Attachment and Perceived Stress among Pet Owners before and during the Lockdown in China

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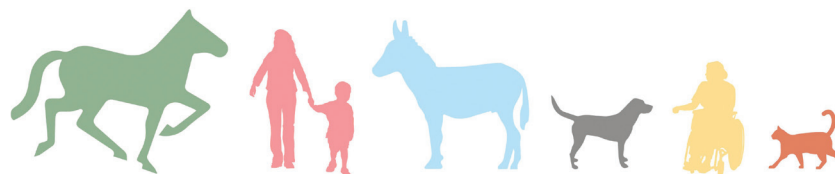Available at: https://docs.lib.purdue.edu/paij/vol5/iss1/3

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Cover Page Footnote

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Abstract: The current pandemic has brought a lot of social and economic strains to families worldwide, as well as making a huge impact on the long-term care of companion animals. The current study explored differences in the attachment level of owners toward their pets and their perceived stress before and during the pandemic in China. The questionnaire, besides demographic information, included a modified version of the Companion Animal Bonding Scale (CABS) and the original form of the Perceived Stress Scale (PSS). A total of 261 questionnaires were collected. The respondents did not show any significant differences in attachment level toward their companion animals before and during the pandemic, nor in relation to the type of pet (dog or cat). The study showed that when pet owners experienced emotional difficulties such as perceived stress/anger and lack of control, the attachment toward their pets was compromised, indicated by an increase of the negative aspects of the bond. These factors also were positively associated with the pandemic and with strict and medium levels of lockdown. Moreover, the pet owners were more likely to sleep with their companion animals when they felt a higher perceived lack of control, and this behavior was higher in women than in men. On the other hand, attachment toward the pets increased when there was more than one animal in the household, and when the respondents had difficulties in providing food supplies to their companion animals. It is critical to understand how companion animals might affect the lives of their owners during times of crisis, in order to provide people with suitable support and to avoid animal abandonment.

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Introduction

In December 2019 patients from Wuhan, China, were admitted to the hospital and diagnosed with a new coronavirus pneumonia, which was later named SARS-Cov-2 (Huang et al., 2020). Following an exponential increase of cases caused by the newly discovered virus, Hubei Province (in which Wuhan is the capital city) announced the total suspension of all transportation (buses, trains, airports, and highways) in and out of the city, and the complete shutdown of all business activities from shops to industry, on January 23, 2020. This lockdown, which was considered the strictest in modern history, had a total duration of 78 days. In addition, companies that could not operate with remote-working possibilities (e.g., airline companies) furloughed their employees with 50–80% of their previous income, causing a potential increase in job insecurity due to a prolonged time of suspended activities. In February 2020, the new disease was named COVID-19, and on March 11, 2020, WHO characterized the new epidemic as a pandemic (WHO, 2020a, b).

Following an increase in COVID-19 cases nationwide in China, all the provinces of the country established different types of lockdown, ranging from medium (only one person per family was allowed to go out every three days for shopping) to flexible (people were allowed to go out for a few walks and for shopping, with no limitations on the number of times per week). The government of the city of Wuhan forbade all citizens to leave their homes, not even to buy food supplies. A few of the main supermarkets and locally authorized markets of the city were kept open with a restricted number of delivery people who distributed the goods purchased by citizens who used special apps set up for the emergency. The groceries were left at the gate of the residential compounds, or at the buildings' lobby.

It is important to remember that the first lockdown in China was established a few days before the celebration of Chinese New Year (CNY, January 25, 2020), the most important holiday in the country, when millions of people travel to visit relatives. Therefore, many Chinese people were not able to return to their hometowns, provinces, or places of origin until April 8, 2020, when the Wuhan lockdown was lifted. In addition, many families decided to separate their members, with children moving in with one parent or with grandparents to reduce the possibilities of COVID-19 infection.

All of these sudden changes also affected people's pets. Many pet owners, who were already on holiday during the onset of the pandemic, were not allowed to return to their homes because of the sudden lockdown, with no possibility of finding anyone to take care of their pets. For example, in the city of Wuhan alone approximately 2,000 pets trapped in their homes without food and water were rescued by the Wuhan Small Animal Protection Association (Mr. Dufan, personal communication). In addition, pet owners under strict and medium lockdown were only allowed to walk their dogs once or twice a day. In the cases where the buildings were quarantined and the tenants were not allowed to go out, people needed to explore other alternatives and had to retrain their pets to relieve themselves in designated areas inside the house, or on the rooftops of the buildings. In some extreme cases, people who lived on the second or third floor of a building lowered their dogs by the leash from the window at the ground floor to allow the animals to have a short walk. Furthermore, other major challenges for the owners were represented by difficulties in finding veterinary services and food supplies for their pets. In such extreme situations, the stressors related to COVID-19 also might have been detrimental to the human–pet relationship (Applebaum, Tomlinson, et al., 2020).

The great social constraints caused by the lockdown created a wave of psychosocial stressors characterized by an increase in anxiety disorders, depression, and PTSD observed worldwide, including in China, which was regarded as a "Shadow Pandemic" (Chatterjee et al., 2020; Clemente-Suarez & Ruisoto-Palomera, 2020; Pandey et al., 2020; Yan et al., 2021). Therefore, the worsening of the living conditions of many people around the world raised a lot of concerns about the impact that the pandemic might have on the long-term care of pets (Delanoeije, 2020; Parry, 2020). For example, these

circumstances might have altered the perceived cost and benefit balance of having an animal for people (Bowen et al., 2020; Ratschen et al., 2020; Vincent et al., 2020). Indeed, pet owners have often reported that living with an animal did not always influence feelings of social contentedness during the lockdown (Okabe-Miyamoto et al., 2020), and the cost of caring for the animals during economic hardship could have detrimental effects on the human–pet relationship, leading to extreme consequences such as pet relinquishment (Applebaum, Tomlinson, et al., 2020; Owczarczak-Garstecka et al., 2021; Vice, 2020). This situation was also worsened at the beginning of the pandemic by common concerns regarding the possibility of pets becoming infected with the SARS-Cov-2 virus and transmitting it to their owners (Almendros, 2020). This belief spread fear among people, and in some cases led to pet abandonment or abuse around the world, including in China (Cui et al., 2020; Kim, 2020; Parry, 2020; Zhu, 2020). Chinese stray animal rescue activists registered an increased number of abandoned pets across the country in 2020 (Pollard, 2021). Therefore, people with pets might have felt increased emotional distress caused by the additional responsibilities toward their animals during the lockdown. Moreover, the hardship of caring for the companion animals during the lockdown was also exacerbated by the social issues that developed following the increased time spent at home, such as family violence and accidents between animals and children (Bowen et al., 2020; Campbell, 2020; Dogs Trust, 2020; Ratschen et al., 2020).

On the other hand, companion animals could have represented an important social resource for their owners during the lockdown, acting as a "social buffer" against the consequences of stress (Serpell & Paul, 2011). In general, social support acts as a buffer that reduces the negative impact of stressful events in life (Cohen & Wills, 1985; Li et al., 2021). For example, when people feel lonely they are more likely to view their pets as a source of support (Epley et al., 2008). Indeed, social support has been shown to be one of the major protective factors against the stressors caused by the COVID-19 pandemic (Bowen et al., 2020). Companion animals

have been identified as a source of routine and may have contributed to people's mental health during the lockdown in different countries (Holland et al., 2021; Moore et al., 2020; Oliva & Johnston, 2020; Ratschen et al., 2020; Shoesmith et al., 2021). Generally, it has been observed that people form strong emotional connections with their pets that are consistent with human attachment theory (Crawford et al., 2006; Hart &Yamamoto, 2015; Wood et al., 2005), which posits that an individual seeks attachment when under stress for comfort and safety (Bowlby & Ainsworth, 2013). According to Poresky et al. (1987), attachment behaviors toward pets can be classified into three categories: physical proximity, emotional bond, and caretaking. These behaviors can produce the sensation of comfort in people through a series of physiological mechanisms that also play a role in controlling attachment behaviors and social bonding in mammals and reduce stress (Ader et al, 1995; Donaldson & Young, 2008; Kikusui et al., 2006; Lim & Young, 2006; Uchino, 2006). Therefore, given that people were continuously moving in and out of lockdown for the past two years, it becomes critical to understand what the physical and psychological implications are of owning a pet in these difficult times, in order to develop supporting measures that could also help avoid the risk of animal abandonment.

After more than one year from the first lockdown in China (January 23, 2020), cities around the country are still experiencing different levels of lockdown depending on the number of COVID-19 cases. The current questionnaire study conducted in China aims to assess differences in the owners' attachment levels toward their pets, and their perceived stress in relation to the care of those animals before and during the pandemic.

Materials and Methods

Structure of the questionnaire

The first section of the questionnaire focused on demographic details such as gender, age, education, family members affected by COVID-19, and number

of family members in the house before and during lockdown. Subsequently, the respondents were asked about the type of pet owned (dog, cat, both), if there were additional pets besides the one surveyed, if the surveyed pet had a medical condition before or during the pandemic, and the difficulties in finding pet food and veterinary services before and during the pandemic. In addition, the respondents had to indicate the type of lockdown they witnessed during the pandemic (strict lockdown—not allowed to go out of the house; medium—people can only go out to buy food; flexible—people can go out for shopping and walks a few times a week) (Table 1).

The rest of the questionnaire was structured with two scales:

1. The Companion Animal Bonding Scale (CABS) from Poresky et al. (1987) was developed to assess the level of attachment of owners to their pets. The original scale, consisting of 8 items, was modified and expanded to 16 items by the authors in order to accommodate the situation that pet owners could experience during the pandemic. Each item was scored on a 5-point Likert scale, ranging from (1) never to (5) always. The 16 items of the modified scale (CABS) were categorized after principal component analysis (PCA) into three subscales: *Positive bond* (e.g.: How often did you hold, stroke, or pet your companion animal?), *Negative bond* (e.g.: Did you feel your companion animal to be a bother?), and *Proximity* (e.g.: How often did your companion animal sleep with you?) (Table 2). The reliability of the overall scale was α = 0.78. The scale was translated into Chinese through forward and backward translations of the English version by two bilingual assistants working independently.

2. The Perceived Stress Scale (PSS) from Roberti et al. (2006) was used in its original form. The scale measured the extent to which the respondents perceived their lives before and during the lockdown in relation to the care of their pets. The scale had 10 items (e.g.: How often have you felt nervous and "stressed"?) that were scored on a 5-point Likert scale from (1)

never to (5) always, with higher scores indicating a higher level of perceived stress. The scale had already been used in China in a previous study (Wu et al., 2018), and it demonstrated good validity and reliability (Lee, 2012; Wang et al., 2011; Wu et al., 2018). The PSS reliability for the current study was α = 0.77. The 10 items were grouped into three subscales: *Anger/Stress* (e.g.: How often have you been angered because of things that were outside of your control?), *Lack of control* (e.g.: How often have you felt that you were unable to control the important things in your life?), and *Confidence* (e.g.: How often have you felt that you were on top of things?) (Table 2). The scale was translated into Chinese through forward and backward translations of the English version by two bilingual assistants working independently.

Survey method

The questionnaire and survey were approved by the Research Department of Jianghan University in June 2020 (Wuhan, China). The Chinese and the English versions of the questionnaire were uploaded to the online platform Wèn Juàn Xīng (Changsha Ranxing Information Technology Co., Ltd.), which produced two weblinks and QR codes that were sent to the public around China through the main Chinese social media platforms (WeChat, Weibo). The questionnaire was addressed to people who owned dogs or cats. The respondents were able to access the questionnaire by using their phones, computers, or tablets. The uploaded questionnaire had an initial part that explained the purpose of the survey and the anonymity of the responses. Pet owners with multiple animals of the same species in the house were recommended to choose only one of them for the survey. In addition, during the uploading of the questionnaire to the online platform, the function was selected that did not allow partially filled questionnaires to be submitted. As the entire questionnaire was rather long and took time to complete (approximately 30 minutes), the reply rate for this convenience sample was rather low. The link remained open from July 1, 2020, to June 30,

Table 1.   Demographics of the Chinese respondents in the analyzed questionnaire.

Demographic Variables		No. of Respondents	% of Survey Sample
Type of lockdown	Strict	116	44
	Medium	61	24
	Flexible	84	32
Gender	Female	194	74
	Male	67	26
Age	18–25	49	19
	26–35	95	36
	36–45	67	26
	Over 45	50	19
Education	College	164	63
	High school	19	7
	Middle school	4	2
	Postgraduate	74	28
Family member BE**	1	23	9
	2	67	26
	3	85	33
	4	45	17
	5–9	41	15
Family member DE**	1	33	13
	2	60	23
	3	82	31
	4	44	17
	5–9	42	16
Family member with COVID-19	Yes	15	6
	No	246	94
Type of pet	Dog	134	51
	Cat	93	36
	Both	34	13
Other pets in the household	Yes	37	14
	No	224	86
Difficulties to find pet food BE	Yes	30*	10
	No	265	90
Difficulties to find pet food DE	Yes	113*	38
	No	182	62
Difficulties to find veterinarian BE	Yes	22*	7
	No	273	93
Difficulties to find veterinarian DE	Yes	16*	5
	No	279	95
Pet medical condition BE	Yes	32*	11
	No	263	89
Pet medical condition DE	Yes	30*	10
	No	265	90

* The total count is 295 because of the number of cats and dogs that belong to the variable "both" that have been counted as separated individuals in this section.
** BE: before pandemic; DE: during pandemic

Table 2.   Perceived Stress Scale (PSS) and Companion Animal Bonding Scale (CABS) items' grouping by PCA.

Scale	Variable	Items
PSS	Anger/stress	How often have you been upset because of something that happened unexpectedly?
		How often have you felt nervous and "stressed"?
		How often have you been angered because of things that were outside of your control?
	Lack of control	How often have you found that you could not cope with all the things that you had to do?
		How often have you felt that you were unable to control the important things in your life?
		How often have you felt difficulties were piling up so high that you could not overcome them?
	Confidence	How often have you felt confident about your ability to handle your personal problems?
		How often have you felt that things were going your way?
		How often have you been able to control irritations in your life?
		How often have you felt that you were on top of things?
CABS	Positive bond	How often were you responsible for your companion animal?
		How often did you clean up after your companion animal?
		How often did you hold, stroke, or pet your companion animal?
		How often did you feel that your companion animal was responsive to you?
		How often did you feel that you had a close relationship with your companion animal?
		How often did you feel you understood what your companion animal communicated to you?
		How often did your companion animal positively influence your life?
	Negative bond	Did you feel your companion animal to be a bother?
		How often were you afraid something bad could happen to your companion animal?
		How often did you think to relinquish your companion animal?
		How often did the presence of your companion animal cause you problems with other family members?
		How often did the presence of your companion animal influence the relationship with your partners/family members?
		How often did the presence of your companion animal influence your ability to take care of your family?
		How often did you feel angry at your companion animal?
	Proximity	How often did your companion animal sleep with you?
		How often did you sleep near your companion animal?

Table 3. Principal Component Analysis (PCA) loadings for each CABS scale item on the three principal components (PC1, PC2 and PC3). Loadings > 0.40 are in bold.

Scale Item	PC1	PC2	PC3
How often were you responsible for your companion animal?	**0.71**	−0.14	−0.02
How often did you clean up after your companion animal?	**0.72**	−0.02	0.08
How often did you hold, stroke, or pet your companion animal?	**0.78**	−0.04	0.26
How often did you feel that your companion animal was responsive to you?	**0.78**	−0.06	0.24
How often did you feel that you had a close relationship with your companion animal?	**0.82**	−0.1	0.26
How often did you feel you understood what your companion animal communicated to you?	**0.71**	−0.06	0.25
How often did your companion animal positively influence your life?	**0.63**	0.03	0.34
Did you feel your companion animal to be a bother?	−0.19	**0.54**	0.09
How often were you afraid something bad could happen to your companion animal?	0.14	**0.44**	0.39
How often did you think to relinquish your companion animal?	−0.22	**0.61**	0.04
How often did the presence of your companion animal cause you problems with other family members?	−0.06	**0.77**	−0.07
How often did the presence of your companion animal influence the relationship with your partners/family members?	−0.01	**0.75**	−0.06
How often did the presence of your companion animal influence your ability to take care of your family?	−0.1	**0.76**	0.08
How often did you feel angry at your companion animal?	0	**0.58**	−0.13
How often did your companion animal sleep with you?	0.23	0	**0.87**
How often did you sleep near your companion animal?	0.28	−0.02	**0.87**

2021, allowing respondents to complete the survey at their own convenience. A total of 261 completed questionnaires were received (221 from the Chinese version and 40 from the English version).

Statistical Analysis

All statistical analyses were performed using R 3.6.0 (R core team, 2020). First, all answers from both questionnaires were transformed into ordinal numeric variables (Never = 1, Rarely = 2, Often = 3, Generally = 4, Always = 5).

Principal component analysis (PCA) on the correlation matrix with a Varimax rotation was conducted using the "principal()" function from the "psych" package (Revelle, 2021) to extract grouping factors from the CABS scale. Three factors emerged from the principal component analysis. The first factor explained 45% of the variance and could be labeled "Positive care/relationship with the companion animal." The second factor explained 32% of the variance and could be labeled "Negative feelings toward the companion animal." The third factor explained 23% of the variance and could be labeled "Proximity with the companion animal" (Table 3).

For further analyses, answers to CABS items were averaged following the factors extracted from the PCA to obtain three variables. Answers to PSS

items were grouped and averaged to obtain three variables. First, the associations between PSS and CABS were analyzed using linear mixed effect models (LMMs) with the "lmer()" function from the "lme4" package (Bates et al., 2015). Three models were fitted, with response variables being one of the three PSS variables and predictors being the three CABS variables.

The effect of context on the CABS and PSS variables was also analyzed using LMMs. One model was conducted for each CABS and PSS variable for a total of 6 models. Predictors in each model were demographic data (age, gender, family size), pet species (cat or dog), pet medical condition (yes or no), presence of other pet(s) (yes or no), ability to easily find veterinary services (yes or no), ability to easily find food for the pet (yes or no), type of lockdown (flexible, medium, or strict), and the period (before or during the pandemic).

The owner's ID was included as a random factor in all models. A model diagnosis was conducted to check each model, including normality of residuals and homogeneity of variances. Multicollinearities were also checked using a variance inflection factor (VIF) for covariate or generalized variance inflection factor (GVIF$^{(1/(2\times Df))}$, Fox & Monette, 1992) for factors, with no major issues (no VIF > 5, no GVIF$^{(1/(2\times Df))}$ > 2). Wald chi-squared tests were used to obtain p-values. Pairwise-tests were conducted by running the same models with appropriate subsettings and applying a Bonferroni correction.

Only a statistical outcome of significant results ($p < 0.05$ or satisfying Bonferroni correction criteria) and tendencies ($0.1 > p > 0.05$) will be presented.

Results

Association between CABS and PSS

Perceived anger/stress was positively associated with the negative bond with the companion animal ($\chi^2 = 26.11$, $df = 1$, $p < 0.001$). The perceived lack of control was also positively associated with the negative bond ($\chi^2 = 22.91$, $df = 1$, $p < 0.001$) and with proximity ($\chi^2 = 6.59$, $df = 1$, $p = 0.010$) with the animal.

Perceived confidence was negatively associated with the negative bond with the animal ($\chi^2 = 5.58$, $df = 1$, $p = 0.018$) (Figure 1). No significant differences were found in the association between CABS and PSS before and during the pandemic ($p < 0.05$), or among the CABS and PSS variables and the type of pets ($p < 0.05$). Additionally, the presence of family members with COVID-19 disease did not influence the factors of the CABS or the PSS scales ($p < 0.05$).

Association between context and CABS and PSS

CABS

Proximity with the companion animal was significantly higher for females than for males ($\chi^2 = 16.93$, $df = 1$, $p < 0.001$) and negatively associated with family size ($\chi^2 = 14.18$, $df = 1$, $p < 0.001$) (Figure 2, Table 4).

The positive bond with the companion animal was significantly higher for females than for males ($\chi^2 = 14.91$, $df = 1$, p < 0.001) and negatively associated with family size ($\chi^2 = 24.19$, $df = 1$, $p < 0.001$). It was also significantly higher when other pets were present than when the owner only had one pet ($\chi^2 = 7.43$, $df = 1$, $p = 0.006$) and when the owner had difficulties in finding pet food than when not ($\chi^2 = 6.24$, $df = 1$, $p = 0.012$) (Figure 3, Table 5).

The negative bond toward the companion animal was significantly higher when the owner had difficulties in finding veterinary services than when not ($\chi^2 = 6.77$, $df = 1$, $p = 0.009$) and tended to be impacted by the type of lockdown ($\chi^2 = 5.19$, $df = 2$, $p = 0.074$) (Figure 4, Table 6).

PSS

The anger/stress grouping was significantly higher for females than for males ($\chi^2 = 4.70$, $df = 1$, $p = 0.010$) and negatively associated with family size ($\chi^2 = 11.41$, $df = 1$, $p = 0.007$). It was also significantly higher when the pet had a medical condition than when not ($\chi^2 = 9.26$, $df = 1$, $p = 0.002$), and during the pandemic than before ($\chi^2 = 12.17$, $df = 1$, $p < 0.001$). Anger/stress was significantly impacted by the lockdown type ($\chi^2 = 10.17$, $df = 2$, $p = 0.006$): it was higher for
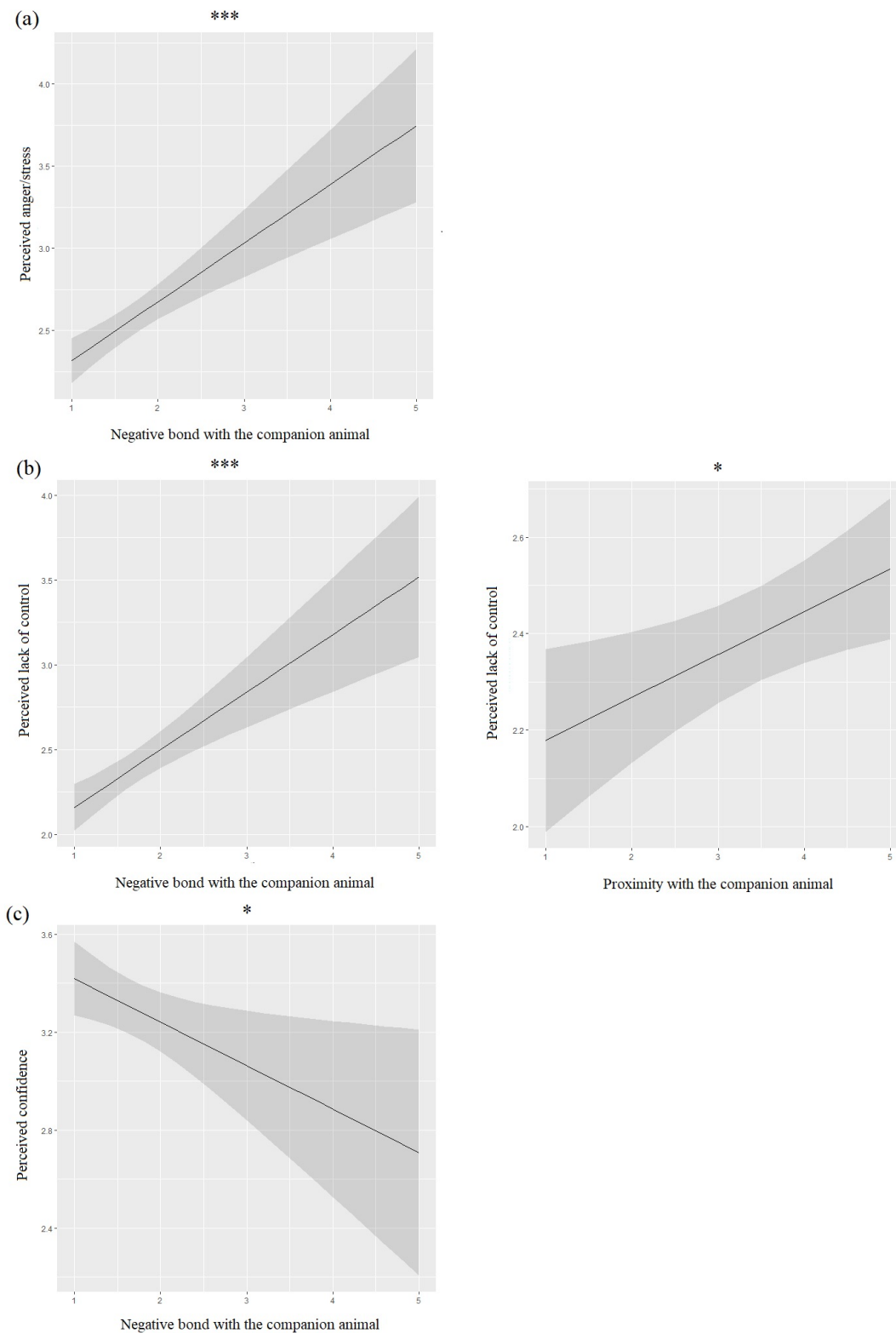
Figure 1. Significant associations between perceived anger/stress (a), lack of control (b) and confidence (c), and CABS factors. Means and 95% confidence intervals have been extracted from linear mixed effect models (LMMs); *: $p < 0.05$; ***: $p < 0.001$ (Wald chi-square test).
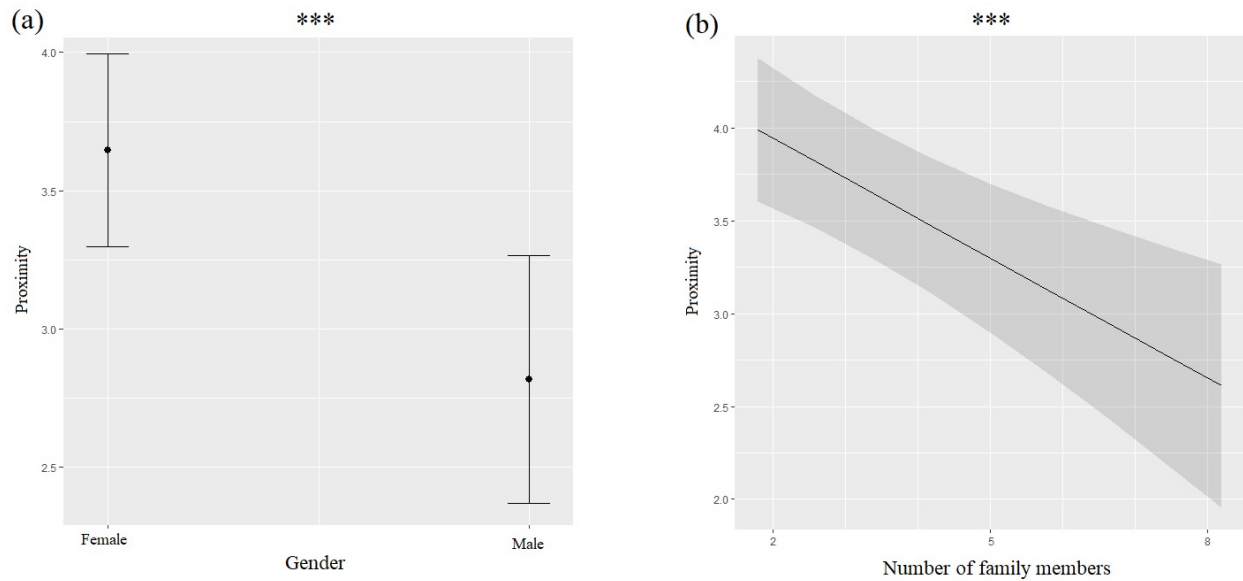
Figure 2. Proximity with the companion animal depending on the owner's gender (a) and family size (b). Means and 95% confidence intervals have been extracted from linear mixed effect models (LMMs); ***: *p* < 0.001 (Wald chi-square test).

Table 4.   Means, standard errors (SE), and 95% confidence intervals (CI) of proximity with the companion animal depending on the demographic and context variables.

Variable	Level	Fitted Mean	SE	Lower CI	Higher CI
Age	< 26	3.54	0.23	3.08	4.00
	26–35	3.19	0.19	2.82	3.57
	36–45	3.53	0.20	3.13	3.93
	> 45	2.87	0.24	2.40	3.34
Gender	Female	3.72	0.15	3.41	4.02
	Male	2.89	0.20	2.49	3.29
Pet species	Cat	3.34	0.16	3.03	3.64
	Dog	3.27	0.16	2.97	3.58
Medical condition	No	3.31	0.15	3.02	3.61
	Yes	3.29	0.16	2.97	3.62
Other pet	No	3.07	0.13	2.82	3.32
	Yes	3.53	0.25	3.05	4.02
Difficulty to find a veterinarian	No	3.32	0.14	3.04	3.60
	Yes	3.29	0.18	2.93	3.65
Difficulty to find pet food	No	3.33	0.15	3.04	3.62
	Yes	3.28	0.16	2.96	3.59
Lockdown type	Flexible	3.29	0.20	2.89	3.68
	Medium	3.32	0.21	2.91	3.73
	Strict	3.30	0.18	2.95	3.66
Period	Before pandemic	3.31	0.15	3.02	3.61
	During pandemic	3.29	0.15	3.00	3.59

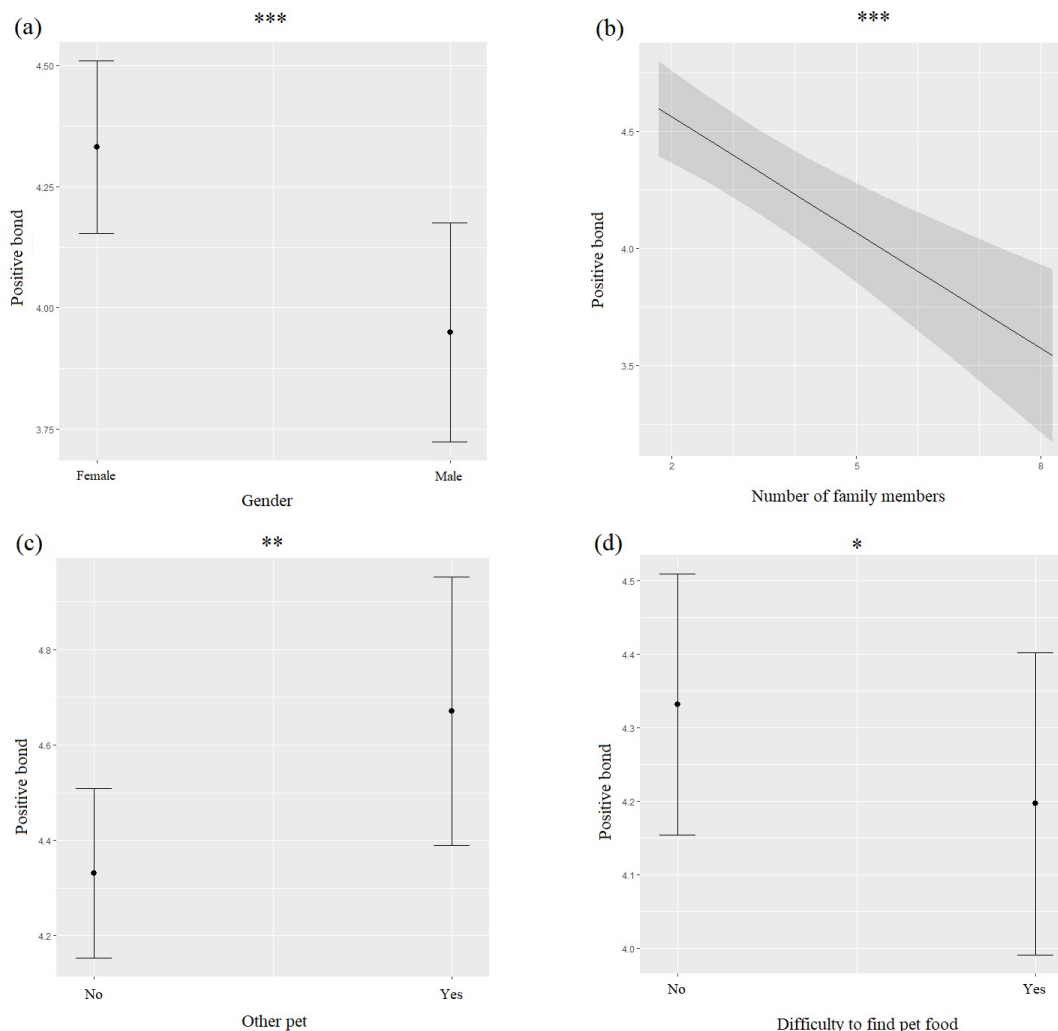Parameters have been extracted from linear mixed effect models (LMMs).

Figure 3. Positive bond with the companion animal depending on the owner's gender (a), family size (b), the presence of other pet(s) (c), and ability to find pet food (d). Means and 95% confidence intervals have been extracted from linear mixed effect models (LMMs); *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$ (Wald chi-square test).

medium ($\chi^2 = 7.71$, $df = 1$, $p = 0.005$) and strict ($\chi^2 = 6.83$, $df = 1$, $p = 0.009$) lockdown than for flexible lockdown (Figure 5, Table 7).

Lack of control was significantly higher for females than for males ($\chi^2 = 4.49$, $df = 1$, $p = 0.034$), tended to be negatively associated with the owner's age ($\chi^2 = 2.85$, $df = 1$, $p = 0.091$), and was negatively associated with family size ($\chi^2 = 7.13$, $df = 1$, $p = 0.008$). It was also significantly higher when the pet had a medical condition than when not ($\chi^2 = 4.78$, $df = 1$, $p = 0.029$), and tended to be higher when the owner had

difficulties in finding pet food than when not ($\chi^2 = 2.76$, $df = 1$, $p = 0.097$). The lack of control was significantly higher during the pandemic than before ($\chi^2 = 23.79$, $df = 1$, $p < 0.001$) (Figure 6, Table 8).

The feeling of confidence/control was significantly higher for males than for females ($\chi^2 = 4.66$, $df = 1$, $p = 0.031$) and was positively associated with the owner's age ($\chi^2 = 15.85$, $df = 1$, $p < 0.001$). This feeling was significantly lower during the pandemic than before ($\chi^2 = 23.60$, $df = 1$, $p < 0.001$) (Figure 7, Table 9).

Table 5. Means, standard errors (SE), and 95% confidence intervals (CI) of positive bond with the companion animal depending on the demographic and context variables.

Variable	Level	Fitted Mean	SE	Lower CI	Higher CI
Age	< 26	4.40	0.12	4.16	4.63
	26–35	4.23	0.10	4.03	4.42
	36–45	4.36	0.10	4.15	4.56
	> 45	4.30	0.12	4.05	4.54
Gender	Female	4.51	0.08	4.35	4.67
	Male	4.13	0.11	3.92	4.33
Pet species	Cat	4.32	0.09	4.15	4.49
	Dog	4.32	0.09	4.15	4.49
Medical condition	No	4.36	0.08	4.20	4.52
	Yes	4.28	0.09	4.10	4.47
Other pet	No	4.16	0.07	4.02	4.30
	Yes	4.48	0.13	4.23	4.73
Difficulty to find a veterinarian	No	4.33	0.08	4.18	4.48
	Yes	4.31	0.11	4.10	4.52
Difficulty to find pet food	No	4.39	0.08	4.23	4.54
	Yes	4.25	0.09	4.07	4.43
Lockdown type	Flexible	4.20	0.11	3.99	4.41
	Medium	4.35	0.11	4.14	4.56
	Strict	4.41	0.09	4.22	4.59
Period	Before pandemic	4.31	0.08	4.15	4.47
	During pandemic	4.33	0.08	4.17	4.49

Parameters have been extracted from linear mixed effect models (LMMs).
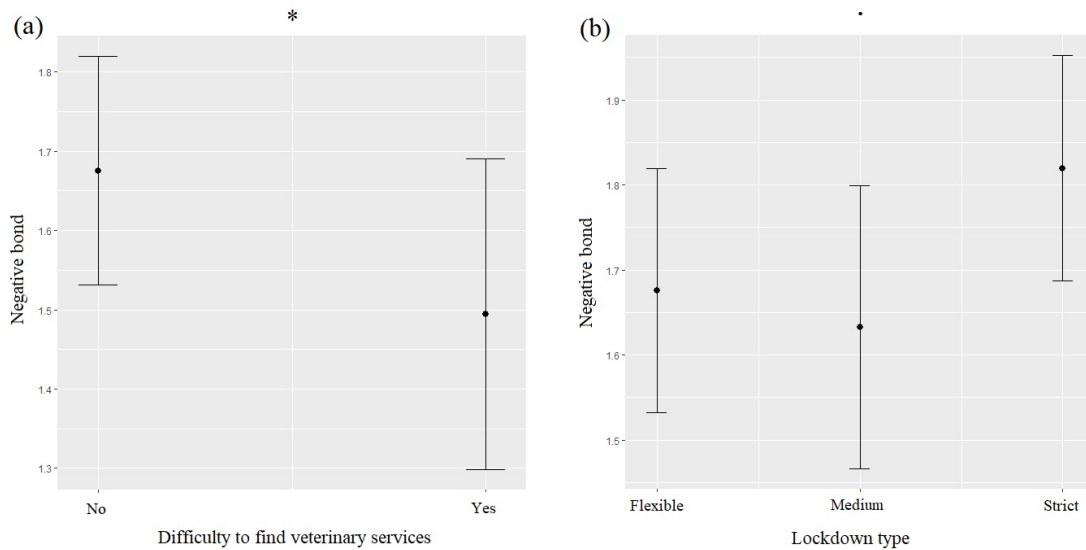

Figure 4. Negative bond toward the companion animal depending on the ability to find veterinary services (a) and lockdown type (b). Means and 95% confidence intervals have been extracted from linear mixed effect models (LMMs); *: $p < 0.05$ (Wald chi-square test with Bonferroni correction).

Table 6. Means, standard errors (SE), and 95% confidence intervals (CI) of negative bond with the companion animal depending on the demographic and context variables.

Variable	Level	Fitted Mean	SE	Lower CI	Higher CI
Age	< 26	1.55	0.10	1.36	1.74
	26–35	1.67	0.08	1.52	1.83
	36–45	1.55	0.08	1.38	1.71
	> 45	1.52	0.10	1.32	1.72
Gender	Female	1.59	0.07	1.46	1.72
	Male	1.55	0.08	1.38	1.72
Pet species	Cat	1.58	0.07	1.45	1.71
	Dog	1.56	0.07	1.43	1.70
Medical condition	No	1.54	0.07	1.41	1.66
	Yes	1.61	0.07	1.46	1.75
Other pet	No	1.60	0.06	1.49	1.71
	Yes	1.55	0.10	1.35	1.75
Difficulty to find a veterinarian	No	1.66	0.06	1.54	1.78
	Yes	1.48	0.08	1.32	1.64
Difficulty to find pet food	No	1.56	0.06	1.43	1.68
	Yes	1.59	0.07	1.45	1.72
Lockdown type	Flexible	1.53	0.09	1.36	1.70
	Medium	1.49	0.09	1.32	1.67
	Strict	1.69	0.08	1.54	1.84
Period	Before pandemic	1.58	0.07	1.45	1.71
	During pandemic	1.56	0.06	1.43	1.69

Parameters have been extracted from linear mixed effect models (LMMs).

Discussion

The current study is the first to assess the relationship between the pets (dogs and cats) and their owners, and perceived stress of the companion animal caretakers before and during the pandemic in China. Consistent with previous studies (Hawkins & Brodie, 2020; Okabe-Miyamoto et al., 2020), pet owners in China did not show any significant differences between their attachment levels toward their pets before and during the pandemic. In fact, other surveys across various populations found no association between better well-being and pet ownership (Curl et al., 2017; Miyake et al., 2020; Morrison et al., 2013). Nor did the respondents of the current study show any differences in their attachment levels between dogs and cats, a result consistent with previous

findings where pet owners showed no differences in their bond or interactions between dogs and cats (Holcomb et al., 1985; Marks et al., 1994). However, previous studies have recommended taking into account underlying differences during the interactions of people with dogs and cats, and differences in the behavioral repertoire of the animal species when assessing owner attachment to them (Johnson et al., 1992; Stallones et al., 1988).

The presence of family members with COVID-19 disease did not influence the attachment of the respondents toward their pets, nor their perceived stress. This result must, however, be viewed with caution given the low percentage of people who had family members with COVID-19 disease (5.7%) in this study.

Moreover, pet owners in China showed an increase of negative bond toward their animals associated
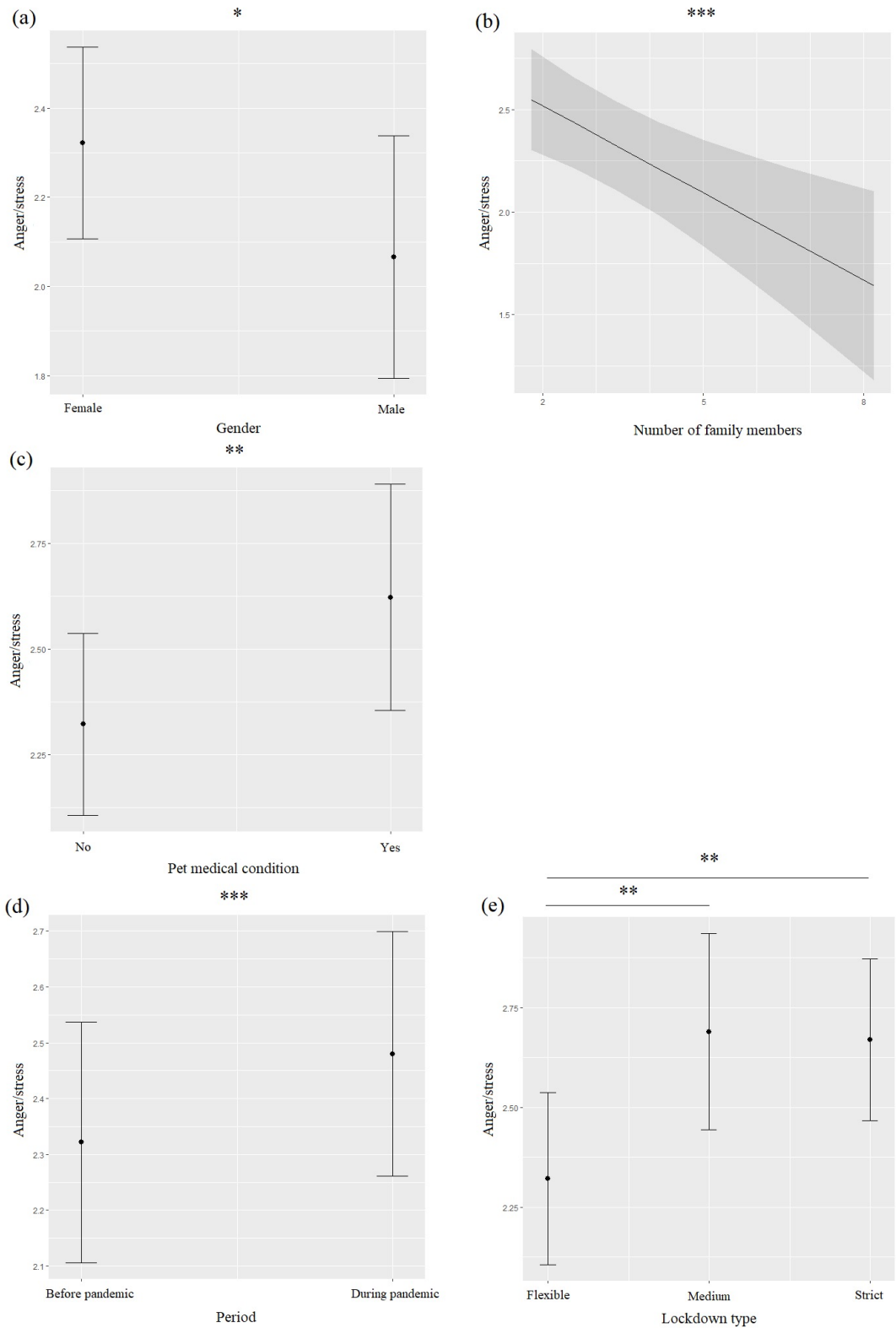
Figure 5. Owner's anger/stress depending on gender (a), family size (b), pet medical condition (c), period (d), and lockdown type (e). Means and 95% confidence intervals have been extracted from linear mixed effect models (LMMs); *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$ (Wald chi-square test with Bonferroni correction).

Table 7. Means, standard errors (SE), and 95% confidence intervals (CI) of anger/stress depending on the demographic and context variables

Variable	Level	Fitted Mean	SE	Lower CI	Higher CI
Age	< 26	2.57	0.15	2.29	2.85
	26–35	2.79	0.12	2.55	3.02
	36–45	2.63	0.13	2.38	2.88
	> 45	2.34	0.15	2.05	2.63
Gender	Female	2.72	0.10	2.51	2.92
	Male	2.45	0.13	2.19	2.70
Pet species	Cat	2.60	0.11	2.39	2.80
	Dog	2.57	0.11	2.36	2.78
Medical condition	No	2.44	0.10	2.23	2.64
	Yes	2.73	0.12	2.49	2.96
Other pet	No	2.59	0.09	2.41	2.76
	Yes	2.57	0.15	2.28	2.87
Difficulty to find a veterinarian	No	2.58	0.09	2.40	2.76
	Yes	2.58	0.14	2.31	2.86
Difficulty to find pet food	No	2.55	0.10	2.35	2.74
	Yes	2.62	0.11	2.39	2.84
Lockdown type	Flexible	2.33	0.13	2.07	2.58
	Medium	2.71	0.13	2.45	2.97
	Strict	2.70	0.11	2.48	2.93
Period	Before pandemic	2.50	0.10	2.30	2.71
	During pandemic	2.66	0.10	2.46	2.86

Parameters have been extracted from linear mixed effect models (LMMs).

with perceived stress and lack of control. An increase of negative bond was also associated with a reduction of perceived confidence by the respondents. In general, when people live in a state of stress and feel that they can't control or cope with the events of their lives, this creates an unavoidable realization that caring for a pet can become a challenge (Vice, 2020). Under these circumstances, pet owners might have a natural response to reduce the hardship by surrendering the pet (Vice, 2020). In fact, past studies have observed that, if the animal caretakers are also affected by psychological disorders or disabilities, they might perceive caring for an animal as an additional burden (Adelman et al., 2014; Cousino & Hazen, 2013). Furthermore, the results of the current survey do not concur with the findings of the study performed by Wu et al. (2018) on pet owners in Hong Kong. Those authors reported an increased level of attachment of the owners toward their pets in association with lower levels of perceived stress (Wu et al., 2018). The different results might be explained in two ways: (1) The respondents in Hong Kong had not yet experienced the pandemic at the time the survey was performed. Therefore, their level of stress was likely influenced by the lifestyle rhythm in that city. (2) Chinese people in Hong Kong have been strongly influenced by Western culture for decades, which might have had an effect on their perception of the pets as members of the family. In fact, it is important to take into consideration that pet ownership is only a recent phenomenon in China, since it was banned in the country until 1992 (Headey et al., 2008). In recent decades, pet ownership has been growing exponentially in China, leading to the world's largest
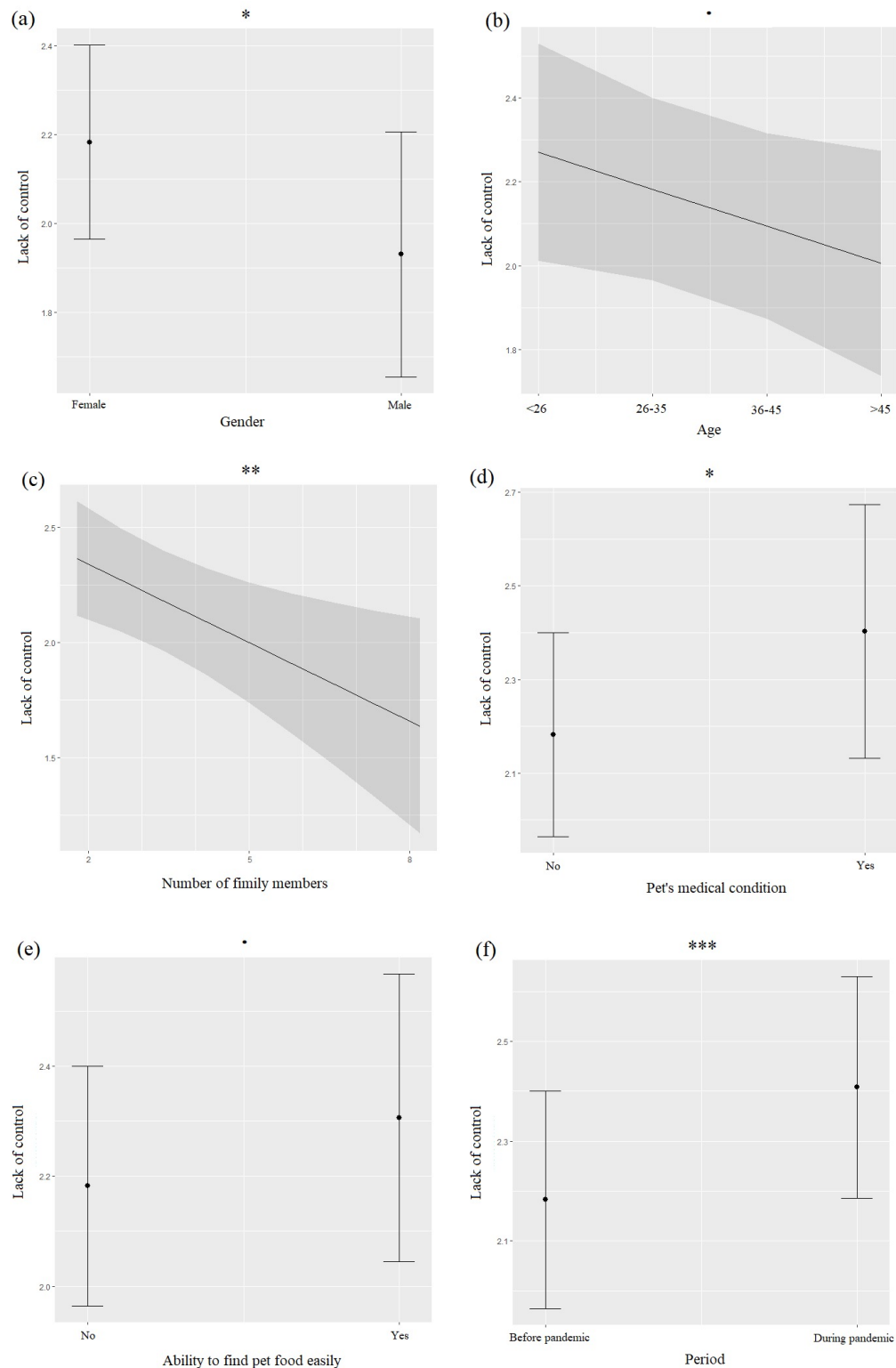
Figure 6. Owner's lack of control depending on gender (a), age (b) family size (c), pet medical condition (d), ability to find pet food (e), and period (d). Means and 95% confidence intervals have been extracted from linear mixed effect models (LMMs); *: $p < 0.05$; ***: $p < 0.001$ (Wald chi-square test).

Table 8. Means, standard errors (SE), and 95% confidence intervals (CI) of lack of control depending on the demographic and context variables.

Variable	Level	Fitted Mean	SE	Lower CI	Higher CI
Age	< 26	2.39	0.15	2.10	2.68
	26–35	2.63	0.12	2.38	2.87
	36–45	2.44	0.13	2.18	2.69
	> 45	2.21	0.15	1.91	2.51
Gender	Female	2.55	0.10	2.34	2.75
	Male	2.28	0.13	2.03	2.54
Pet species	Cat	2.43	0.11	2.22	2.64
	Dog	2.40	0.11	2.18	2.61
Medical condition	No	2.31	0.10	2.10	2.51
	Yes	2.52	0.12	2.28	2.76
Other pet	No	2.45	0.09	2.27	2.63
	Yes	2.38	0.15	2.08	2.68
Difficulty to find a veterinarian	No	2.36	0.09	2.17	2.54
	Yes	2.47	0.14	2.19	2.75
Difficulty to find pet food	No	2.35	0.10	2.16	2.55
	Yes	2.48	0.12	2.25	2.70
Lockdown type	Flexible	2.25	0.13	1.99	2.51
	Medium	2.44	0.13	2.18	2.70
	Strict	2.56	0.12	2.33	2.79
Period	Before pandemic	2.30	0.11	2.10	2.51
	During pandemic	2.53	0.10	2.33	2.73

Parameters have been extracted from linear mixed effect models (LMMs).

dog and cat populations estimated approximately 180 million companion animals (Look & Ye, 2021; Chen, 2019). Nevertheless, most people in China still consider owning a pet to be an enhancement of their status, a consequence of increased wealth. This particular consideration toward the companion animals might also influence the level of Chinese people's attachment toward them. On the other hand, younger Chinese generations, who did not experience the same level of hardship as their parents and gained more care, support, and wealth, show more affection and empathy toward animals in general, which could also be reflected in the amount of consideration pets have in their lives (Tobias & Morrison, 2014).

Furthermore, pet owners in China showed higher negative bonds, perceived stress, and lack of control during the pandemic, and when associated with strict and medium lockdowns. The respondents also showed lower perceived confidence associated with the same factors mentioned above. Unfortunately, social distancing and lockdown were the only measures that allowed control of the spread of the virus, leading people to develop increased feelings of loneliness, lack of control, and stress (Stallard et al., 2021). The great uncertainty caused by the pandemic for many people around the world, including China (Hawkins & Brodie, 2020; Xiong et al., 2020), might also have caused a change of perception of pet owners towards their animals. Various studies have reported inconclusive evidence on the benefit of having a pet during these moments of crisis (Clark Cline, 2010; Fraser et al., 2020; Hughes et al., 2020), with many pet owners stating that it would have been easier to go through the lockdown if they did not have a pet, and their
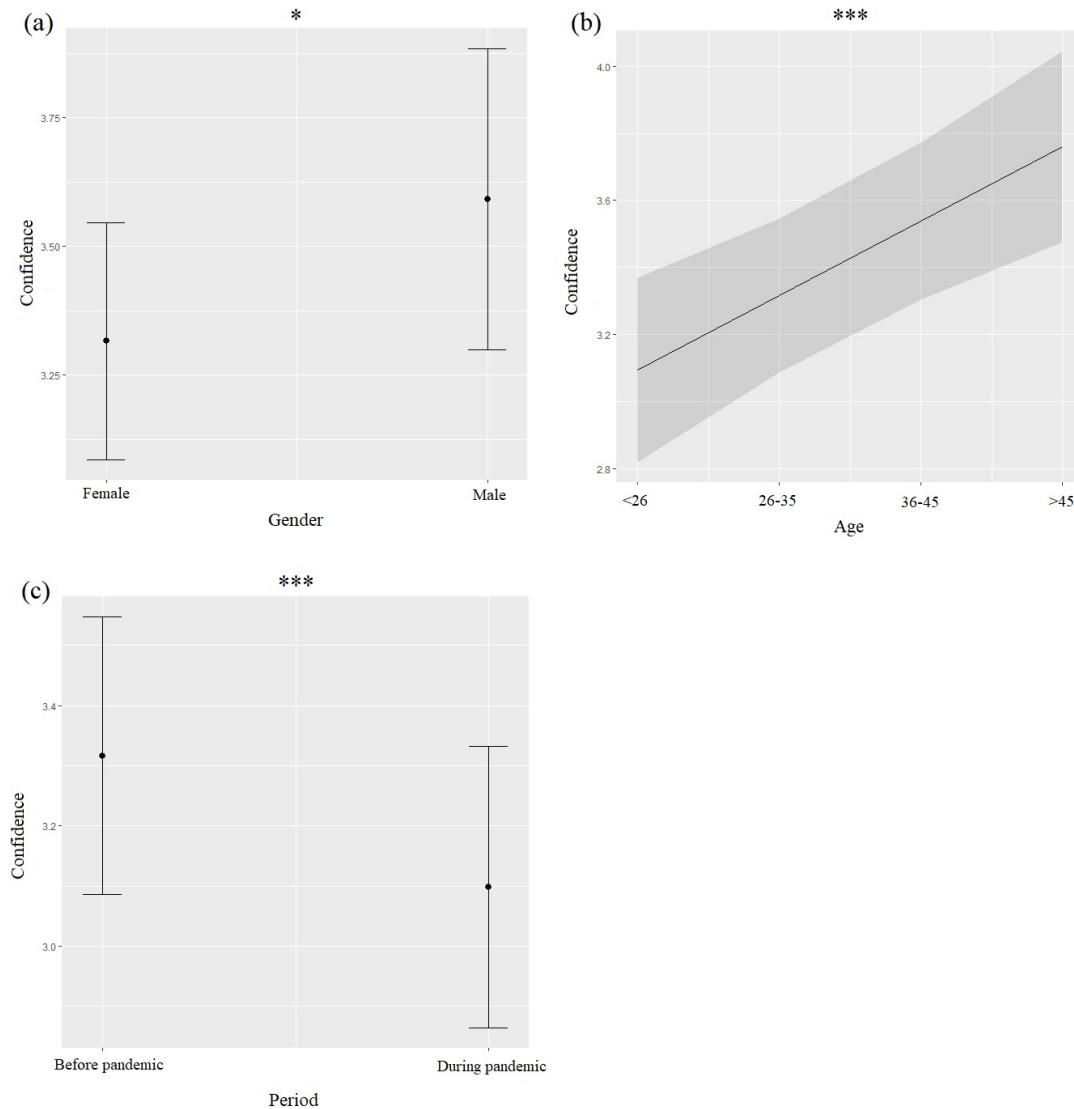
Platto, Serres, Normando, Yanqing, and Turner

Figure 7. Owner's confidence depending on gender (a), age (b), and period (c). Means and 95% confidence intervals have been extracted from linear mixed effect models (LMMs); *: $p < 0.05$; ***: $p < 0.001$ (Wald chi-square test).

major concern being not being able to provide financially for themselves and for their animals (Vice, 2020). In China, and in particular in Wuhan, the measures undertaken by the government to control the pandemic were very strict. The owners might have been under an enormous level of stress between trying to organize the daily life of their families, ensuring food provisions, and finding ways to satisfy the needs of their animals. People might have had the sense of not being able to cope with the situation,

aggravated by the fact that many of them also experienced the loss of family members. For example, the respondents who had experienced a strict or medium lockdown might have encountered many difficulties when trying to provide their pets with the necessary exercise, food supplies, and safety from disease. In fact, it is important to remember that at the early stage of the pandemic in China, little was known about the virus, and there was a general concern regarding the possibilities of pets getting infected with

Table 9. Means, standard errors (SE), and 95% confidence intervals (CI) of confidence depending on the demographic and context variables.

Variable	Level	Fitted Mean	SE	Lower CI	Higher CI
Age	< 26	3.21	0.16	2.90	3.51
	26–35	3.17	0.13	2.91	3.42
	36–45	3.55	0.14	3.29	3.82
	> 45	3.77	0.16	3.45	4.08
Gender	Female	3.29	0.11	3.07	3.50
	Male	3.56	0.14	3.29	3.83
Pet species	Cat	3.40	0.11	3.18	3.63
	Dog	3.44	0.11	3.22	3.66
Medical condition	No	3.44	0.11	3.23	3.66
	Yes	3.40	0.13	3.16	3.65
Other pet	No	3.38	0.09	3.20	3.57
	Yes	3.47	0.16	3.15	3.78
Difficulty to find a veterinarian	No	3.41	0.10	3.22	3.61
	Yes	3.43	0.15	3.15	3.72
Difficulty to find pet food	No	3.45	0.10	3.24	3.65
	Yes	3.40	0.12	3.16	3.63
Lockdown type	Flexible	3.52	0.14	3.25	3.79
	Medium	3.45	0.14	3.17	3.73
	Strict	3.30	0.12	3.06	3.54
Period	Before pandemic	3.53	0.11	3.32	3.75
	During pandemic	3.31	0.11	3.11	3.52

Parameters have been extracted from linear mixed effect models (LMMs).

the SARS-Cov-2 virus and then transmitting it to the owners (Almendros, 2020; Cui et al., 2020; Zhu, 2020). This fear spread quickly, leading to animal abuse and abandonment (Kim, 2020; Parry, 2020). Later, it was determined that the probability of potential transmission of the SARS-Cov-2 virus from pet to human was very low and more likely would travel from human to pet (Csiszar et al., 2020). Furthermore, the lockdown led people to spend every day together for months within the household, which might have worsened the conflicts among family members, including those with pets. Indeed, the current pandemic has caused a surge of family violence worldwide, which has been described as a "double pandemic" (Bettinger-Lopez & Bro, 2020). Multiple reports of family violence have also been observed around China, aggravated by economic distress, and pets might have been victims of these tragedies (Zhang, 2020). An interesting study revealed a completely different trend in the city of Wuhan, and Hubei Province in general, where the conflicts within families caused by the lockdown were lower compared to the rest of the country (Lin, 2020). This was explained by the fact that both Hubei Province, and the city of Wuhan in particular, were the epicenter of the pandemic, and they had experienced the highest infection and mortality rate from the SARS-Cov-2 virus within China. It is possible that facing the huge threat of losing loved ones, family members may have become closer to each other and gave much less weight to any other conflicts (Lin, 2020). Moreover, studies have shown that during the current pandemic the Perceived Stress Scale scores were higher than that observed in the general population

during the SARS outbreak in 2003 (Limcaoco et al., 2020). In fact, the current pandemic has been characterized by a strong disruption of the social support network where people could not have access to face-to-face services (Navas et al., 2021).

The pet owners in China also showed an increase in perceived stress and lack of control in association with the difficulties of finding food supplies and veterinary care. In general, the Chinese pet industry can offer almost everything for the care of animals, but sometimes it can still be quite a long process to find suitable supplies or veterinary care for the dog or cat that has special needs. Pet owners' concerns about obtaining veterinary services and supplies for their pets escalated during the pandemic (Bowen et al., 2020; Ratschen et al., 2020), in particular in China where most of the services were closed in the attempt to contain the spreading of the COVID-19 infection. In general, it has been observed that pet owners' burden in the form of intensified pet care responsibility can lead to an increase of emotional distress (Christiansen et al., 2013). On the other hand, pet owners in China showed a higher positive bond when they had difficulties in finding food supplies for their animals. This finding initially seems to contradict the results presented above, but a possible interpretation can be provided by previous research that reported an increase of attachment toward pets by owners who expressed more "pet-related concerns," such as providing the animals with the necessary care (Applebaum, Adams, et al., 2020; Applebaum, Tomlinson, et al., 2020). In general, Chinese cities have very well-developed community systems, which were a great support to citizens during the lockdown. Therefore, it would be advisable to also develop support programs for pet owners within the community centers for times of emergency. These programs could help citizens to find solutions for issues such as veterinary service and pet supplies availability, and more important, provide consultant services for emergency situations such as conflicts emerging between the pets and family members.

Consistent with previous studies, the respondents in our survey preferred to sleep with their pets when their perceived lack of control increased. Proximity

is one of the factors that describe attachment toward pets, and it is related to physical closeness between the owners and their animals (Wu et al., 2018). In general, companion animals can provide a sense of comfort, which is regarded as a "pet effect" (Allen, 2003; Herzog, 2011; Westgarth et al., 2010; Winefield et al., 2008), and they can become a supplementary source of support, not only in the context of highly stressful events, but also as a buffer to help people cope with everyday low-level stressors (Bowen et al., 2020). In general, physical closeness and interaction with pets can favor physiological responses such as an increase of oxytocin and vasopressin, the hormones that control bonding and attachment, which also modulate cortisol levels, attenuating the stress-response system (Beetz et al., 2012; Cardoso et al., 2014; Engert et al., 2016; Pendry & Vandagriff, 2019). Therefore, these interspecific social connections might also provide humans with the feeling of emotional support (Applebaum & Zsembik, 2020; Graham & Glover, 2014; Wood et al., 2005; Wood et al., 2017).

The current study also showed gender differences in the perception of stress and lack of control, with women showing higher scores than men, the latter also expressing higher perceived confidence. The reason for this might be related to gender differences in coping with stress. Women, by being more affiliative and having a stronger involvement in the household and family care, are more exposed to problems in general (Dalgard et al., 2006). Here it is important to mention that the majority of respondents in the current survey were women (73.4%) and of those, 90.2% had a college education. Therefore, it is possible that most of them were professionals who had to balance family and work (mainly with a distance-working modality), which might be a cause of additional stress. In fact, higher levels of stress were registered in women compared to men worldwide during the pandemic, including China (Limcaoco et al., 2020; Liu et al., 2020; Maarefvand et al., 2020; Wang et al., 2020).

Gender differences were also reported in the pet attachment domains of proximity and positive bond, where women showed higher scores than men. These

results are consistent with previous studies that have shown gender differences in interaction with and attitude toward animals (Herzog, 2007). In fact, women in general represent the primary caretakers of the family, and by extension of the pets too (Martens et al., 2016), developing stronger emotional bonds with their animals compared to men (Kotrschal et al., 2009; Prato-Previde et al., 2006).

Proximity and positive bond were also negatively associated with family size. It is possible that in the families that have a higher number of members, the time spent by owners with their pet might be reduced, with fewer chances to share sleeping space. In addition, it is possible that with the increase in family size, the bond between pets and owners might be compromised by the development of conflicts between other family members and the companion animals. In the current survey, the respondents who left their homes for the CNY holidays right before the lockdown was announced, could not return to their original provinces for almost three months, and they had to stay in relatives' or friends' houses. These temporary new living arrangements might have caused stress among the members of the family, including a disruption of the daily and environmental routine of the pets of the household. These new circumstances might have increased conflicts between the family members and the pets, in particular involving children who had a lot of time to spend with their animals during the lockdown. Indeed, an increase of behavioral problems of pets toward children was reported in Europe during the pandemic (Dogs Trust, 2020).

On the other hand, pet owners in China showed a decrease in perceived stress and lack of control when family size increased. Chinese families can rely on the support of grandparents to raise the grandchildren. Grandparents often live with their married children, helping them with the management of the household until the grandchildren reach the age for attending secondary schools. This particular living arrangement might favor women, who can be relieved from the additional stress of daily life. In addition, it is possible that having more family members living in the same house during the lockdown could have represented moral support for the respondents.

Furthermore, pet owners showed a perceived lack of control and confidence being negatively associated with age. These results are consistent with previous studies that have shown that stress levels tend to decrease with age, with older adults showing higher well-being and lower stress levels compared to young people (Archer et al., 2015). In addition, this finding could be explained by the fact that many young adults might have lost their job or have been furloughed during the lockdown, increasing economic instability and uncertainty about the future, which could create enormous stress.

It was interesting to observe that the positive bond with pets increased when the respondents owned more than one animal. A possible explanation might be that people who decide to own more than one pet already have a better attitude toward animals in general, and therefore they would be more willing to take on the responsibility that comes with it. Further, this result might have also been influenced by the fact that the majority of the respondents in the current survey were women, who were already shown to have better attachment toward the pets than men.

Strengths and Limitations

The current study presents several limitations. First, the small sample size does not allow us to generalize the findings to the rest of the population in China. The questionnaire was probably too long, which discouraged many people from participating, limiting our sample size. Second, the majority of the respondents were women, and college-educated people, which also might bias the results, again limiting generalization. Third, the study focused only on dog and cat owners, which, although mirroring the most common pets found in Chinese society, could still limit the results. Further studies are needed to test the attachment of people in China to other types of pets. Fourth, the current survey was performed several months after the main lockdown in China was lifted. Therefore, the respondents had to reply to the statements on the questionnaire retrospectively, which might have influenced the results. Fifth, the scale used to assess the pet

owners' attachment toward their companion animals was a modified version of the Companion Animal Bonding Scale (CABS) from Poresky et al. (1987). Despite the good reliability of the scale (α = 0.78), the tool was not validated, which might have added further bias to the results.

Nevertheless, the current study represents the first assessment of the attachment of pet owners toward their pets, and their perceived stress before and during the pandemic in China. Therefore, the findings obtained from this study still can add valuable information to the existing worldwide literature on the subject.

Conclusions

The current study examined the effect of the pandemic and the lockdown on pet owners' attachment toward their pets, and their perceived stress in China. The comparison between attachment level before and during the pandemic did not show any significant differences, as well as the bond toward different types of pets. When owners perceived a high level of stress and lack of control, the negative bond toward their pets increased. Moreover, the perceived stress, lack of control, confidence, and negative bond were strongly influenced by the pandemic and the strict and medium lockdowns. Further, women had better levels of attachment than men. Additionally, high levels of perceived stress and low confidence were perceived mainly by women and young people. Even though the bond with the pets was worsened by increasing family size, the larger family had positive effects in reducing perceived stress in the respondents. These findings, even though not conclusive, still highlight the importance of developing support for pet owners during moments of crisis in China, in order to avoid conflicts with their pets that can escalate to the point of abandonment of the animals. In addition, these findings also highlight the importance of developing local community support programs for pet owners in Chinese cities (online or in person), to help them cope with issues such as pet behavioral problems, finding pet food supplies, and veterinary care for their companion animals, issues that could become unbearable during times of emergency such the current pandemic.

Summary for Practitioners

The present study aimed to assess the attachment level and the perceived stress of pet owners before and during the COVID-19 pandemic in China. The questionnaire used for the survey was structured in three parts. The first part included a demographic section where the respondents had to indicate the type of lockdown (strict, medium, or flexible), the number of family members before and during the lockdown, any family members affected by COVID-19, owned pets, if the pet had a medical condition before and during the lockdown, and the difficulties in finding veterinary services and food supplies for the pets before and during the lockdown. A second part included a modified version of the CABS (Companion Animal Bonding Scale) (Poresky et al., 1987) with 16 items that assessed the positive bond, negative bond, and proximity on a 5-point Likert scale. Finally, a third part included the Perceived Stress Scale (PSS-10) composed of 10 items (Roberti et al., 2006), which measured the extent to which the respondents perceived stress before and during the lockdown, also on a 5-point Likert scale. The questionnaire was uploaded onto the Chinese online platform Wèn Juàn Xīng (Changsha Ranxing Information Technology Co., Ltd.), which allowed creation of a weblink that was sent to the public around China through the media platforms of the country (Weibo and WeChat). A total of 261 responses were collected (221 from the Chinese version and 40 from the English version). The study showed that the pandemic did not influence the level of attachment of the pet owners toward their pets in China. In addition, the different types of pets (dog and cat) did not result in any differences in attachment by the owners. It is important to consider that the percentages of surveyed dogs (56.6%)

and cats (43.1%) were very similar, which also might have influenced the results. Moreover, the level of attachment toward the pets deteriorated when the owners felt an increase of perceived stress and lack of control. These parameters were also strongly influenced by the pandemic and the type of lockdown. It is very well known that the lockdown in China, and in particular in Wuhan, was very hard on people. Therefore, pet owners, especially those who owned dogs, faced a lot of difficulties in providing proper care for their animals. For example, most if not all veterinary services, along with all other business activities, were closed in the attempt to control the spreading of the virus. Indeed, pet owners from the current survey showed an increase in perceived stress in association with the difficulties of finding food and veterinary care for their animals. These obstacles also affected the owners' bond with their pets negatively. The great uncertainty caused by the pandemic for many families around the world, including China (Hawkins et al., 2020; Xiong et al., 2020), might have diminished the perception of people toward their pets. Different pet-owners in Western countries reported that it would have been easier to go through the lockdown without pets (Vice, 2020). Moreover, pet owners felt the need to be closer to their animals when they felt they could not control the events around them. Interaction with and closeness to animals has been demonstrated to help release hormones that regulate happiness and reduce stress (Beetz et al., 2012; Cardoso et al., 2014; Engert et al., 2016; Pendry & Vandagriff, 2019). Furthermore, we found that bigger families tend to negatively influence the proximity of the owners with their pets. When families are composed of many members, the time spent interacting with the pets per person might be reduced. In addition, big families might also increase the probability of conflicts between people and the household pets. Many families changed their composition and size during the pandemic in China, mainly caused by the fact that many people could not return to their hometowns because of the lockdown and they had to stay in relatives' or friends' homes. Therefore, it is possible that these new living arrangement might have disrupted the daily routine and the stable environment of the pets. Perhaps these situations caused a spike in behavioral problems in pets such as biting and growling at family members, in particular children. On the other hand, bigger families helped the respondents to reduced their perceived stress. In China many grandparents live with their married children and help raise the grandchildren, reducing the stress of the parents. But women and young adults showed higher perceived stress than men and older adults respectively. This might be related to gender and age differences in coping with stress. In general women have a stronger involvement with the family and household affairs, which might expose them to more problems (Dalgard et al., 2006).

We also observed that pet owners showed a higher positive bond when they had more than one animal. It is important to remember that the majority of the respondents of this survey were women (73.1%), which might have influenced this result. Perhaps people who own more than one animal are in general more willing to take on the responsibility that comes with it, and they might pay more attention to the welfare of their pets. In addition, the positive bond also increased when the respondents felt it more difficult to find food supplies for their animals. Even though this result seems contradictory with the previous findings described in the current survey, previous studies have shown that when pet owners express more "pet-related concerns" such as providing their animals with adequate care, they showed higher attachment levels toward their animals (Applebaum, Adams, et al., 2020; Applebaum, Tomlinson, et al., 2020).

Acknowledgments

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