

Pets and a Pandemic: An Exploratory Mixed Method Analysis of How the COVID-19 Pandemic Affected Dogs, Cats, and Owners

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The purpose of the present study was to explore how the COVID-19 pandemic impacted dogs, cats, and interactions between these pets and their owners. Participants included 102 dog and/or cat owners residing primarily in the United States. Participants completed an online questionnaire between late April to late May 2020. Analyses included *t*-tests comparing retrospective estimates of pre-pandemic functioning and functioning during the pandemic, and qualitative thematic analysis was used to analyze participants' responses to three open-ended questions. Quantitative analyses found that pets and owners spent significantly more time together, with increases in physical contact between owners and pets, exercise with dogs, and engagement in dog-related activities. No significant changes were found regarding owners' percentage of pet care responsibility, attachment to their pets, pleasantness derived from pet-related activities, or upset feelings toward their pets when comparing pre-pandemic and during pandemic scores. Five themes arose from the thematic analysis: Social/Attachment (i.e., changes to owner-pet, pet-pet, and owner-owner relationships), Physical (i.e., increases in owners' physical contact and proximity with pets, physical benefits to pets and owners), Psychological (i.e., changes in owners' and pets' behavior and emotionality), Safety/Well-Being (i.e., health concerns regarding owners and pets), and Responsibilities/Routines (i.e., changes in owners' and pets' daily routines, changes in owners' responsibilities and productivity). These findings provide valuable insight into how dogs, cats, owners, and interactions between these pets and owners were affected by the COVID-19 pandemic as well as considerations for animal welfare in the wake of the pandemic. Additionally, the study generated many hypotheses pertaining to how and why these changes occurred, providing a foundation for additional research in this area.

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When the COVID-19 outbreak began in the early months of 2020, many countries enforced restrictions to limit the spread of the virus. These restrictions included social distancing, stay-at-home or lockdown orders, community curfews, and quarantine or isolation from others. Certainly these restrictions had a significant impact on the mental health of millions of people (Khan et al., 2020), and research has investigated how owning a pet may relate to mental health outcomes, both positively and negatively, during the COVID-19 pandemic (Applebaum et al., 2020; Ratschen et al., 2020).

Early studies on owning a pet during the COVID-19 pandemic have been mixed, with authors finding both positive and negative impacts on not only pet owners, but also the companion animals themselves. Looking first at the positives, although enforced lockdowns and social distancing may have caused increased feelings of loneliness due to limited or eliminated socialization, pets may have mitigated these feelings for some owners and improved the mental health of pet owners (Oliva & Johnston, 2020; Ratschen et al., 2020). Mechanisms that may be responsible for the attenuated feelings of loneliness and improved mental well-being include pets providing owners physical contact, exercise, a reason to leave the house, someone to talk to, a routine, a purpose, and amusement (Oliva & Johnston, 2020). These benefits were reported by the majority of pet owners, as 86.5% reported their pet helped them emotionally cope, 94.4% reported their pet positively impacted their family, and 72.5% reported their pet helped them stay active during lockdown (Ratschen et al., 2020). As for the pets, it is possible that having owners present throughout the day due to the COVID-19 restrictions was beneficial (Aitken, 2020), though studies on the pandemic's impact on companion animals are sparse. One such study found that pets received more attention from owners due to lockdown, and some pets appeared happier and more relaxed (Oliva & Johnston, 2020).

Although positive outcomes of the COVID-19 pandemic have been found for owners and pets, negative outcomes also exist for both parties. For example, lockdown resulted in increased clinginess, behavioral issues, and greater demands for attention from pets (Oliva & Johnston, 2020). These behavioral changes in pets were found to have been met with frustration and irritation from some pet owners (Applebaum et al., 2020). Other concerns expressed by pet owners during the COVID-19 pandemic include changes in routine, limited stimulation for pets, concerns about procurement of pet supplies, and concerns regarding access to veterinary care and new veterinary clinic protocols (e.g., curbside drop-off) due to COVID-19 restrictions (Applebaum et al., 2020; Kogan et al., 2021; Ratschen et al., 2020). Research has also found that pet owners are aware of the difficulties that could arise if they were unable to care for their pet, and some owners expressed concern over the possibility of pets being a vector for the disease (Applebaum et al., 2020; Kogan et al., 2021).

Overall, early research on the impact of the COVID-19 pandemic on pets and their owners has elucidated both benefits and drawbacks of pet ownership during this time. This avenue of human-animal interaction research is burgeoning as the COVID-19 pandemic continues. To add to the literature base on how COVID-19 impacted owners and their pets, we conducted the present mixed methods study. We aimed to describe changes in dog and cat ownership due to the COVID-19 pandemic including obtaining a new pet, engagement in pet-related activities, owners' attachment to their pets, and feelings toward pets during the pandemic. Further, we aimed to describe how the COVID-19 pandemic affected pet owners, including how pets helped or hindered in coping with social distancing and any other pet-related concerns caused by the pandemic. Due to the limited

research base and novelty of this avenue of research, no a priori hypotheses were established, and the present study is considered exploratory.

Methods

Participants

Total respondents included 148 individuals, which included 102 dog and/or cat owners (here forward referred to as ‘pet(s)’ and ‘pet owners’ unless otherwise specified by species). Of this pet-owning sample, 91.2% were female, 97.1% were Caucasian/White, 96.1% were non-Hispanic/Latinx, 53.9% were married, 83.3% had a bachelor’s degree or more education, 48.0% reported annual income greater than \$70,000, 91.2% resided in the United States, and 55.9% resided in suburban areas. The mean age of the sample was 38 years ($SD = 13.66$; range 21-84). Of this sample, 73 participants were dog owners (71.6%) and 53 were cat owners (52.0%) prior to the COVID-19 pandemic (23 participants owned at least one dog and one cat).

Materials

Due to the unique nature of this pandemic-related research, we developed specific questions for the measurement of our variables of interest. The exact questions can be found in Appendix A. Participants were asked to report on their pet ownership before and during the pandemic, if they had acquired a new pet during the pandemic (and if so, if the pet was obtained from a humane society/shelter), and if they had fostered a pet during the pandemic. Broadly speaking, participants were asked to report on their engagement with their dog and/or cat both in the month prior to the COVID-19 outbreak and during the COVID-19 outbreak. These questions assessed how long pet owners spent time with their pets (in hours), their pet care responsibility (0-100%), time spent engaging with their pet (in hours), time spent physically touching their pet (in hours), pleasantness of engaging with the pet (1 = not at all pleasant to 4 = very pleasant), upset feelings toward their pets (1 = not at all upset to 4 = very upset), and attachment to the pets (1 = not particularly attached to 3 = very attached; Serpell, 1996). Dog owners were also asked about the time they engaged in physical activity with their dog (in hours). Three open-ended questions assessed how participants’ experience with the COVID-19 outbreak had been impacted by being a pet owner, how their pet had been helpful or unhelpful in coping with social distancing, and what (if any) concerns participants had related to their pet during the COVID-19 outbreak.

Procedure

The present study was part of a larger study on psychological functioning during the COVID-19 pandemic. Participants were recruited using a convenient, snowball sampling technique via social media postings on the researchers’ personal social media profiles as well as the research lab’s Facebook page, social media advertisements, and word of mouth. Interested individuals clicked a link that redirected them to a Qualtrics webpage which provided the informed consent document. Individuals who provided consent to participate in the study were then advanced to the survey hosted on Qualtrics. Participants completed the survey between April 22nd, 2020 and May 23rd, 2020. Participants completed the survey voluntarily and were not provided monetary compensation. Questions related to pet ownership included in the survey are listed in Appendix A. This study was reviewed by the Mississippi State University Institutional Review Board and deemed exempt (IRB-20-150).

Data Analysis

Quantitative

Descriptive statistics were used to determine rates of pet adoption and fostering due to the pandemic. To explore changes in human-animal interactions before and during the pandemic, paired sample *t*-tests were used. Prior to conducting analyses, two dog owners' data were excluded from quantitative analyses. One participant was excluded due to inconsistent responding and another for inaccurate responses (e.g., spending more than 24 hours with their dog per day). Therefore, the sample of pet owners for the quantitative analyses was 100.

Qualitative

To further understand how the COVID-19 pandemic impacted pet owners and their pets, we conducted an inductive semantic thematic analysis using an essentialist framework. Broadly, this analysis approach aims to minimally summarize patterns found in the explicit responses provided by participants in a straight-forward manner with minimal inference (Braun & Clarke, 2006). Further, the inductive nature of this technique does not utilize a pre-determined coding scheme, which was selected due to the novelty of the COVID-19 pandemic (Braun & Clarke, 2006). First, authors CJB and GEE individually read through participants' responses to the three open-ended survey questions regarding the impact of the COVID-19 pandemic, how the pet had been helpful or unhelpful during the pandemic, and any concerns the participants had related to their pets during the COVID-19 pandemic several times in order to become familiar with the data (Braun & Clarke, 2006; Elo & Kyngäs, 2008). Next, CJB and GEE individually open coded the participants' responses in a descriptive manner with an extremely low level of inference. No disagreements arose between CJB and GEE after the initial open coding process, so CJB's codes were used in the following step. CJB and GEE then collaboratively grouped these codes into categories to begin connecting the codes to the research question. Finally, CJB and GEE collaborative used the process of abstraction to create broad themes that each summarized the categories. This inductive analysis process is outlined further in Elo and Kyngäs (2008).

Results

Quantitative Results

Pet Adoption and Fostering

All participants that completed the survey were asked if they adopted or fostered a pet during the pandemic, regardless of whether they endorsed owning a pet both prior to and during the pandemic ($N = 148$). Of these 148 participants, 133 provided a response to the question of obtaining a new pet since the COVID-19 outbreak began, and seven of these 133 (5%) endorsed obtaining a new pet. Of these individuals, two respondents reported they adopted their new pet from a shelter or humane society. Further, one participant reported fostering a pet during the COVID-19 pandemic because the restrictions made it a good time to foster a pet.

Human-Dog Interactions Before and During the Pandemic

Results of the paired sample *t*-tests found that dog owners spent significantly more wakeful hours with their dog during the pandemic than before (see Table 1). This trend continued in time spent engaging in dog related activities, dog exercise, and physical contact with the dog. Alternatively, the percentage of dog care responsibility, ratings of attachment to the dogs, and

feelings of pleasantness or upset toward the dogs did not change with the onset of the pandemic (see Table 1).

Human-Cat Interactions Before and During the Pandemic

Results from the paired samples *t*-tests found that, like dog owners, cat owners spent significantly more wakeful hours with their cat during the pandemic than before (see Table 1). Additionally, cat owners spent significantly more time in physical contact with their cat during the pandemic. Other variables (i.e., pet care responsibility, time engaging with the cat, attachment, pleasantness, and feeling upset) did not significantly differ before and during the pandemic (see Table 1).

Table 1

Paired Sample t-Test Results Comparing Interaction with Pets Before and During the Pandemic

Variable	Pet (<i>n</i>)	Before Pandemic <i>M</i> (<i>SD</i>)	During Pandemic <i>M</i> (<i>SD</i>)	<i>t</i>	<i>df</i>	<i>p</i>
Wakeful hours with pet	Dog (60)	6.41 (4.23)	10.73 (5.24)	6.87	59	.000
	Cat (42)	6.31 (7.21)	8.24 (7.22)	2.41	41	.02
Pet care responsibility %	Dog (59)	71.19 (26.00)	74.58 (24.17)	1.98	58	.053
	Cat (42)	79.17 (26.68)	78.76 (26.83)	0.61	41	.55
Time engaging with pet	Dog (61)	2.10 (2.03)	2.95 (1.93)	3.74	60	.000
	Cat (42)	2.13 (2.77)	2.41 (2.09)	1.40	41	.17
Physical activity time	Dog (61)	1.22 (1.18)	1.68 (1.64)	3.78	60	.000
	Cat	-	-	-	-	-
Physical contact time	Dog (61)	2.57 (3.06)	3.68 (3.13)	3.52	60	.001
	Cat (42)	1.77 (1.16)	2.32 (1.46)	3.20	41	.003
Attachment to pet	Dog (61)	2.80 (0.48)	2.84 (0.45)	1.43	60	.16
	Cat (42)	2.79 (0.47)	2.74 (0.50)	-1.43	41	.16
Pleasantness	Dog (60)	3.50 (0.68)	3.57 (0.70)	1.07	59	.29
	Cat (42)	3.50 (0.77)	3.62 (0.70)	1.53	41	.13
Feeling upset with pet	Dog (60)	1.52 (.60)	1.52 (0.68)	0.00	59	1.00
	Cat (42)	1.33 (0.53)	1.43 (0.70)	1.07	41	.29

Note. *N* = 100. Cat owners were not asked to report time spent engaging in physical activities like walking with their cat.

Qualitative Results

Through the thematic analysis process, we recognized that several pet owners reported experiencing no changes due the COVID-19 pandemic. Specifically, open coding resulted in 44 codes listed as “no change with pandemic.” Additionally, several pet owners reported their pet was generally helpful in coping with the COVID-19 pandemic as open coding resulted in 40 codes of “pet is helpful.” Five themes summarized the participants’ responses to the three open-ended questions. These themes include Social/Attachment, Physical, Psychological, Safety/Well-Being, and Responsibilities/Routine All categories included in each of the five themes are listed in Appendix B.

Social/Attachment

The theme of Social/Attachment includes changes to owner-pet, pet-pet, and human-human relationships. Pet owners often reported both social benefits and drawbacks due to owning a pet during the COVID-19 pandemic. For example, pet owners reported pets both helped and hindered maintaining social distance from other humans (e.g., “She doesn't like other dogs, so we have a good excuse not to get close to other dog walkers.” vs. “Walking him has been hard. Our neighborhood sidewalks are very busy these days and it's hard to stay away from others”). Additionally, owners reported the COVID-19 pandemic restrictions both promoted socialization of their pet and was a barrier to socializing their pet with other animals. Owners reported pets were both beneficial and a hinderance to meeting social needs during the pandemic. Owners expressed concerns regarding how their pets may readjust back to normal routines after the pandemic when owners return to working outside the home. Further, some owners reported being separated from their pet during the pandemic, while other owners reported adopting or fostering new pets during the pandemic.

Physical

The Physical theme comprised increases in physical contact and proximity with pets as well as physical benefits experienced by both pets and owners due to the pandemic. Owners spent more time cuddling and petting their pets during the pandemic. This increase in contact is attributed to the increase in time that owners spent at home. Pet owners also reported pets were more clingy than normal. For example, one dog owner stated, “My dogs seem to know there's something different going on and they have been closer to me than before the outbreak.” Additionally, owners reported their pets helped them to be physically active during the pandemic.

Psychological

The Psychological theme encompassed changes in owners' and pets' mental health, including behavior and emotionality, during the COVID-19 pandemic. Owners reported that they experienced and thought their pets also experienced pleasant (e.g., happiness, love, comfort, calm, sense of safety, reassurance, peace) and unpleasant (e.g., guilt, anxiety, boredom, frustration, irritation, regret) feelings during the pandemic. Owners reported that having a pet was emotionally beneficial during the pandemic. For example, one cat owner reported, “My cats make me smile and happy when I am having a difficult mental day,” while a dog owner reported, “Cuddling with her and walking her help calm my anxiety.” Further, owners and pets were reported to psychologically benefit from each other. Lastly, owners reported their pets' behavior had changed during the pandemic, and not always for the better. Owners reported that some pets exhibited an increased appetite, signs of increased agitation such as whining, changes in temperament, and changes in appropriate elimination patterns.

Safety/Well-Being

The theme of Safety/Well-Being relates to the health of both owners and pets during the COVID-19 pandemic. Owners often expressed concerns that they or their pet may contract the virus as well as concerns that their pet may be a vector. Additional categories that contributed to the Safety/Well-Being theme included concerns regarding providing or procuring pet care. Owners often expressed concerns of not being able to care for their pet if they contracted the virus. Further, owners reported delaying veterinary care due to changes in veterinary clinic protocols (e.g., “They

were supposed to receive their annual vaccines in April but veterinary said they were only attending emergency patients”) and/or fear of contracting the virus at the clinic (e.g., “I hope they don’t need veterinary care because I’d prefer as little contact with others as possible”).

Responsibilities/Routines

The theme of Responsibilities/Routines includes ways the COVID-19 pandemic changed owners’ and pets’ daily routines as well as owners’ responsibilities and productivity. Owners working from home reported both that their pets interfered with work tasks (e.g., barking during telephone calls, appearing in owners’ video feeds) and improved work/life balance (e.g., “There’s finally a balance in life between work, home chores, my dogs and personal projects.”). Some owners reported changes in their amount of pet care responsibility as well as the type of care provided. For example, one pet owner reported learning how to groom their dog at home. Owners reported spending more time with their pets due to the COVID-19 pandemic, as was found in the quantitative analysis. Further, owners reported having a pet encouraged them to maintain a routine during the pandemic, although owners also reported the pandemic changed pets’ usual routines. This change in routine was reported to affect the pets’ sleeping patterns (e.g., “My dog isn’t napping because too many people are home”). Lastly, some owners reported owning a dog during the pandemic allowed them to maintain routines that the pandemic restrictions may have eliminated for non-pet owners (e.g., “My dog provides me with a valid excuse to get outside and hang out at a park during Shelter-in-Place”).

Discussion

Summary & Interpretation of Findings

In summary, quantitative and qualitative analyses found that pet owners spent more time with their dogs and/or cats during the COVID-19 pandemic. Specifically, pet owners endorsed having more physical contact with their pet, and dog owners experienced increased physical activity during the pandemic. Interestingly, cat owners did not report engaging in activities with their cat significantly more during the pandemic, whereas a statistically significant difference was found for dog owners engaging in dog-related activities. A possible explanation for this finding may be explained by the different housing regimens of cats and dogs, as a large majority of household cats are kept indoors only. This means that when owners are home, cats are in more frequent contact with humans within the household on a daily basis. Many dogs are crated during the day, housed outside, or restricted to one portion of the house, such as a laundry room, during portions of the day. Therefore, with owners spending more time at home, the normal housing regimen of dogs likely changed, such that they may have been more likely to spend time uncrated or inside the house. Their presence inside the house may have contributed to more active engagement with owners. Another possible contributing factor could be the difference between canine and feline social behavior. Many cats are more solitary in nature (Udell & Wynne, 2008), and cats often choose times to engage with their owners (much of this time being spent sleeping next to their owner), but they also spend time apart sunning, grooming, hunting, and in solitary play. Although owners do engage their cats in play, play sessions between cats and their owner are generally short bouts of play (Strickler & Shull, 2014). Contrarily, dogs tend to form familial groups. For domesticated dogs, owners become participating members of these groups, so they are involved in many social activities such as play. This difference in interaction styles between cats and dogs was supported by participant reports of cats being less playful, affectionate, and more of

a utility than dogs (e.g., “It hasn't changed much. My cats are not cuddly and aren't very playful to begin with” and “No change. My cat is to keep mice away.”). Also, due to the social distance requirements of the pandemic and potential subsequent feelings of isolation, many owners may have been seeking alternative forms of interaction, thus prompting their dogs to engage in exercise or other dog-related activities. The exercise needs of dogs may have provided a reason to get out of the house by engaging in outside play or walks.

Some discrepancies were found between the quantitative and qualitative results. First, quantitative reports found no change in pleasantness engaging in pet-related activities nor changes in feeling upset with one's pet; however, qualitative reports often suggested both owners and their pets (inferred by owners) experienced a range of pleasant and unpleasant emotions during the pandemic. This discrepancy suggests that the pandemic may have had an effect on emotionality in general, though this effect was not found when examining emotionality within the human-animal relationship dynamic. When examining reports of unpleasant emotions for dogs and owners, it is possible that the dogs were experiencing these emotions because of their owners' own changes in affect. To the authors' knowledge, there have been no studies that have investigated the pandemic's effect on the stress level of household pets. Although there is no quantitative data demonstrating changes in cortisol levels of pets during the pandemic, some owners reported behavioral changes such as increased attention seeking behavior and inappropriate elimination within the house. Suggested causes of stress to household pets include changes in routines including owner presence, changes in the amount of physical activity, changes in feeding times, the introduction of new pets (both new adoptions and fosters) into the household, and the changes in stress levels of pet owners. Due to possible temporary unemployment, fear of the virus, social disconnection, and changes in daily routines, owners may have been more likely to exhibit signs of stress during the pandemic, which may have been detectable by household pets. Prior to the COVID-19 pandemic, Sundman and colleagues (2019) found synchronization of long-term stress levels between owners and pets using cortisol levels in hair samples from both the dog and owner. Interestingly, the study revealed that the personality of the owner seemed to affect the dog's stress level more than the dog's personality affected the human's stress level. The results indicate that the stress level of owners experienced during the pandemic is likely to be reflected by their dogs (Sundman et al., 2019). It was found that owners with personality traits of Neuroticism, Openness, and Conscientiousness had greater influence on the dogs' long-term stress levels. One possible explanation given was that owners with these traits may be more likely to include dogs in their social support system (Sundman et al., 2019), which may have attenuated feelings of social disconnection for dog owners during the pandemic. As for the range of pleasant emotions owners reported they and their pets experienced, this may have been due to owners having more time to spend with their pets, more balance between work and personal lives, and/or the synchronization of pleasant affect between pets and owners, though the present study did not examine these possibilities.

Second, no statistically significant change in pet care responsibility was found in quantitative analysis, but some pet owners reported experiencing a change in pet care responsibility when responding to the open-ended questions. This discrepancy may be the result of the wording of the quantifiable question used to determine changes in pet care responsibility due to the pandemic (i.e., “What percentage of caring for your dog [cat] are [were] you responsible for?”). Owners who reported being the sole provider for their pet (i.e., 100% responsibility) likely did not change their degree of responsibility during the pandemic except in infrequent circumstances where the pet and owner were separated (e.g., “[I am] currently separated from my

dog who is with other family”). When responding to the open-ended questions, however, owners reported taking on new responsibilities that they may have outsourced prior to the pandemic, like grooming. Therefore, although the percentage of pet ownership may not have changed, the number of tasks the owners completed for their pet *themselves* appears to have increased during the pandemic.

Third, some owners reported their pet provided a source of socialization during the pandemic, though no statistically significant difference in attachment to pets before and during the pandemic were found. This may have been due to a ceiling effect as all pre-pandemic and during pandemic attachment to pet scores were less than one standard deviation from the maximum score. Further, this item employed a three-point response, which has been useful in previous research (Serpell, 1996), though this abbreviated scale may have limited the variability of attachment to pet scores, and thus may have made it difficult to statistically detect any small effects the pandemic had on owners’ attachment to their pets. Another possibility is that bidirectional effects on attachment to pets canceled each other out, as was suggested by the conflicting benefits and drawbacks to socializing and attachment reported in the qualitative analysis.

Finally, the qualitative analysis was able to elucidate effects of the pandemic on pet owners that we did not anticipate and include in quantitative assessment questions. Namely, many pet owners reported concerns regarding themselves or their pet contracting COVID-19 and concerns regarding providing or obtaining pet care and veterinary care. Qualitative analysis also found that although some pets appeared more psychologically healthy during the pandemic, some other pets displayed concerning behavioral changes. Household pets, like their owners, had to adjust to a new routine during the pandemic. As owners begin to return to work, pets will again be required to adjust to a different routine.

Limitations & Strengths

As with all research, the present study has both strengths and limitations. Considering the limitations first, the present study’s sample demographics were highly homogenous, with the majority of participants being White, well-educated women. Therefore, we use caution in generalizing our findings beyond this population. This limitation is attenuated by the adequate sampling of the predominate pet owning groups in the United States (i.e., dog owners, cat owners, and owners of dogs and cats). Another limitation of this study involves the use of retrospective estimates of functioning before the pandemic. Ideally, we would have sampled participants prior to the pandemic as well as during the pandemic, though the COVID-19 pandemic occurred rather unexpectedly, so retrospective reports were the best available option. Further, the measurement of owners’ attachment to their pets demonstrated a ceiling effect, which limited variability in scores and may have resulted in changes in attachment due to the pandemic going undetected in the present analysis. Another limitation includes the order of presentation of survey questions. In the survey, quantitative questions were displayed before the open-ended questions, which may have biased participants’ responses. We believe that this is a possibility, though if it occurred, it appears to primarily have impacted participants’ discussion of the time they spent with their pets (see Appendix A). A final limitation of this study is the lack of inclusion of some potentially meaningful variables like pet and owner temperaments and the presence of existing problematic pet behaviors prior to the pandemic. For example, pet owners may have found spending more time at home with pets displaying problematic behaviors more undesirable than owners with better behaved pets. Turning to the strengths of the study, the largest strength of this study was the use of mixed

methods, especially the inclusion of qualitative methods. This provided more information and a richer context on how pets and owners were impacted by the unprecedented COVID-19 pandemic. Additionally, this study establishes a foundation for various future research directions regarding how the COVID-19 pandemic affected pets, owners, and related industries.

Future Directions

As the threat of COVID-19 wanes, more owners are likely to return to work and school, while others may continue to work from home or take classes online due to new policies. Regardless, pets will be asked to adjust to the new normal, again. Routines may change for household pets, which may contribute to stress as we found with the initial transition caused by the COVID-19 pandemic. Owner education in the correct observation of stress will be important in maintaining the welfare of pets. In a study by Mariti and colleagues (2012), owners were more successful in identifying moderate signs of stress such whining and excessive barking, while less successful in identifying subtle signs such as yawning and nose licking. The same findings were true for both dog and cat owners, although interestingly women were better than men in detecting stress in pets. Due to the inability of owners to correctly interpret early signs of stress, early intervention is less likely (Mariti et al., 2012). Educational resources will be needed to assist owners in the early detection of stress in pets for faster intervention and recovery to occur. The increased ability of owners to detect subtle stress signs will assist in determining which activities and situations are causing the most stress for their pets (Mariti et al., 2012). Additional research may include gathering data regarding the number of veterinary visits due to stress related health reasons. Assessment of both concerns specific in nature as well as regarding the response to the synchronization of stress levels between pets and their owners (Sundman et al., 2019) will be needed to determine if there was a rise in the number of veterinary visits as a result of the pandemic or its after effects.

It is unknown whether animal shelters will see an increase in the number of surrenders in the future due to the COVID-19 pandemic. It is possible the same paradigm that occurred after the recession in 2008 may occur in the wake of the COVID-19 pandemic, such that shelters may see an increase in surrenders one to two years after the pandemic ends (Mattson, 2020). Future studies will be needed to evaluate whether an increase in surrenders occurs as a result of the pandemic and the contributing causes of the surrenders. It is hypothesized that as a result of the COVID-19 pandemic, financial strain, new problematic behaviors, and return to work will be contributing factors to surrenders.

Additional avenues for research to expand on our findings are plentiful. First, in order to confirm that attachment between pets and owners was not impacted by the pandemic, future research may use longer, more diverse measures to assess attachment before, during, and after the pandemic. Second, following pets and owners as they continue to work from home or readjust to post-pandemic routines would help explain if the adjustment alone created the effects we found or if unique characteristics were the primary source. Third, future studies will extend the literature base by assessing and covarying additional factors (e.g., problematic pet behavior, owner and pet temperaments) to further elucidate why some owners reported benefits for themselves and their pets during the pandemic and why others had less favorable experiences or reported both benefits and drawbacks simultaneously. Fourth, many participants reported feeling less lonely during the pandemic due to their pet, and quantitative follow-up research would help to support this finding. Finally, other future research studies could investigate whether gender differences influenced the

amount of engagement in pet related activities and whether owner personality traits affected the role of pets during the COVID-19 pandemic.

Conclusions

In conclusion, our findings indicate that pet owners spent more time with their pets during the COVID-19 pandemic. Specifically, owners spent more time in physical contact with their pets, and dog owners increased their engagement in activities, such as exercise, with their dog. Further, pet owners reported changes in social, physical, safety, routine, and psychological domains for themselves and their pets during the COVID-19 pandemic. The impacts of our findings are mixed as our data elucidated both benefits and drawbacks for owners and pets alike. Although we are still in the very early days of understanding the impact of these changes on both our pets and ourselves, our study lays the groundwork for future investigations in this area. In particular, our findings and the growing work-from-home movement necessitate additional research on the impact that this work arrangement has on pets. In particular, research examining which owners and pets are best suited to work-at-home arrangements may help in making successful pet matches in the future, hopefully enriching the lives of both the owners and the pets.

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Appendix A

Survey Questions

1. Have you owned a dog [cat] both before and now during the COVID-19 outbreak?
2. Did you get a pet since the COVID-19 outbreak began?
3. [If yes to 2] Did you get the pet from a shelter/humane society?
4. Have you fostered a pet since the COVID-19 outbreak began?

In the month prior to the COVID-19 outbreak...

1. On average, how many wakeful hours per day did you spend with your dog [cat]?
2. What percentage of caring for your dog [cat] were you responsible for?
3. On average, how long did you spend engaging in activities with your dog [cat] per day?
4. On average, how long did you spend walking or engaging in other physical activities with your dog? [not administered to cat owners]
5. On average, how long did you spend physically touching your dog [cat] (e.g., cuddling, petting, grooming, holding, etc.)?
6. On average, how pleasant was engaging in activities with your dog [cat]?
7. How attached were you to your dog [cat]?
8. On average, how upset were you with your dog [cat] (e.g., annoyed, frustrated, irritated, angry, etc.)?

Now during the COVID-19 outbreak...

1. On average, how many wakeful hours per day do you spend with your dog [cat]?
2. What percentage of caring for your dog [cat] are you responsible for?
3. On average, how long do you spend engaging in activities with your dog [cat] per day?
4. On average, how long do you spend walking or engaging in other physical activities with your dog? [not administered to cat owners]
5. On average, how long do you spend physically touching your dog [cat] (e.g., cuddling, petting, grooming, holding, etc.)?
6. On average, how pleasant is engaging in activities with your dog [cat]?
7. How attached are you to your dog [cat]?
8. On average, how upset are you with your dog [cat] (e.g., annoyed, frustrated, irritated, angry, etc.)?
9. In general, how has your experience with the COVID-19 outbreak been impacted by being a dog [cat] owner?*
10. In general, how has your dog [cat] been helpful or unhelpful in coping with social distancing during the COVID-19 outbreak?*
11. What (if any) concerns do you have related to your dog [cat] during the COVID-19 outbreak?*

*Open-ended questions used in qualitative analysis

Appendix B

Social/Attachment

pet is a barrier to social distancing
owner ok with social distancing
pet promotes social distancing
barrier to pet socializing
owner social drawback from pet
owner social benefit from pet
pet is not sufficient social connection
promotes pet socialization
post-shelter in place readjustment
pet and owner separated
adopting/fostering a pet

Psychological

pet psychological benefit from owner
owner psychological benefit from pet
pet feeling
pet pleasant feeling
pet unpleasant feeling
owner pleasant feeling
owner unpleasant feeling
owner emotional benefit from pet
pet behavior change
increased pet behavior problems

Physical

owner physical benefit from pet
more physical contact with pet
more physical proximity with pet
pet physical benefit from owner

Safety/Well-Being

concern for pet's well-being
vector
pet or owner contracting COVID
concern about providing pet care
change in pet care – delaying vet or concern

Responsibilities/Routines

decrease in pet care responsibility
work/pet compatibility
work/pet incompatibility
owner routine benefit from pet
pet allows owner to go outside
change in pet care – responsibility/changes
change in pet's routine
change in pet's sleep
change in time with pet