

Exploring the dynamics of Human-Pet attachment: An In-Depth analysis of socio-demographic factors and relationships

Doğukan ÖZEN^{1,a,✉}, Nail Mert BIÇAKCI^{2,b}, Yasemin SALGIRLI DEMİRBAŞ^{2,c}

¹Ankara University, Faculty of Veterinary Medicine, Department of Biostatistics, Ankara, Türkiye; ²Ankara University, Faculty of Veterinary Medicine, Department of Physiology, Ankara, Türkiye

^aORCID: 0000-0003-1943-2690; ^bORCID: 0009-0006-9739-0114; ^cORCID: 0000-0001-6344-5603

ARTICLE INFO

Article History

Received : 27.09.2023

Accepted : 20.02.2024

DOI: 10.33988/auvfd.1366652

Keywords

Attachment

Companion animal

Human-animal bond

Pet caretakers

✉Corresponding author

ozen@ankara.edu.tr

How to cite this article: Özen D, Bıçakçı NM, Salgırlı Demirbaş Y (2024): Exploring the dynamics of Human-Pet attachment: An In-Depth analysis of socio-demographic factors and relationships. Ankara Univ Vet Fak Derg, 71 (4), 385-393. DOI: 10.33988/auvfd.1366652.

ABSTRACT

This study examined the factors influencing pet attachment by investigating attachment dimensions and exploring the relationship between demographic factors and pet attachment. The study utilized the Pet Attachment Questionnaire (PAQ) to assess the level of attachment between pet owners and their animals. A demographic questionnaire was also administered to gather socio-cultural, economic, and health-related data from pet caretakers. Confirmatory factor analysis was applied to confirm the scale factor structure. Hypothesis testing procedures were used to reveal the relationship between the demographic characteristics of the participants and the attachment relationships. The study involved 304 volunteers who visited the animal hospital at Ankara University, Faculty of Veterinary Medicine, Türkiye. The findings revealed significant impacts of various factors on attachment dimensions, including age, household income, participant and household member anxieties and traumas, number of pets owned, pet health, and previous pet ownership. These results contribute to our understanding of the complex dynamics that shape the attachment between humans and animals. Further research is needed to understand the underlying mechanisms and potential interactions among these factors, advancing our knowledge of human-pet attachment.

Introduction

Researchers have paid a great deal of attention to the bond between pet owners and their animals, recognizing it as a significant and dynamic relationship (23, 29, 41). Research has indicated that humans and animals benefit from strong emotional bonds (14, 26). For example, owners with higher levels of attachment to their pets had improved mental health outcomes, such as reduced loneliness, depression, and anxiety (7). Dogs with secure attachments to their owners also exhibited fewer behavioral problems and improved overall welfare (38). These findings emphasize the mutual benefits of emotional support and companionship in the relationship between pet and owner. A key component of this relationship is the centrality of the bond formed between a pet and its caregiver. Bowlby (6) introduced the theory

of pet attachment, which concerns the emotional bond and affection that arises between humans and their animal companions. It is a prime example of the deep emotional connections that can exist between species (15). Comprehending the nature and dynamics of this attachment is essential for the well-being of companion animals and humans alike.

Domestication has played a crucial role in the development of pet-owner attachment. Certain animal species, including domestic dogs and cats, have developed a unique ability to form profound emotional connections with humans (10, 29). Numerous studies have investigated the factors that contribute to the formation and strength of the pet-owner relationship, categorized as follows: the characteristics of the owner, the characteristics of the pet, and the dynamics of their

interaction (16, 21, 27, 28). Individual owner characteristics may influence the extent of pet attachment, according to research. Individuals with an idealist personality type had higher attachment scores than those with other personality types, according to one study. One study reported that people with an idealistic personality type had higher attachment scores than people with other personality types (3). According to de Albuquerque et al. (9) a significant correlation was found between greater attachment to pets and neuroticism. Those with greater empathy tend to form stronger attachments to their companions (8). Likewise, previous favorable experiences with pets may increase the likelihood of developing stronger attachments to current pets (4). The species and age of the animal can affect the intensity of the attachment. For example, research indicates that dog owners tend to have higher attachment levels than cat owners (22). Moreover, due to their perceived vulnerability and dependence, puppies and kittens are more likely to inspire stronger attachments (2). Lastly, the dynamics of the owner-pet interaction contribute to the development of attachment. Since positive interactions, such as play, hygiene, and engaging in shared physical activities, have been found to increase attachment levels (17, 19), the quality of care may influence the strength of the bond.

Various tools and measures have been developed to assess the degree of pet-owner attachment, building upon evidence-based theories of human interpersonal relationships. These tools have been modified in various ways to provide the most appropriate explanations of the physiological and psychosocial effects on the well-being of both humans and animals (1, 25, 41). The majority of these instruments focus on the attachment between pets and their caretakers. Intimacy, commitment, emotional involvement, conflict, and other aspects of human-animal relationships vary significantly, just as they do between humans. These variations reflect the internal functioning patterns associated with expectations, emotions, and pet-related behavior. To better define this relationship and assess pet attachment orientations, Zilcha-Mano et al. (40) developed the self-report Pet Attachment Questionnaire (PAQ). This scale was developed based on the Experiences in Close Relationships form (13), which is one of the most widely attachment patterns between care takers and their pets through a series of questions pertaining to sentiments of closeness, dependence, and the overall quality of the relationship. This instrument has proven useful for comprehending the dynamics of pet-owner attachment and has provided researchers with standardized measures for assessing attachment levels across various populations.

While the emotional bond between humans and their pets, known as pet attachment, has been recognized as a significant and evolving relationship, previous studies have not comprehensively explored the human-related

factors that may influence attachment types of caretakers towards their pets. Understanding the nature and dynamics of this attachment is crucial for comprehending the well-being of both companion animals and humans. This study aims to explore various factors, including socio-demographics and the experiences of pet caretakers, contributing to the pet-caretaker attachment type.

Materials and Methods

Sample Size Considerations and Participants: Prior to the study, a power analysis conducted. To detect the difference between the Cronbach alpha coefficient under the null hypothesis of 0.86 and the coefficient alpha under the alternative hypothesis of 0.89 using a two-sided F-test with a significance level of 0.05, a sample of 275 subject would be enough to achieve 80% power (5, 11).

In the current study, there were 304 individuals who visited the animal hospital at Ankara University, Faculty of Veterinary Medicine between March and June 2023, ranging in age from 18 to 65, and who live with at least one pet. There were 223 (73.4%) female participants and 81 (26.6%) male participants.

This study has obtained the necessary permission from the Ankara University Ethics Committee (dated 24.11.2022, decision number 20). The participants were given an "informed consent" form at the beginning of the study, in which they were assured about information and confidentiality about the research, and their consent was obtained.

Data Collection Tools

Demographic Information Form: The socio-demographic variables of the participants and the information including 26 questions about owning a pet were evaluated.

Pet Attachment Questionnaire (PAQ): The Pet Attachment Questionnaire, which consists of 26 items in total and examines the attachment relationships of the participants to the pets was used. Each item in the scale is scored on a Likert scale between 1 (strongly disagree) and 7 (strongly agree). The original scale exhibited a 2-factor structure as anxious and avoidant attachment style, and Cronbach's alpha values were found to be 0.86 and 0.89, respectively. The Turkish adaptation study of the scale was carried out by Şahin and Kahya (35), and the Cronbach alpha values of the study adapted into Turkish were found to be 0.86 and 0.79.

Statistical Analysis: Frequency (n) and percentage (%) were used for categorical data and median (minimum-maximum) was used for numerical data in describing the demographic characteristics of the participants. The chi-square test was used by considering the distribution of expected cells in the comparison of the frequencies of

categorical variables between groups. Prior to examining the differences in scale scores for each variable between the groups, the data were analysed using the Shapiro-Wilk test for conformity to normal distribution and the Levene test for homogeneity of variances. For the comparison among two groups, the Student t-test was used for variables that met the assumptions while the Mann Whitney U test was used for those that did not. For comparing more than two groups, a one-way analysis of variance (ANOVA) was used for variables that met the assumptions of the parametric test, and Kruskal-Wallis tests were used for variables that did not meet the assumptions. Cronbach's alpha coefficient was used to determine the internal consistency of the scale. In order to assess the factor structure of the scale, explanatory factor analysis was carried out using principal axis factoring and varimax rotation, in line with the original study of the scale. Kaiser-Meyer-Olkin (KMO) measure was used to determine sampling adequacy. Bartlett's test of sphericity was used to test null hypothesis that the correlation matrix is an identity matrix. Confirmatory factor analyses were used to confirm the scale factor structure. The $P < 0.05$ criterion was used in all statistical evaluations. Stata 18 was used in the analysis of the data.

Results

Participants' pets had an average age of 5.23 ± 3.36 years (median: 4). In addition, the average duration of pet ownership of the participants was 11.01 ± 5.55 years (median: 8). A summary of the socio-demographic, economic, and history/experience with pets of caretakers is presented in Table 1.

To evaluate the factor structure of PAQ, explanatory factor analysis was conducted with basic axis factoring (Principle axis extraction method) and varimax rotation, consistent with the original study of the scale. Since item

1 in the Pet Attachment Scale is a reversed item, reverse coding was performed before factor analysis. The results showed that the data set obtained using PAQ was suitable for explanatory factor analysis ($KMO = 0.815$; Barlett Test $\chi^2 (325) = 2327, P < 0.001$). The eigenvalues, scree plot, and item distribution of the factors were taken into consideration while adhering to the original study of the scale and its adaption to Turkish, and the two-factor structure in its original form was preferred (35, 40). These two factors were theoretically named as anxious (PAQ-anxiety) and avoidant (PAQ-avoidant) attachment to pets, as indicated in the attachment literature. In the study, it was found that these two factors together accounted for 35.63% of the variation. 18.81% of the variation was explained by factor 1, which corresponds to the avoidance dimension, and 16.82% by factor 2, which corresponds to the anxiety dimension. The factors' eigenvalues were 4.63 and 4.37, respectively. The Cronbach alpha values of the study were found to be 0.796 and 0.813 for avoidance and anxiety dimensions, respectively (Table 2).

The confirmatory factor analysis, which was conducted to confirm the factor structure of PAQ by taking into account the original scale structure, adaptation study, and existing explanatory factor analysis findings, demonstrated acceptable fit between the model and the data. The fit of the model was assessed using indices such as RMSEA (0.058), CFI (0.911), TLI (0.902) and SRMR (0.076), which indicate the usability of the model as well as the verification of the factor structure of the scale (Table 3). The factor structure of the scale and the standardised values were presented in Figure 1. Results showed that all factor loadings were significant at the $P < 0.001$ level. PAQ6 was the primary contributor to anxiety, whereas PAQ21 was the biggest contributor to Avoidance. We found the covariance between anxiety and avoidance to be insignificant ($cov (Anxiety, Avoidant) = 0.025$; $z = 0.31, P = 0.754$) (Figure 1).

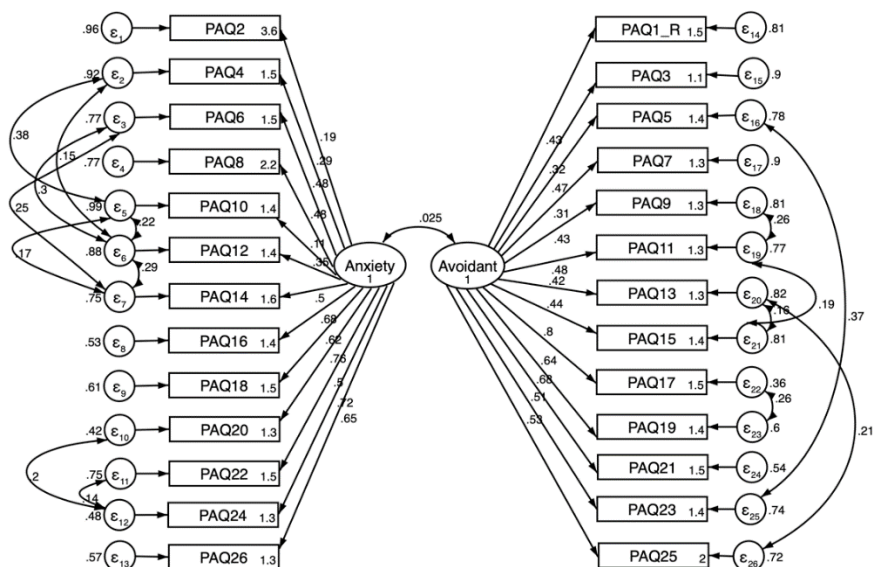


Figure 1. Standardized coefficients of the model for the two-factor structure of the Pet Attachment Questionnaire.

Table 1. Information on the socio-demographic and economic status of the patients.

Variables	Category	n (%n)
Sex	Female	223 (73.4%)
	Male	81 (26.6%)
Age (year)	<=20	10 (3.3%)
	21-40	184 (60.5%)
	41-60	91 (29.9%)
	>60	19 (6.3%)
Marital Status	Single	177 (58.6%)
	Married	103 (34.1%)
	Divorced	22 (7.3%)
	Secondary Ed.	37 (12.3%)
Educational level	Undergraduate	204 (67.5%)
	Postgraduate	61 (20.2%)
Working status	Yes	166 (55.1%)
	No	135 (44.9%)
Household income level	0 - 500 US\$	52 (17.2%)
	501 - 1000 US\$	145 (48%)
	>1000 US\$	105 (34.8%)
Do you live with your family	Yes	172 (56.8%)
	No	131 (43.2%)
Has anyone in your home ever experienced trauma or a fear of animals?	Yes	41 (13.5%)
	No	263 (86.5%)
Is there a previous history of pet ownership in your family?	Yes	236 (77.6%)
	No	68 (22.4%)
Do you have a history of an animal-related allergy disease?	Yes	50 (16.4%)
	No	254 (83.6%)
Do you have a fear of animals or a traumatic history?	Yes	49 (16.1%)
	No	255 (83.9%)
Do you have children?	Yes	103 (33.9%)
	No	201 (66.1%)
What type of pet are you looking after?	Cat	221 (72.7%)
	Dog	52 (17.1%)
	Other	8 (2.6%)
	Cat and Dog	23 (7.6%)
	Shelter	20 (6.6%)
How did you get your pet?	Adopting a stray animal	165 (54.5%)
	Petshop	26 (8.6%)
	Familiar environment	92 (30.4%)
Did you pay a fee to adopt your animal?	Yes	43 (14.3%)
	No	258 (85.7%)
Before the animal you are currently caring for, did you have another pet?	Yes	230 (75.7%)
	No	74 (24.3%)
Have you ever had more than one pet at once?	Yes	197 (64.8%)
	No	107 (35.2%)
Are the animals you own the same species?	Yes	111 (49.6%)
	No	113 (50.4%)
Does your pet suffer from a physical condition or ongoing illness?	Yes	82 (27%)
	No	222 (73%)
Have you ever experienced losing a pet?	Yes	209 (69.2%)
	No	93 (30.8%)
Have you given up on your pet before?	Yes	35 (11.5%)
	No	269 (88.5%)

Table 2. Results of the explanatory factor analysis of PAQ items.

PAQ items	On-factor loadings
1. Being close to my pet is pleasant for me (reverse-scored)	0.432 (1)
2. I'm often worried about what I'll do if something bad happens to my pet	0.451 (2)
3. I prefer not to be too close to my pet	0.349 (1)
4. Sometimes I feel that I force my pet to show more commitment and desire to be close to me	0.401 (2)
5. I prefer to keep some distance from my pet	0.596 (1)
6. If I can't get my pet to show interest in me, I get upset or angry	0.598 (2)
7. Often my pet is a nuisance to me	0.375 (1)
8. Signs of affection from my pet bolster my self-worth	0.516 (2)
9. I feel distant from my pet	0.519 (1)
10. I often feel that my pet doesn't allow me to get as close as I would like	0.311 (2)
11. I'm not very attached to my pet	0.593 (1)
12. I get angry when my pet doesn't want to be close to me as much as I would like it to	0.489 (2)
13. If necessary, I would be able to give away my pet without any difficulties	0.482 (1)
14. I get frustrated when my pet is not around as much as I would like it to be	0.622 (2)
15. I have no problem parting with my pet for a long duration	0.586 (1)
16. I need shows of affection from my pet to feel there is someone who accepts me as I am	0.685 (2)
17. I get uncomfortable when my pet wants to be close to me	0.721 (1)
18. I feel frustrated if my pet doesn't seem to be available for me when I need it	0.679 (2)
19. I get nervous when my pet gets too close to me	0.645 (1)
20. Without acts of affection from my pet I feel worthless	0.767 (2)
21. I want to get close to my pet, but I keep pulling away	0.647 (1)
22. I am worried about being left alone without my pet	0.524 (2)
23. I try to avoid getting too close to my pet	0.564 (1)
24. I need expressions of love from my pet to feel valuable	0.736 (2)
25. When I'm away from my pet for a long period of time, I hardly think about it	0.596 (1)
26. I need a lot of reassurance from my pet that it loves me	0.684 (2)
Cronbach alpha	0.796 (1)
	0.813 (2)
Percentage of explained variance in item scores (%)	18.81 (1)
	16.82 (2)

(1): Avoidance, (2): Anxiety

Table 3. Goodness-of-fit criterias for the created model.

Goodness of fit criteria	Close approximate fit	Acceptable range	Achieved goodness of fitness
χ^2	$0 \leq \chi^2 \leq 2sd$	$2sd \leq \chi^2 \leq 3sd$	499.278 (sd=247)
P value	$0.05 < P \leq 1.00$	$0.01 \leq P \leq 0.05$	<0.001
RMSEA	$0 \leq RMSEA \leq 0.05$	$0.05 \leq RMSEA \leq 0.08$	0.058 (PCLOSE=0.036)
CFI	$0.97 \leq CFI \leq 1.00$	$0.95 \leq CFI \leq 0.97$	0.911
TLI	$0.95 \leq TLI \leq 1.00$	$0.90 \leq TLI \leq 0.95$	0.902
SRMR	$0 \leq SRMR \leq 0.04$	$0.5 \leq SRMR \leq 0.10$	0.076

RMSEA: Root Mean Square Error of Approximation; TLI: Tucker-Lewis Index; CFI: Comparative Fit Index; SRMR: Standardized Root Mean Residual.

Table 4. The relationship between the demographic information of the animal owners and the PAQ.

		PAQ-Anxiety Median (Min - Max)	P	PAQ-Avoidance Median (Min - Max)	P
Sex	Female	37 (15 - 81)	0.254	22 (16 - 54)	<0.001
	Male	36 (13 - 66)		26 (18 - 49)	
Age (year)	<=20	39.5 (24 - 81) a	0.047	22 (19 - 30) a	0.031
	21-40	38 (16 - 80) ab		23 (19 - 49) a	
	41-60	33.5 (13 - 73) b		25 (16 - 54) b	
	>60	36 (25 - 59) ab		21 (18 - 40) ab	
Marital Status	Single	37 (16 - 81)	0.526	23 (19 - 49)	0.244
	Married	38 (13 - 79)		25 (16 - 54)	
	Divorced	31 (16 - 73)		22 (19 - 41)	
Educational level	Secondary Ed.	36 (16 - 71)	0.701	25.5 (16 - 54) a	0.039
	Undergraduate	37 (13 - 81)		22 (18 - 50) b	
	Postgraduate	37.5 (15 - 73)		23.5 (19 - 45) b	
Working status	Yes	36 (13 - 79)	0.096	23 (19 - 49)	0.763
	No	37 (18 - 81)		23 (16 - 54)	
Household income level	0 - 500 US\$	34 (16 - 73) ab	0.019	24.5 (19 - 49)	0.523
	501 - 1000 US\$	38 (19 - 81) a		22.5 (16 - 54)	
	>1000 US\$	34 (13 - 71) b		23 (19 - 40)	
Do you live with your family	Yes	36.5 (13 - 80)	0.644	24 (16 - 54)	0.238
	No	37 (16 - 81)		23 (18 - 49)	
Has anyone in your home ever experienced trauma or a fear of animals?	Yes	44 (19 - 81)	0.002	25 (19 - 54)	0.081
	No	36 (13 - 80)		23 (16 - 50)	
Is there a previous history of pet ownership in your family?	Yes	36 (15 - 81)	0.205	23 (19 - 54)	0.455
	No	40 (13 - 74)		24 (16 - 49)	
Do you have a history of an animal-related allergy disease?	Yes	34 (16 - 81)	0.64	22.5 (19 - 49)	0.715
	No	37 (13 - 79)		24 (16 - 54)	
Do you have a fear of animals or a traumatic history?	Yes	45 (19 - 81)	<0.001	24 (19 - 54)	0.43
	No	36 (13 - 79)		23 (16 - 50)	
Do you have children?	Yes	35 (13 - 73)	0.157	25 (16 - 54)	0.005
	No	38 (16 - 81)		23 (19 - 49)	
What type of pet are you looking after?	Cat	37 (13 - 80)	0.632	23 (16 - 54)	0.134
	Dog	35 (16 - 79)		22 (19 - 42)	
	Other	45.5 (19 - 81)		26 (24 - 45)	
	Cat and Dog	37 (18 - 73)		23.5 (19 - 42)	
How did you get your pet?	Shelter	40 (15 - 73)	0.899	25 (19 - 34)	0.18
	Adopting a stray animal	36 (13 - 80)		22 (16 - 54)	
	Petshop	37 (18 - 81)		24 (18 - 42)	
	Familiar environment	37.5 (19 - 66)		25 (19 - 49)	
Did you pay a fee to adopt your animal?	Yes	38 (18 - 81)	0.609	24 (18 - 49)	0.706
	No	36.5 (13 - 80)		23 (16 - 54)	
Before the animal you are currently caring for, did you have another pet?	Yes	35.5 (15 - 81)	0.014	24 (16 - 54)	0.674
	No	41.5 (13 - 74)		23 (18 - 49)	
Have you ever had more than one pet at once?	Yes	35 (13 - 81)	0.021	23 (16 - 54)	0.142
	No	40.5 (18 - 80)		25 (18 - 49)	
Are the animals you own the same species?	Yes	34.5 (13 - 68)	0.142	23 (19 - 50)	0.277
	No	37 (15 - 81)		23 (19 - 54)	
Does your pet suffer from a physical condition or ongoing illness?	Yes	36 (16 - 79)	0.938	22 (19 - 54)	0.675
	No	37 (13 - 81)		24 (16 - 49)	
Have you ever experienced losing a pet?	Yes	36 (13 - 80)	0.168	23.5 (16 - 54)	0.522
	No	38 (19 - 81)		23 (19 - 50)	
Have you given up on your pet before?	Yes	47 (20 - 71)	0.018	23 (19 - 38)	0.257
	No	36 (13 - 81)		23 (16 - 54)	

a,b,c: Different letters in the same column for each variable show statistically significant difference (P<0.05).

In Table 4, the comparison of the variables of interest based on the participant's demographics and PAQ sub-factor scores is presented.

Considering the anxiety scores of the participants in the study, which express the anxious attachment style to their pets, "age ($P=0.047$)", "household income level ($P=0.019$)", "fear of animals in the household or in oneself ($P<0.01$)", "being ownership of a previous pet ($P=0.014$)", "having more than one animal ($P=0.021$)", and "giving up on a pet before ($P=0.018$) had all statistically significant effect. Once these factors are analyzed further in detail, it is evident that anxiety affects those who are very young and very old. Anxiety levels were significantly higher in middle-class individuals, those who fear animals or have undergone trauma, people who have owned pets in the past, people who have multiple dogs, and people who have previously had to give up their pets (Table 4).

Gender ($P=0.011$), age ($P=0.031$), education level ($P=0.039$), and having a child ($P=0.005$) were all shown to be statistically significant when examining the avoidance scores of the study participants, which express the avoidant attachment to their pets. Considering the significant factors related to avoidance; men compared to women; middle and upper age group (>41 years) compared to young people (<40); those who have undergraduate and graduate education compared to secondary education, and those who have children have statistically significantly higher avoidance scores than those who do not (Table 4).

Discussion and Conclusion

The human-animal attachment, specifically regarding companion animals, has gained considerable attention in recent years (2, 18, 24, 31). Understanding the factors that contribute to pet attachment is crucial for comprehending the reasons, effects, and nature of this bond, as noted by Johnson et al. (18). This study aimed to investigate the influence of various factors on anxious and avoidant attachment styles towards pets, contributing to the understanding of human-pet attachment. To assess pet attachment, the study utilized the Pet Attachment Questionnaire (PAQ), a valid and reliable tool for measuring attachment levels and attributions of meaning to pets, particularly regarding anxiety and avoidance dimensions (20).

Consistent with previous research on the correlation between pet attachment level and age of care takers, age was found to be a significant factor influencing attachment types (3). Both younger and older individuals displayed higher levels of anxiety in their attachment to pets in comparison to other age groups (Table 4). This finding also aligns with existing literature suggesting that older individuals tend to have a higher level of attachment to pets, as pets compensate for the absence of human

companionship and contribute to a reduction in negative moods (2, 36, 39).

Regarding attachment anxiety and avoidance, gender was found to have a significant effect only on the avoidance component. Men were more likely than women to exhibit an avoidant attachment to their dogs (Table 4). Previous studies have also shown differences in attitudes toward animals between females and males (3, 33, 34, 37). Although females generally exhibit more favorable attitudes toward animals, no significant gender effect was observed on attachment levels. Thus, it can be concluded that different attachment styles can influence one's attitude toward companion animals, even though this attitude does not directly affect the level of attachment.

Participants with higher levels of education, particularly those who had completed undergraduate and graduate education, demonstrated greater degrees of avoidance (Table 4). This finding may be attributed to individuals with higher education levels having more demanding work schedules or a preference for personal space and independence, both of which contribute to a more avoidant attachment style towards their pets (20). Contrary to previous findings (32, 36, 39), marital status did not statistically impact attachment anxiety and avoidance components. However, individuals without children exhibited a higher level of avoidant attachment compared to those who had children. One possible explanation is that individuals without children have better management of their time and energy, along with reduced caring responsibilities, allowing for a more avoidant attachment style toward pets.

The study revealed that prior pet ownership significantly impacted attachment anxiety, possibly due to the experience of losing a pet in the past (Table 4). Attachment anxiety and stronger attachment were positively correlated with more severe grief in pet caregivers, which may further influence their attachment style with a new pet (12). Furthermore, household income level emerged as a significant factor influencing attachment type. While previous studies by Johnson et al. (18) suggested that lower income was associated with stronger attachment, this research indicates that individuals with a middle-income level exhibit higher levels of attachment anxiety. Individuals with pre-existing irrational fears or phobias of animals also displayed higher levels of anxiety in their pet attachment, suggesting that addressing these issues is crucial for developing a healthy relationship between individuals and their dogs. Additionally, individuals who had previously given up a pet exhibited higher anxiety levels, possibly indicating a continued sense of connection insecurity (40). Despite caretakers with multiple pets generally having stronger attachments to their animals (3), this study found that

owning more than one animal was associated with higher levels of anxiety. This suggests that the obligations and demands associated with caring for multiple animals contribute to increased anxiety levels among owners.

An intriguing finding of this study is the connection between the presence of a child and increased levels of avoidance in the attachment to pets, despite the common perception of many people considering their companion animals as their children, as previously discussed by Sife (30). This phenomenon suggests that the attachment style can be influenced by the presence of a child in the family. The responsibilities and demands of parenting may redirect attention and resources away from the pet, leading to the development of an avoidant attachment pattern between the individual and their pet.

In conclusion, this study highlights the significant impact of various factors, including age, household income level, fear of animals, prior pet ownership, owning multiple animals, gender, education level, and having a child, on anxious and avoidant attachment styles toward pets. Understanding the elements that influence human-pet attachment can aid in improving animal care practices and environments. By revealing these influential factors, this research enhances our understanding of the complex dynamics that shape human-pet relationships. Furthermore, the study's observations regarding the impact of different demographic factors on attachment can assist pet owners in making informed decisions about the care of their pets. By informing and influencing the dynamics of human-animal interaction, these findings possess the capability to enhance the general quality of life for pets. Additionally, the findings have the potential to improve positive outcomes associated with strong, healthy relationships between humans and animals. Further investigation into the underlying mechanisms and potential interactions among these factors is crucial for deepening our comprehension of the intricate nature of attachment to pets.

Acknowledgements

The authors would like to thank all volunteers who patiently responded the survey. Also the authors wish to thank to Ankara University Veterinary Faculty Administration and Animal Hospital Chief Physician for their support and convenience.

Financial Support

This research received no grant from any funding agency/sector.

Conflict of Interest

The authors declared that there is no conflict of interest.

Author Contributions

DO designed the study. NMB contributed to data collection. DO analysed the data. YSD contributed to the interpretation of the results. DO and YSD lead in writing and the critical review of the manuscript. All authors provided critical feedback and helped shape the research, analysis and manuscript.

Data Availability Statement

The data supporting this study's findings are available from the corresponding author upon reasonable request.

Ethical Statement

This study was carried out after the animal experiment was approved by Ankara University Local Ethics Committee (Decision number: 20, Date: 24.11.2022). All respondents read and accepted the consent form before responding to the survey.

Animal Welfare

The authors confirm that they have adhered to ARRIVE Guidelines to protect animals used for scientific purposes.

References

1. **Anderson DC** (2007): Assessing the human-animal bond: A compendium of actual measures. Purdue University Press, Indiana.
2. **Archer J** (1997): *Why do people love their pets?* *Evol Hum Behav*, **18**, 237-259.
3. **Bagley DK, Gonsman VL** (2005): *Pet attachment and personality type*. *Anthrozoös*, **18**, 28-42.
4. **Bennett PC, Rohlfs VI** (2007): *Owner-companion dog interactions: Relationships between demographic variables, potentially problematic behaviours, training engagement and shared activities*. *Appl Anim Behav Sci*, **102**, 65-84.
5. **Bonett DG** (2002): *Sample size requirements for testing and estimating coefficient alpha*. *J Educ Behav Stat*, **27**, 335-340.
6. **Bowlby J** (1969): *Attachment and loss* New York: Basic.
7. **Brooks H, Rushton K, Walker S, et al** (2016): *Ontological security and connectivity provided by pets: a study in the self-management of the everyday lives of people diagnosed with a long-term mental health condition*. *BMC Psychiatry*, **16**, 1-12.
8. **Daly B, Morton L** (2006): *An investigation of human-animal interactions and empathy as related to pet preference, ownership, attachment, and attitudes in children*. *Anthrozoös*, **19**, 113-127.
9. **de Albuquerque NS, Costa DB, Rodrigues GdR, et al** (2023): *Personality traits of Brazilian pet owners and nonowners and their association with attachment to pets*. *Anthrozoös*, **36**, 295-305.
10. **Dugatkin LA, Trut LudN** (2017): *How to tame a fox (and build a dog): Visionary scientists and a Siberian tale of jump-started evolution*. Vol. 316. University of Chicago Press.

11. Feldt LS, Woodruff DJ, Salih FA (1987): *Statistical inference for coefficient alpha*. Appl Psychol Meas, **11**, 93-103.
12. Field NP, Orsini L, Gavish R, et al (2009): *Role of attachment in response to pet loss*. Death Stud, **33**, 334-355.
13. Fraley RC, Waller NG, Brennan KA (2000): *An item-response theory analysis of self-report measures of adult attachment*. J Pers Soc Psychol, **78**, 350-365.
14. Gee NR, Mueller MK (2019): *A systematic review of research on pet ownership and animal interactions among older adults*. Anthrozoös, **32**, 183-207.
15. Gosse GH, Barnes MJ (1994): *Human grief resulting from the death of a pet*. Anthrozoös, **7**, 103-112.
16. Gray PB, Young SM (2011): *Human-pet dynamics in cross-cultural perspective*. Anthrozoös, **24**, 17-30.
17. Hawkins RD, Williams JM, Animals SSftPoCt (2017): *Childhood attachment to pets: Associations between pet attachment, attitudes to animals, compassion, and humane behaviour*. Int J Environ Res Public Health, **14**, 490.
18. Johnson TP, Garrity TF, Stallones L (1992): *Psychometric evaluation of the Lexington attachment to pets scale (LAPS)*. Anthrozoös, **5**, 160-175.
19. Joseph N, Chandramohan AK, D'souza AL, et al (2019): *Assessment of pet attachment and its relationship with stress and social support among residents in Mangalore city of south India*. J Vet Behav, **34**, 1-6.
20. Kogan LR, Schoenfeld-Tacher R, Viera AR (2012): *The Internet and health information: differences in pet owners based on age, gender, and education*. J Med Lib Assoc, **100**, 197.
21. Kurdek LA (2009): *Pet dogs as attachment figures for adult owners*. J Fam Psychol, **23**, 439.
22. Lass-Hennemann J, Schäfer SK, Sopp MR, et al (2020): *The relationship between dog ownership, psychopathological symptoms and health-benefitting factors in occupations at risk for traumatization*. Int J Environ Res Public Health, **17**, 2562.
23. le Roux MC, Wright S (2020): *The relationship between pet attachment, life satisfaction, and perceived stress: Results from a South African online survey*. Anthrozoös, **33**, 371-385.
24. Martins CM, Mohamed A, Guimarães AMS, et al (2013): *Impact of demographic characteristics in pet ownership: modeling animal count according to owners income and age*. Prev Vet Med, **109**, 213-218.
25. Meehan M, Massavelli B, Pachana N (2017): *Using attachment theory and social support theory to examine and measure pets as sources of social support and attachment figures*. Anthrozoös, **30**, 273-289.
26. Rault J-L, Waiblinger S, Boivin X, et al (2020): *The power of a positive human-animal relationship for animal welfare*. Front Vet Sci, **7**, 590867.
27. Rehn T, Keeling LJ (2016): *Measuring dog-owner relationships: Crossing boundaries between animal behaviour and human psychology*. Appl Anim Behav Sci, **183**, 1-9.
28. Rodriguez KE, Herzog H, Gee NR (2021): *Variability in human-animal interaction research*. Frontiers in Veterinary Science, **7**, 619600.
29. Serpell JA (2000): *Domestication and history of the cat*. In: Turner, DC and Bateson, P, Eds, The Domestic Cat: The Biology of Its Behaviour, 2nd Edition, Cambridge University Press, Cambridge.
30. Sife W (1998): *The loss of a pet*. New York, Howell Book House.
31. Simon RW, Nath LE (2004): *Gender and emotion in the United States: Do men and women differ in self-reports of feelings and expressive behavior?* Am J Sociol, **109**, 1137-1176.
32. Soares C, Whalen T (1986): *The canine companion in the family system complex*. Unpublished manuscript.
33. Stallones L, Marx MB, Garrity TF, et al (1988): *Attachment to companion animals among older pet owners*. Anthrozoös, **2**, 118-124.
34. Stevens LT (1990): *Attachment to pets among eighth graders*. Anthrozoös, **3**, 177-183.
35. Şahin Ö, Kahya Y (2018): *Evcil hayvana bağlanma ölççeği: geçerlik ve güvenilirlik çalışması*. Nesne, **6**, 174-197.
36. Turner DC, Rieger G, Gygas L (2003): *Spouses and cats and their effects on human mood*. Anthrozoös, **16**, 213-228.
37. Wells D, Hepper P (1995): *Attitudes to animal use in children*. Anthrozoös, **8**, 159-170.
38. Wells DL, Hepper PG (2000): *Prevalence of behaviour problems reported by owners of dogs purchased from an animal rescue shelter*. Appl Anim Behav Sci, **69**, 55-65.
39. Zasloff RL, Kidd AH (1994): *Loneliness and pet ownership among single women*. Psychol Rep, **75**, 747-752.
40. Zilcha-Mano S, Mikulincer M, Shaver PR (2011): *An attachment perspective on human-pet relationships: Conceptualization and assessment of pet attachment orientations*. J Res Pers, **45**, 345-357.
41. Zilcha-Mano S, Mikulincer M, Shaver PR (2012): *Pets as safe havens and secure bases: The moderating role of pet attachment orientations*. J Res Pers, **46**, 571-580.

Publisher's Note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.
