for different dog breeds, is still unknown. However, how a person perceives the sociability or trainability of an animal may influence what experiences they offer to that animal, thereby influencing the animal's behavior in return. Future research should compare captive cat care practices in the United States and Japan to determine factors that lead to these differences in human-directed social behavior.

From a cultural evolutionary perspective, it is interesting to consider whether the cat social behavior results are in line with the nature of Japanese and United States citizens. Future research should explore whether personality characteristics of the owner vary by country and whether owner personality relates to cat social behavior. These results align with prior research that found differences between European dog breeds and ancient dogs, a group made up of almost all Japanese dog breeds (Tonoike et al., 2022). Although no differences were found in the ability of each dog group to read human gestures, it was found that ancient dog breeds looked to humans on a problem-solving task less than European dog breeds, indicating some differences in the social communication of Japanese and Western dog breeds. It is possible that adaptation to a certain environment (e.g., the natural environment) or an occupation (e.g., agriculture) may result in a similarity of characteristics across species.

It is important to consider study limitations. First is the relatively small sample size of

participants when examining cultural differences, especially for Study 2 and Study 3. Future research should expand and diversify the demographics and number of both humans and cats involved in each country. Another consideration is ensuring that participants in the study have similar backgrounds between the countries (e.g., humans in both countries have equivalent levels of experience with cats or cats have equivalent socialization histories) or that they live in similar situations (e.g., similar size of home or similar level of income). Finally, in the methodology for both behavioral tests, people were allowed to freely interact in the attentive state, which means they could pet and vocalize to the cat however they wished (see Vitale & Udell, 2019). This allows owners to interact with their cats as they typically would and allows for different interaction styles, which may be influenced by a person's culture. However, it is important to consider that differences in interactions may exist which are not due to culture, such as how loudly or often a person calls the cat to them. In the future, researchers should examine the petting and play styles of people in the United States and Japan to determine if cultural differences exist in how humans interact with cats.

With several differences and similarities seen between the United States and Japan, research comparing the countries allows for a unique perspective of the human-cat relationship. Given the ubiquity of cats across the world and that cat social behavior is flexible and dependent on life experience and environment, domestic cats make an excellent model species to examine cross-cultural differences in human-animal interactions. Additionally, the discipline of human-animal interactions is often dominated by Western views (Srinivasa et al., 2022). It is important to examine non-

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Western views of human-animal interactions and captive animals, including companion animals. We must keep in mind that results based on data collection in one part of the world may not always hold true in a different part of the world. Given the lack of research in this area, future research would greatly benefit our understanding of how human-animal relationships differ cross-culturally and how to apply these findings to improve the welfare of captive cats.

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