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Empirical Research Paper

The Perks of Pet Ownership? The Effects of Pet Ownership on Well-Being During the COVID-19 Pandemic

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Abstract

Pet ownership has often been lauded as a protective factor for well-being, particularly during the COVID-19 pandemic. We expanded this question to consider how pet (i.e., species, number) and owner (i.e., pet relationship quality, personality, attachment orientations) characteristics affected the association between pet ownership and well-being in a pre-registered mixed method analysis of 767 people assessed three times in May 2020. In our qualitative analyses, pet owners listed both benefits and costs of pet ownership during the COVID-19 pandemic. In our quantitative analyses, we found that pet ownership was not reliably associated with well-being. Furthermore, this association largely did not depend on the number of pets owned, the species of pet(s) owned, the quality of the human–pet relationship, or the owner's psychological characteristics. Our findings are consistent with a large body of research showing null associations of pet ownership on well-being (quantitatively) but positive reports of pet ownership (qualitatively).

Keywords

pet ownership, COVID-19, well-being, personality, attachment orientation

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The COVID-19 pandemic challenged many people's mental health (Robinson et al., 2022). One way that people tried to enhance their well-being during the pandemic was by adopting pets or further investing time and energy into their relationships with their current pets (see Amiot et al., 2022). Although pets ostensibly and anecdotally provide mental health benefits for people (Hui Gan et al., 2020; Wells, 2009), evidence consistently demonstrating a mental health boost from pet ownership has proven elusive (see Herzog, 2011 for reviews; Islam & Towell, 2013). Is owning a pet associated with better well-being in the context of an unprecedented stressor, like the onset of the COVID-19 pandemic? The few attempts that examined this particular question mostly assessed whether people owned pets or not and with a cross-sectional design. However, it is possible that the effects of pet ownership might depend on the duration one has owned their pet and other modifiers (i.e., individual differences) of these benefits—Does owning pets predict greater well-being throughout times of stress? Does it depend on the type/species of pet, how many pets one owns, how close people are to their pets, or the owner's personality? The current study examined whether pet owners reported greater well-being during the early stages of the COVID-19 pandemic. We drew on data from three assessment points in May 2020 and tested whether pet ownership–well-being associations varied based on pet and owner characteristics. By doing so, the current study is able to shed light on the ambiguous evidence of the link between pet ownership and well-being by examining this association during a time when pets may have been particularly important for well-being.

Pet Ownership and Well-Being

When people are asked how their pets make them happier, they can quickly articulate reasons: pets provide companionship, are a source of positive emotions, and require a routine and schedule that provide structure to owners' lives (Hui Gan

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et al., 2020; Podberscek, 2006; Wells, 2009). There is also a public sentiment found in popular news outlets and books that getting a pet improves people's well-being (Aschwanden, 2014; Becker & Morton, 2003; Herzog, 2011). It may then be surprising that formal examinations that compare pet owners' happiness levels to those of non-pet owners do not conclusively suggest that pets make people happier. On one hand, some studies show that pet owners are better off psychologically. In these studies, pet ownership is associated with less loneliness and depression, higher self-esteem and well-being, less negativity following a social rejection (compared to a neutral condition), less anxiety and anger, lower blood pressure, and even greater longevity (Allen, 2003; El-Alayli et al., 2006; Friedmann et al., 1980; Fritz et al., 1995; Headey, 1999; Jessen et al., 1996; McConnell et al., 2011; O'Haire et al., 2015; Stanley et al., 2014). On the other hand, although receiving less attention, there is a growing list of studies showing largely null associations between pet ownership and well-being (Fraser et al., 2020; Gilbey et al., 2007; Herzog, 2011; Siegel, 1990; Straede & Gates, 1993; N. L. Watson & Weinstein, 1993). In addition, there is even some evidence that pet owners may have *worse* mental health than non-pet owners (Koivusilta & Ojanlatva, 2006; Miltiades & Shearer, 2011; Müllersdorf et al., 2010; Parslow et al., 2005).

The onset of the COVID-19 pandemic provides a useful context for studying the effects of ownership on well-being, as pets may have ostensibly been important sources of well-being during this particularly stressful time (Gasteiger et al., 2021; Giansanti et al., 2022; Tan et al., 2021). Similarly though, studies examining the question of whether pet ownership is associated with well-being during the COVID-19 pandemic have also been mixed—with studies showing positive, negative, and null associations between pet ownership and well-being (Barklam & Felisberti, 2022; Carr et al., 2021; Damberg & Frömbling, 2022; Denis-Robichaud et al., 2022; Grajfoner et al., 2021; Ivanski et al., 2021; Kogan et al., 2021; Martin et al., 2021; Oliva & Johnston, 2021; Ratschen et al., 2020). However, in their systematic review of the effects of pet ownership on loneliness, Kretzler, König, and Hajek (2022) noticed a fascinating pattern. While pet ownership was not consistently associated with reductions in loneliness, at least outside the context of the pandemic, pet ownership was more beneficial in reducing loneliness and social isolation *during the pandemic*. This pattern suggests that the pandemic might be a unique context in which pet ownership may be particularly important for people's well-being (although see Albright et al., 2022; Clements et al., 2021; Falck et al., 2022; Krouzecky et al., 2022; Kuehne et al., 2022; Law et al., 2022; McDonald et al., 2021; Mueller et al., 2021, 2022; Phillipou et al., 2021; Shah et al., 2021 for conflicting evidence). Specifically, because lockdowns might have restricted socializing and compromised individuals' mental health (Jiang et al., 2022), the presence of a pet may have been particularly important for maintaining well-being. Thus, although studies have generally found conflicting associations between pets and well-being, these associations may be sensitive to important contextual factors (B. Bennett et al., 2022; Lima et al., 2022; Martinez-Caja et al., 2022; Xin et al., 2021).

In line with previous findings, we hypothesized that pet owners would have better well-being than non-pet owners (as indexed by higher life satisfaction, higher meaning in life, more positive affect, less negative affect, less stress, less isolation, and less depression) during the COVID-19 pandemic. One important limitation of previous studies, however, is that they have often considered the benefits (or lack thereof) of pet ownership at one time point only and rarely included potentially important moderating factors. Thus, we used longitudinal data collected during the early stages of the pandemic—a rare and rich opportunity to test the prospective effects of pet ownership on well-being (Gilbey et al., 2007). Another important limitation of previous studies and a potential reason for the heterogeneity in obtained past findings, is that only a few of these studies examined additional contextual variables that might affect whether or not pet ownership is good for well-being. In other words, is information lost by only comparing the dichotomy of whether people are pet owners or not? Thus, in the current study, we examined whether pet ownership and well-being associations depend on the characteristics of pet ownership and the owners. Specifically, we examined four sources of additional variation: the number of pets that people own, the species of pets that people own, the relationship quality people have with their pets, and potentially salient individual differences in owners' personalities.

Pet Ownership During the COVID-19 Pandemic: Possible Moderating Factors

In moving beyond previous research assessing whether or not someone owns a pet, we considered additional factors that might explain the mixed findings found in previous research. We focused mostly on characteristics of both the pets and their owners that contextualize previous research findings. For example, owning one species of pet is likely a qualitatively different experience than owning a different species of pet (Bao & Schreer, 2016; Fraser et al., 2020). Likewise, having too many pets or an adversarial relationship with a pet may make pet ownership a burden and ultimately reduce well-being (Amiot et al., 2022; Kim & Chun, 2021; Scoresby et al., 2021; Zilcha-Mano et al., 2011). Based on our evaluation of the existing literature, we focused on pet species, number of pets, and pet–human relationship quality. Finally, we drew on two of the most dominant frameworks for characterizing individual differences in personality: adult attachment orientation and the Big Five personality traits (John & Srivastava, 1999; Mikulincer & Shaver, 2017). These individual difference characteristics have been linked to both well-being and how people think, act, and behave.

They are also the most commonly implicated characteristics in the pet ownership literature (de Albuquerque et al., 2022; Zilcha-Mano et al., 2011), providing us a useful opportunity to examine if any of the pet ownership effects might depend on personality and attachment orientations (which surprisingly has rarely been tested). We provide a short review of each of the factors we examined in the current study—the number of pets that people own, the species of pets that people own, the relationship quality people have with their pets, and the individual difference characteristics of owners—below.

Pet Characteristics

There are several reasons why the number and species of pets that people own might be differentially associated with well-being during the COVID-19 pandemic. For example, owning 20 venomous snakes probably makes for a more stressful environment than owning a single miniature horse or one schnauzer. Owning several pets can be both a blessing and a burden (Meier & Maurer, 2022). On one hand, having several pets around might make it easier to alleviate feelings of loneliness, comparable to how interacting with more friends is associated with lower loneliness (Russell et al., 1980), particularly during the pandemic (Lades et al., 2020). On the other hand, having more pets can be associated with greater caregiving demands, stress, and concerns about the pets' health—all drawbacks people list about pet ownership in general and during the pandemic (Applebaum et al., 2020, 2021; Podberscek, 2006; Wells, 2009). Unfortunately, formal tests of how owning multiple pets is associated with well-being are rarely conducted. In large surveys, the number of pets a person owns is often collapsed into a binary variable (i.e., 0 = *owning no pets*, 1 = *owning at least one pet*; Xiao et al., 2021), so this information is sometimes lost. There are a few exceptions. For example, in a 2017 survey of over 40,000 Koreans, people who owned one pet were happier than those who owned multiple pets (Kim & Chun, 2021). In one study conducted during the pandemic, the number of pets owned was largely unrelated to well-being, suggesting that the positives and negatives of owning multiple pets might cancel each other out on average (Amiot et al., 2022). In the present work, given the mixed evidence from previous research, we treated whether the number of pets contributed to well-being as an open, exploratory question.

Studies finding differences in the number of pets owned suggest that these effects might be attributable to the *species* of pets people own (Fraser et al., 2020). Among pet owners, the species of pet makes for an entirely different experience, especially during the pandemic. Many animals need outdoor space. Dogs, for example, need to be walked regularly (or have access to outdoor space) but can stay inside for long stretches of time. Cats and birds can spend most of their time alone, either indoors or outdoors. Horses (which one of our participants reported having) often live exclusively outside the home. (Some) fish and marine pets may take up the least amount of space in a person's home. The vast majority of research has focused on comparing cat owners to dog owners. In this work, one somewhat reliable finding is that cat owners report higher levels of loneliness, more depression, and higher negative affect, and are more likely to have a mental health diagnosis than dog owners and non-pet owners (Bao & Schreer, 2016; Enmarker et al., 2015; Fraser et al., 2020; Straede & Gates, 1993). Having a bird companion was also associated with reductions in depression in a small study of older adults undergoing physical rehabilitation (Jessen et al., 1996). However, even among these studies, the effects are heterogeneous and not always tested in comparative ways (and often only cross-sectionally). For example, some studies examine only dogs (Barcelos et al., 2020), only cats (Straede & Gates, 1993), or only other animals in isolation or others (e.g., birds; Jessen et al., 1996). In the current study, we more formally examined the associations between the species of pets that participants own and whether pet species was associated with well-being (in an exploratory way).

Owner Characteristics

Aside from characteristics about the pet, *owners* likely possess characteristics that affect whether owning a pet is good for their well-being. In the current study, we focused on two factors—owners' perceived relationship quality with their pets and owners' personalities.

One obvious factor in whether owning a pet is associated with well-being is whether people think they have a good relationship with their pet. Having an adversarial relationship with a pet, particularly during a global pandemic, is unsurprisingly not good for humans or pets for that matter. Relationship quality with a pet is operationalized in many different ways, including "pet attachment"—a catch-all term that ranges from people's characteristic approach to pet relationships–to the extent to which they feel bonded to and feel supported by their pets, to how happy they are with their pets (Scoresby et al., 2021; Zilcha-Mano et al., 2011). Indeed, some studies find that having a positive relationship with pets is positively associated with well-being (Marsa-Sambola et al., 2017). Positive human–pet relationships might have been particularly important for those who struggled to emotionally navigate the COVID-19 pandemic (Barklam & Felisberti, 2022). However, like the other research highlighted above, even this seemingly straightforward expectation that positive relationships with pets would be associated with greater well-being is undermined by inconsistent findings across studies. For example, in their systematic review, Scoresby et al. (2021) found that only 38% of studies found a positive association between pet attachment and mental health outcomes, with 46% of studies finding either mixed or no associations (e.g., El-Alayli et al., 2006; Luhmann & Kalitzki, 2018). There is even a growing number of studies (15% in the systematic review) finding that pet attachment is

negatively associated with mental health outcomes (Herzog, 2011; Luhmann & Kalitzki, 2018; Miltiades & Shearer, 2011). This is also the case in at least one study conducted during the pandemic (Wells et al., 2022). One of the prominent explanations found in these articles is that people who report too strong of attachments to their pets or too intense a reliance on their pet may be doing so at the expense of other close relationships in their lives. In this way, having an intensely positive relationship with pets might compromise well-being because there is a lack of other relationships in people's lives. This might have been particularly salient during a time of restricted human socialization (i.e., a global pandemic). In the current study, we revisited whether human–pet relationship quality was associated with well-being during the COVID-19 pandemic.

Finally, we examined the possibility that people with certain individual difference characteristics might have benefited more from pet ownership during the COVID-19 pandemic. We focused on the Big Five personality traits (John & Srivastava, 1999) and adult attachment orientation (Crowell et al., 2008). The Big Five taxonomy of personality characterizes individual differences in five traits: extraversion (i.e., traits like outgoing and lively), agreeableness (i.e., traits like helpful and sympathetic), openness to experience (i.e., traits like imaginative and curious), conscientiousness (i.e., traits like hardworking and responsible), and neuroticism (i.e., traits like moody and worrying). In addition, attachment anxiety (i.e., a concern about the availability of close others) and avoidance (i.e., a discomfort with emotional and physical intimacy) serve as a framework for guiding people's thoughts, feelings, and behavior in close relationships (Cassidy & Shaver, 2008).

Most of the personality work in studies on pet ownership has focused on how these characteristics differentiate pet owners from non-pet owners, or how self-identified "cat people" and "dog people" differ from one another (Bao & Schreer, 2016; Bauer & Woodward, 2007; Edelson & Lester, 1983; Gosling & Bonnenburg, 1998; Gosling et al., 2010; Guastello et al., 2017; S. B. Johnson & Rule, 1991; Kidd & Kidds, 1980; Martinez & Kidd, 1980; Perrine & Osbourne, 1998; Podberscek & Gosling, 2000; Puskey & Coy, 2020; Rusu et al., 2019). In one representative study, pet owners reported higher conscientiousness, extraversion, and attachment avoidance (characterized as "dismissing" attachment; McConnell et al., 2011). People who consider themselves more as "dog people" tend to be more extraverted (the most consistent finding across studies), agreeable, conscientious, and less neurotic and open to experience than people who consider themselves more as "cat people" (Gosling et al., 2010). People high in attachment avoidance are less likely to want to own a pet, whereas people high in attachment anxiety are more likely to want to own a pet (Green et al., 2018). Studies beyond cats and dogs are rarer but do exist: people owning more non-conventional pets (e.g., horses, hedgehogs, rabbits, ferrets) tend to be more open to experience and also higher in narcissism and borderline personality traits (Gosling & Bonnenburg, 1998; Vonk et al., 2016). Variation in personality also explains why dog owners occasionally report higher life satisfaction than cat owners (Bao & Schreer, 2016). Owner personality has also been hypothesized to cultivate variation in the psychological characteristics of their pets (Konok et al., 2015; Pereira et al., 2021).

But whether personality *moderates* the association between pet ownership and well-being is a separate question. Among pet owners, attachment avoidance is associated with using pets as a replacement for human companionship; attachment anxiety is associated with more concern about giving the pet adequate attention (Green et al., 2018) and believing that their pets are negatively evaluating them (Coy & Green, 2018). During the COVID-19 pandemic, with the increased time spent at home, the time spent with pets also likely increased. Avoidantly attached adults might have jumped at the opportunity to interact more with their pets and less with humans (consequently enhancing well-being). Anxiously attached adults may have discovered that being inside with pets more often might provide more opportunities for (perceived) pet scrutiny (consequently reducing well-being). Providing care and having interactions with pets might have been good for the well-being of people high in extraversion (who enjoy social connections), conscientiousness (who like maintaining a schedule and responsibility), and openness to experience (who might welcome the variety a pet affords them). Instead, highly neurotic people might view pet caregiving and health responsibilities as yet another unwelcome stressor during the pandemic (which people spontaneously list as drawbacks of pet ownership; Applebaum et al., 2020, 2021; Podberscek, 2006; Wells, 2009). Unfortunately, no studies have tested the moderating effect of these characteristics on Swine Brachyspira antimicrobial susceptibility well-being (either during COVID-19 or not), so we did not make any firm hypotheses about what to expect but we sought to examine these associations exploratorily.

The Current Study

The current study examined whether pet ownership was associated with well-being in a longitudinal study conducted during the early stages of the COVID-19 pandemic. The survey was mobilized and administered as quickly as possible (i.e., personality and attachment data were collected in March 2020), and we used the soonest wave that included data about pets (i.e., May 2020) and the two assessments after this point. This early pandemic period, and the subsequent follow-ups over the next month, provided us with a unique opportunity to examine pet ownership during this particularly stressful time.

In pre-registering the analysis, we initially thought that there would be a positive effect of pet ownership on well-being given the ubiquity of polling suggesting pets have a positive impact on individuals and our intuition based on

studies showing that choosing to own a pet was associated with higher well-being (Fraser et al., 2020; HABRI, 2021). However, a broader assessment of the literature showed more heterogeneous evidence for the influence of pets on well-being (Herzog, 2022). Ultimately, based on the sentiment of public polling taking place during the pandemic, we thought that pets might play an inordinately positive role in people's lives during a particularly stressful time, like a pandemic. Thus, on average, we thought that pets might be good for people's well-being, albeit that the effects would be modest. Specifically, we hypothesized that people who owned at least one pet would report higher life satisfaction, meaning in life, and positive affect, and less negative affect, stress, isolation, and depression. We expected these differences to persist over the three assessment points. This was the lone pre-registered hypothesis of the study.

Open-ended responses gave us the opportunity to study the purported benefits that people said their pets provided them during the pandemic. To date, most studies look exclusively at whether pet ownership is either quantitatively or qualitatively associated with well-being. Our study is one of the few to examine both types of data simultaneously in a large, longitudinal sample in which people provided answers to an open-ended prompt about pet ownership and a series of closed-ended queries about their pet(s) (Hall & Duke, 2021; Hui Gan et al., 2020; Packer et al., 2020; Peacock et al., 2020). In a way, this mixed method approach enabled us to track how well-being changed quantitatively through the early stages of the pandemic while acknowledging people's reflections and evaluations of the role that their pet has played in their lives. Using existing data restricted the breadth of questions we could ask about pet ownership, so this qualitative information provides an unprecedented opportunity to compare the wide variety of the benefits and costs of pets with variation in well-being over time during the pandemic.

Among pet owners, we also examined whether well-being might depend on the number of pets they own, the species of pet(s) they own, and the relationship quality they had with their pets. Finally, we examined whether individual difference characteristics (e.g., Big Five personality traits, attachment orientation) moderated the associations between pet ownership and well-being. Given the conflicting findings from past work and how rarely some of these moderators were tested, we treated these moderation tests as exploratory.

Method

The current study was pre-registered as a secondary data analysis. The primary analyst did not have access to the data beforehand, and the hypotheses and the analytic plan were made completely agnostic of the data. The pre-registration can be found at https://osf.io/eayd8/. Data, syntax, and a list of all available variables at all waves are available at https://osf.io/cmjqg/.

Participants

Participants were 767 people (M_{age} = 35.17 years, SD = 13.79; 81.7% women, 15.3% men, 3.0% other) drawn from the fourth, fifth, and sixth waves of the internationally based *Love in the Time of COVID* study (see Balzarini et al., 2022 for full details). The Love in the Time of COVID study was a longitudinal convenience sample of volunteers who completed online surveys every two weeks from March 27th onward in 2020. Inclusion in our analyses was limited to those who completed a question about pet ownership during the fourth wave of data collection (i.e., "How many pets do you have?"). Respondents came from the United States (59.2%), Spain (18.5%), Canada (10.7%), the Netherlands (2.0%), and other countries (9.6%). No other exclusionary criteria were applied. There were 767 people with data at Wave 4, 518 at Wave 5 (67.5% of Wave 4), and 430 at Wave 6 (56.1% of Wave 4). Compared to those with longitudinal data (n = 578), those with only Wave 4 data (n = 189) had fewer pets (d = .27) but were otherwise comparable on all study measures.

Measures

Participants reported on pet ownership status (and number and species of pet) at Wave 4 only; each of the outcomes at Waves 4, 5, and 6; and individual difference (i.e., personality) characteristics at Wave 1 (about six weeks prior to the pet ownership assessment).

Pet ownership questions. At Wave 4, participants responded to the question, "How many pets do you have?" on a scale ranging from 1 (*0*) to 11 (*10+; M* = 1.81). *Pet ownership* was coded in terms of whether they owned at least one pet (=1; N = 424; 55.3%) or not (−1; N = 343; 47.7%). *Number of pets* owned was a continuous measure. Because people could own different species of pets (e.g., they might own a dog and a cat), *pet species* was operationalized via dummy-coded variables of dog ownership (55.7%), cat ownership (55.7%), or other pets (e.g., birds; 13.0%). Pet owners responded to two questions about the state of their *relationship quality with their pets* (i.e., "How connected to your pet(s) have you felt since the pandemic began?" and "How much comfort have your pets given you since the pandemic began?"; r = .50, $p < .001$) which were asked on 7-point scales (ranging from less connected/not at all to more connected/very much). These latter two items were averaged to yield one composite of relationship quality with pets.

Finally, people provided open-ended information regarding their pets via the question: "If you want to say a few words about how having pet(s) has been helpful (or not) to you during the time of the pandemic, please feel free to do so here," which was used for qualitative coding. Of the 424 pet owners, 268 participants (63.2%) responded to this open-ended question.

Individual difference characteristics. Individual difference characteristics were assessed at Wave 1. Personality was assessed via an abbreviated version of the Big Five Inventory-2 (Soto & John, 2017), a 15-item questionnaire assessing the Big Five personality traits of extraversion, agreeableness, conscientiousness, neuroticism, and openness (to experience) via 3-item subscales for each. Sample items include "I am someone who tends to be quiet (R)" (for extraversion; $\alpha = .54$), "I am someone who is compassionate, has a soft heart" (for agreeableness; $\alpha = .45$), "I am someone who is reliable, can always be counted on" (for conscientiousness; $\alpha = .51$), "I am someone who worries a lot" (for neuroticism; $\alpha = .65$), and "I am someone who is original, comes up with new ideas" (for openness; $\alpha = .50$). Participants responded to each statement on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Responses were averaged to yield composites for each trait.

Adult attachment orientations were assessed via an adapted version of the Experiences in Close Relationships-Relationships Structures questionnaires (Fraley et al., 2011). The scale consists of seven items asking about people's approaches to romantic relationships in general (not necessarily their current relationship situation). Four items measure avoidance, and three measure anxiety. An example item for avoidance includes, "I prefer not to show my partner how I feel deep down." An example item for anxiety includes, "I am afraid my partner may abandon me." The items were rated on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Responses were averaged to yield composites for anxiety ($\alpha = .75$) and avoidance ($\alpha = .64$).

Well-being outcomes. There were eight outcomes in the current study, each of which was assessed at Waves 4, 5, and 6:

(a) *Subjective well-being* was assessed via a single item from the satisfaction with life scale (i.e., "I have been completely satisfied with my life"; Diener et al., 1985), and responses could range from 1 (*not at all*) to 7 (*completely*).
(b) *Purpose in life* was assessed via a single item from the meaning in life questionnaire (i.e., "My life has had a clear sense of purpose"; Steger et al., 2006), whose responses could range from 1 (*not at all*) to 7 (*completely*).
(c) *Positive* (i.e., four items: happy, excited, inspired, active) and (d) *negative* (i.e., four items: bored, scared, angry, irritable) affects were assessed via averages of items from a variant of the Positive and Negative Affect Schedule-Expanded Form (PANAS-X) that asked how people felt over the past 2 weeks on a scale ranging from 1 (*very slightly or not at all*) to 5 (*every day*; D. Watson & Clark, 1999).
(e) *Stress* and (f) *loneliness* were embedded in the aforementioned PANAS-X questionnaire with the two pairs of items for both stress ("stressed" and "distressed") and loneliness ("isolated" and "lonely," which were derived from Hughes, Waite, Hawkley, and Cacioppo (2004)). Items for stress and loneliness were averaged separately.
(g) *Depression* was measured via the average of two items from Löwe et al. (2010): "Little interest or pleasure in doing things" and "Feeling down, depressed, or hopeless," asking how people felt over the past 2 weeks on a scale ranging from 1 (*not at all*) to 4 (*nearly every day*).

Finally, because of the likely intercorrelations between these measures and the lack of theoretical reasoning for why pet ownership would be associated with one aspect of well-being versus another, we created (h) *an omnibus measure of well-being*. Specifically, we (reversed scored and) standardized the aforementioned measures of well-being and averaged them into one composite measure ($\alpha_M = .87$). Scores on this standardized measure ranged from −2.17 to 1.74 ($M = 0.00$).

Analytic Approach

We pre-registered an analytic plan for both qualitative and quantitative analyses (https://osf.io/eayd8/).

Qualitative analyses. Due to the uncertainty in what the open-ended responses might look like, we pre-registered a broad content coding approach to the open-ended question ("If you want to say a few words about how having pet(s) has been helpful [or not] to you during the time of the pandemic, please feel free to do so here"; Morgan, 1993; Smith, 2000; Woike, 2007). Specifically, the second and third authors first independently read through the first 50 responses (24.9%) to develop and identify a list of themes. Then they discussed the themes and developed an initial coding scheme. This coding scheme was refined after they coded 10 subsequent responses together. Two broader categories were identified: *benefits* and *costs*. While the benefit category included 12 codes (i.e., *positive emotions, coping, affection, responsiveness, entertainment, cuddling, companionship, purpose, exercise, benefits other people, distraction, social connection)*, the costs category included 7 codes (*negative emotions, clean-up, financial costs, interference, separation, worse health, restrictions during COVID*).

The description of each code can be found in Table 1. The two authors afterward separately coded the remaining 191 responses with a binary system (i.e., 0 = *absent*, 1 = *present*), and the coding scheme was finalized. Inter-rater agreement ranged between 85.6% and 99.5% per code ($\kappa = .40$-$.87$). After calculating the inter-rater agreement, the coders reviewed and discussed codes that had lower percent agreement rates (<90%) or that were infrequently mentioned (below 5%) and discussed inconsistencies in coding. This revision resulted in higher percent agreement (91-100%) and inter-rater reliability ($\kappa = .56$-1.00) across 19 codes (see Supplemental Table 1 for all kappas and agreement

Table 1. Frequency of Mentions of Benefits and Costs of Pet Ownership During the COVID-19 Pandemic.

Code	Description	% mentioned	Example statement
Benefits			
Positive emotions	Joy/happiness, comfort, cheering up, calmness, mood-boosting	32.8	"I am studying for the MCAT right now and my dog has been a great study buddy who sleeps on the bed while I study at my desk. [. . .]"
Companionship	Companionship, spending time together	18.9	"My cats [. . .] like to sleep beside me, cuddle up on my lap when I sit watch tv, they lay beside me while I work from home. [. . .]"
Affection	Affection/love, closeness, friendship/relationship/connection	14.9	"I love having the unconditional love of my 2 dogs . . . just so sweet to be able to have them near me for so much of the day."
Exercise	Helpful to be walking, exercising, and taking the pet out of the house	13.4	"I am so happy to have a dog to walk!"
Entertainment	Entertainment/fun, laughter/smiles	12.4	"[. . .] we also got 2 new kittens and they have brought so much love and entertainment to the whole family."
Purpose	Sense of meaning/purpose/stewardship (including responsibility/need to nurture)	10.0	"We also foster kittens and have four kittens currently. This gives us something to do, [. . .], and a sense that we are helping our community."
Cuddling	Physical touch/cuddling	9.5	"They bring a lot of joy in our life. Cuddling them lowers my stress."
Distraction	Distraction from the pandemic/other stressors, bringing a sense of normalcy/constancy (as pets don't know there's a pandemic)	7.5	"Having a pet that does not know what a pandemic is and behaves as he normally does, brings a sense of normalcy. He is certainly happy we are home all day."
Other people	Joy to other family members and friends	7.0	"Their presence has probably calmed my daughter, and I feel less guilt about not seeing them all day!"
Coping	Mental health and coping with stress (explicit mention of mental health concerns, anxiety, depression)	6.5	"[. . .] When I feel anxious they know and come lick my arms. They have been instrumental in maintaining my mental health when I am so disconnected from my partners."
Responsiveness	Responsiveness/emotional support	3.0	"Having no physical contact with human beings, I especially appreciate my kitty. I appreciate his responsiveness, the affection he shows me, the warmth of being physically connected ('cuddling') while watching tv or lying in bed, the sense of mutual dependency."
Social connection	Social connections (e.g., talking to other pet owners)	1.5	"[. . .] taking the dog out on a daily basis has allowed me to also connect (from a distance) with the other dog owners that I know and to get a bit of socialization through that."
Costs			
Negative emotions	Guilt (e.g., not spending enough time or leaving them home, bothering them) worrying about the pet's health and well-being, going crazy	5.5	"The dog is about a year old and going through a bark phase. I wish we could socialize her more and take her to the dog park more. She's kind of driving us nuts, though we understand she's probably also going nuts being stuck inside with us without her own ability to get the stimulation she needs."
Separation	Death/loss/separation	3.5	"We have four cats, one passed away on Mother's Day. This created a week of sadness in our house."
Interference	Difficult to concentrate on work	2.0	"She's just a comforting presence to have around, and gets me out of the house. At the same time, it can be hard to concentrate on work when she insists it is time to play! [. . .]"
Cleanup	Cleaning up after their mess	1.5	"Increased stress and the impending birth of our third child has made me a little resentful of the care and expense of our pets, particularly when it come to maintaining the cleanliness of our home."
Worse health	Behavior constraints (e.g., loss of sleep) are bad for health	1.5	"[. . .] during these weeks I have felt a little sadder/worried/caring as a result of my pet (Kitty) being a little sick with certain symptoms [. . .] The hours of sleep at night have also decreased because I go to bed later at 2:30 a.m. and get up at approximately 8:00 a.m. because I am very aware of my cat's health."
Financial	Financial costs	1.0	"Losing our cat was very difficult. [. . .] We had to bring him to an emergency vet twice during this period, which was stressful both emotionally and financially. [. . .]"
Pandemic restrictions	Restrictions due to COVID-19 regulation are stressful	0.5	"[. . .] But it has also been difficult to go out with him with time and space so limited (200 meters), and sometimes with fear that the police would stop us or of their control (since I saw them stop a neighbor in a not friendly way) and also because of the social control of some people in the neighborhood."

statistics). Frequencies for each code were based on responses that both raters agreed on after this final round of coding.

Quantitative analyses. We also pre-registered an analytic plan in which variation and changes in the eight well-being outcomes over Waves 4, 5, and 6 were modeled as a function of (Model A) pet ownership (−1 = *do not own a pet*; 1 = *own at least one pet*) at Wave 4. Among those with pets, well-being outcomes were modeled as a function of (Model B) number of pets (continuous measure), (Model C) species of pet (because people could own multiple species of pets, owning a dog [0 vs 1], owning a cat [0 vs 1], and owning another species of pet [0 vs 1] were added as dummy variables), and (Model D) pet relationship quality (a continuous measure). Each well-being outcome was examined separately in each analysis.

We also tested Big Five personality traits and attachment orientations (at Wave 1) as moderators of the associations between pet ownership (Model E; i.e., does personality and attachment moderate associations tested in Model A).

To answer these questions, we used multi-level growth curve modeling to model longitudinal changes in the well-being outcomes across the three waves while examining moderators of levels of changes in each outcome (Singer & Willett, 2003). Each well-being outcome was allowed to vary over time, and pet-related questions and individual difference characteristics were treated as time-invariant. Age, gender (dummy coded for women and others with men as a reference group), and education were entered as control variables in all analyses. Although pet owners and non-pet owners did not differ in terms of age ($p = .747$), the percentage of women ($p = .409$), or education ($p = .379$), we retained them as covariates given socio-demographic differences in well-being identified by previous research (Baird et al., 2010; Batz-Barbarich et al., 2018; Pinquart & Sörensen, 2000). The inclusion or exclusion of these variables did not change the substantive interpretation of the results. Continuous variables were grand-mean centered prior to their introduction into the models. Each well-being outcome was modeled as a function of an intercept, the linear effect of time (i.e., change), pet-related predictor (i.e., pet ownership, number of pets, pet species, or pet relationship quality, depending on the model), and an interaction between the pet-related predictor and time, age, gender, and education.

To test for the moderating effects of individual difference characteristics, we added the main effects and interactions with pet ownership (i.e., Model A above) for all of the Big Five personality traits and attachment orientations simultaneously (centered prior to inclusion). Any significant interactions were decomposed by estimating the effect of pet ownership on well-being at ±1 *SD* around the mean of the individual difference characteristic (Aiken & West, 1991).

Standardized effect sizes (*r*) and confidence intervals (CIs) are reported.

Results

Qualitative Insights Into Pet Ownership

As seen in Table 1, there were more types of benefits than costs. Some participants reported *both* the benefits and costs of having pets during the pandemic. In general, benefits were mentioned more frequently than costs (an average of 11.5% across different types of benefits compared to an average of 2.2% across different types of costs).

Benefits. Within the benefits category, participants mentioned *positive emotions* most often, suggesting pets were most helpful during the pandemic because they provided a host of positive emotions, such as a sense of joy and comfort. Improvements in mood were followed by experiencing a sense of *companionship* from spending time with the pet and receiving *affection*. A few people also mentioned pets being helpful because they help build s*ocial connection* with other pet owners for instance; this was the rarest benefit.

Costs. Within the costs category, participants mentioned experiencing *negative emotions* most frequently, suggesting pets could also be difficult during the pandemic because people come to worry about the pet's health and well-being and/or feel guilty about not spending enough time with them. The feeling of negative emotions might emerge for many reasons, such as dramatic changes in their care from before the pandemic to the pandemic (e.g., pet day care settings being closed or being stuck at home with the pet more often, which possibly made caregiving demands more salient). This was followed by difficulties experienced when people were *separated* from their pet due to the pet's death or moving into a different home due to the pandemic, etc. and *interference* with remote work as people found their pets could be distracting. The most unique cost was experiencing stress due to COVID-19 regulations that *restricted* ways they could take care of/spend time with their pet.[1]

Quantitative Insights Into Pet Ownership

A full correlation table with descriptive characteristics is provided in Supplemental Table 2. Because of the large number of tests reported below, we provided a summary of the pertinent effects of all the models in Table 2. The full multilevel regression output can be found in Supplemental Tables 3 to 7 (a full summary with *r*s and 95% CIs from all models can be found in Supplemental Table 8).

Is pet ownership associated with well-being during the COVID-19 pandemic?. Pet ownership was largely not significantly associated with higher well-being during the pandemic. The one exception was that pet ownership was associated with lower depression ($r = -0.08$ [−0.15, −0.01], $p = .018$), but was associated at near-zero levels with the other outcomes.[2] These

Table 2. Summary of Estimates of Interest.

Model A: Pet ownership predicting each outcome					
	Life satisfaction	Purpose	Positive affect	Negative affect	Stress
Estimate					
Pet ownership	0.030 (−0.040, 0.099)	0.043 (−0.027, 0.113)	0.022 (−0.048, 0.092)	0.006 (−0.063, 0.076)	0.027 (−0.043, 0.097)
Pet ownership × time	0.037 (−0.023, 0.097)	0.002 (−0.059, 0.063)	0.022 (−0.039, 0.083)	−0.003 (−0.064, 0.058)	0.047 (−0.013, 0.108)
	Loneliness	Depression	Overall well-being		
Estimate					
Pet ownership	−0.023 (−0.093, 0.047)	**−0.084 (−0.153, −0.014)**	0.031 (−0.039, 0.101)		
Pet ownership × time	0.023 (−0.038, 0.084)	−0.042 (−0.103, 0.018)	0.008 (−0.054, 0.070)		
Model B: Number of pets predicting each outcome					
	Life satisfaction	Purpose	Positive affect	Negative affect	Stress
Estimate					
Number of pets	−0.048 (−0.144, 0.048)	−0.007 (−0.104, 0.089)	−0.068 (−0.163, 0.028)	**0.102 (0.007, 0.196)**	0.034 (−0.063, 0.131)
Number of pets × time	0.000 (−0.081, 0.082)	−0.012 (−0.095, 0.070)	0.050 (−0.032, 0.131)	−0.006 (−0.088, 0.076)	−0.082 (−0.163, 0.000)
	Loneliness	Depression	Overall well-being		
Estimate					
Number of pets	0.095 (−0.001, 0.190)	0.045 (−0.053, 0.142)	−0.076 (−0.171, 0.020)		
Number of pets × time	0.029 (−0.054, 0.111)	0.052 (−0.030, 0.134)	0.007 (−0.076, 0.090)		
Model C: Pet species predicting each outcome					
	Life satisfaction	Purpose	Positive affect	Negative affect	Stress
Estimate					
Dog	**0.083 (0.013, 0.152)**	**0.097 (0.027, 0.166)**	**0.091 (0.021, 0.160)**	0.019 (−0.051, 0.088)	0.019 (−0.051, 0.089)
Cat	−0.016 (−0.086, 0.055)	0.009 (−0.062, 0.080)	−0.022 (−0.092, 0.049)	0.001 (−0.070, 0.072)	0.048 (−0.023, 0.118)
Other pet	−0.019 (−0.091, 0.054)	−0.015 (−0.087, 0.057)	−0.056 (−0.128, 0.016)	0.025 (−0.048, 0.096)	−0.008 (−0.081, 0.064)
Dog × time	**0.070 (0.009, 0.129)**	0.019 (−0.042, 0.080)	0.046 (−0.016, 0.106)	−0.022 (−0.082, 0.039)	0.009 (−0.052, 0.069)
Cat × time	0.045 (−0.016, 0.105)	0.041 (−0.021, 0.102)	0.011 (−0.050, 0.073)	−0.018 (−0.079, 0.043)	0.005 (−0.056, 0.066)
Other pet × time	−0.017 (−0.079, 0.044)	−0.059 (−0.120, 0.003)	0.009 (−0.053, 0.070)	0.027 (−0.034, 0.089)	0.007 (−0.055, 0.068)

(continued)

Table 2. (continued)

	Loneliness	Depression	Overall well-being		
Estimate					
Dog	−0.027 (−0.097, 0.043)	**−0.108 (−0.177, −0.038)**	0.069 (−0.002, 0.138)		
Cat	0.014 (−0.057, 0.085)	−0.023 (−0.094, 0.048)	−0.015 (−0.085, 0.056)		
Other pet	0.003 (−0.069, 0.075)	0.023 (−0.049, 0.096)	−0.023 (−0.095, 0.049)		
Dog × time	−0.011 (−0.072, 0.050)	−0.046 (−0.107, 0.015)	0.046 (−0.016, 0.107)		
Cat × time	−0.009 (−0.070, 0.053)	−0.027 (−0.088, 0.035)	0.031 (−0.031, 0.093)		
Other pet × time	0.046 (−0.016, 0.108)	0.036 (−0.026, 0.098)	−0.039 (−0.101, 0.023)		

Model D: Relationship quality with pet predicting each outcome

	Life satisfaction	Purpose	Positive affect	Negative affect	Stress
Estimate					
Pet relationship quality	0.032 (−0.062, 0.126)	−0.004 (−0.098, 0.090)	0.056 (−0.038, 0.149)	0.049 (−0.045, 0.142)	**0.108 (0.014, 0.200)**
Pet relationship quality × time	0.050 (−0.030, 0.129)	−0.006 (−0.087, 0.075)	0.024 (−0.056, 0.105)	0.050 (−0.030, 0.130)	0.052 (−0.029, 0.133)

	Loneliness	Depression	Overall well-being
Estimate			
Pet relationship quality	0.033 (−0.061, 0.127)	0.063 (−0.033, 0.157)	−0.030 (−0.124, 0.064)
Pet relationship quality × time	0.058 (−0.024, 0.138)	0.066 (−0.015, 0.146)	−0.034 (−0.115, 0.048)

Model E: Personality moderating the effects of pet ownership on each outcome

	Life satisfaction	Purpose	Positive affect	Negative affect	Stress
Estimate					
Pet ownership	0.008 (−0.066, 0.082)	0.022 (−0.052, 0.097)	0.004 (−0.071, 0.078)	0.010 (−0.063, 0.084)	0.036 (−0.038, 0.110)
Pet ownership × attachment anxiety	−0.040 (−0.116, 0.036)	−0.037 (−0.113, 0.039)	−0.057 (−0.133, 0.019)	−0.009 (−0.085, 0.066)	0.054 (−0.022, 0.129)
Pet ownership × attachment avoidance	−0.004 (−0.080, 0.072)	−0.002 (−0.078, 0.075)	−0.026 (−0.102, 0.050)	−0.039 (−0.114, 0.037)	−0.050 (−0.125, 0.027)
Pet ownership × extraversion	0.008 (−0.068, 0.084)	−0.017 (−0.094, 0.060)	0.032 (−0.044, 0.108)	0.015 (−0.061, 0.090)	**0.077 (0.001, 0.153)**
Pet ownership × agreeableness	−0.002 (−0.078, 0.073)	−0.004 (−0.080, 0.072)	0.008 (−0.067, 0.084)	0.005 (−0.070, 0.080)	0.010 (−0.065, 0.086)
Pet ownership × conscientiousness	−0.018 (−0.093, 0.058)	−0.012 (−0.088, 0.064)	0.053 (−0.023, 0.128)	0.033 (−0.042, 0.108)	0.029 (−0.046, 0.105)
Pet ownership × neuroticism	0.045 (−0.030, 0.121)	−0.004 (−0.081, 0.072)	0.070 (−0.006, 0.145)	−0.013 (−0.088, 0.062)	−0.032 (−0.108, 0.044)
Pet ownership × openness	−0.061 (−0.136, 0.014)	**−0.095 (−0.170, −0.019)**	**−0.135 (−0.208, −0.059)**	0.045 (−0.030, 0.120)	0.001 (−0.075, 0.077)

(continued)

Table 2. (continued)

	Loneliness	Depression	Overall well-being
Estimate			
Pet ownership	−0.017 (−0.091, 0.057)	**−0.093 (−0.167, −0.019)**	0.020 (−0.055, 0.094)
Pet ownership × attachment anxiety	−0.002 (−0.077, 0.074)	0.001 (−0.076, 0.078)	−0.037 (−0.113, 0.039)
Pet ownership × attachment avoidance	0.028 (−0.048, 0.103)	0.000 (−0.077, 0.077)	0.005 (−0.071, 0.081)
Pet ownership × extraversion	0.036 (−0.039, 0.112)	0.041 (−0.036, 0.117)	−0.028 (−0.104, 0.048)
Pet ownership × agreeableness	−0.013 (−0.088, 0.063)	0.058 (−0.018, 0.134)	−0.011 (−0.087, 0.065)
Pet ownership × conscientiousness	0.036 (−0.040, 0.110)	0.020 (−0.056, 0.096)	−0.018 (−0.093, 0.058)
Pet ownership × neuroticism	−0.063 (−0.138, 0.012)	−0.048 (−0.124, 0.029)	0.053 (−0.023, 0.128)
Pet ownership × openness	−0.012 (−0.087, 0.064)	0.032 (−0.045, 0.108)	−0.071 (−0.146, 0.004)

Note. Full models can be found in the Supplemental Material. The 95% confidence intervals in bold do not include zero. Bolded associations have confidence intervals that do not include zero.

patterns are consistent with the near-zero bivariate association between pet ownership and overall well-being at each of the time points (*r*s: .016-.044; see Supplemental Table 2).

Is the number of pets a person owns associated with well-being during the COVID-19 pandemic?. The number of pets owned was generally not significantly associated with higher well-being during the pandemic. Contrary to our expectations, owning more pets was associated with greater negative affect during the COVID-19 pandemic ($r = 0.10$ [0.01, 0.20], $p = .036$).[3,4]

Is the species of pet someone owns associated with well-being during the COVID-19 pandemic?. Pet species was also largely not significantly associated with the well-being outcomes. There were a few associations worth discussing: owning a dog was associated with higher life satisfaction ($r = 0.08$ [0.01, 0.15], $p = .020$), purpose in life ($r = 0.10$ [0.03, 0.17], $p = .007$), positive affect ($r = 0.09$ [0.02, 0.16], $p = .011$), and lower depression ($r = -0.11$ [−0.18, −0.04], $p = .002$) during the COVID-19 pandemic. The other associations (both of other pets and with other outcomes) were not significant and were near-zero.[5]

Is relationship quality with pets associated with well-being during the COVID-19 pandemic?. Relationship quality with pets was largely not significantly associated with well-being outcomes. Contrary to our expectations, the one exception was that having better relationship quality with a pet was associated with greater stress ($r = 0.11$ [0.01, 0.20], $p = .024$).

Do Individual Difference Characteristics Moderate the Association Between Pet Ownership and Well-Being During the COVID-19 Pandemic?

The vast majority of interactions between pet ownership and individual difference characteristics (e.g., personality, attachment orientations) were not significantly associated with well-being outcomes. Out of the 56 possible interactions, only 3 were significant (5.4%). These included interactions between pet ownership and openness to experience predicting purpose in life ($r = -0.10$ [−0.17, −0.02], $p = .014$) and positive affect ($r = -0.14$ [−0.21, −0.06], $p < .001$), and pet ownership and extraversion predicting stress ($r = 0.08$ [0.001, 0.15], $p = .046$).

Among those low in openness, pet ownership was associated with greater purpose ($b = 0.162$, $SE = 0.075$, $p = .030$) and positive affect ($b = 0.093$, $SE = 0.036$, $p = .010$) compared to those high in openness for purpose ($b = -0.100$, $SE = 0.076$, $p = .188$) and positive affect ($b = -0.088$, $SE = 0.037$, $p = .016$).

Among those high in extraversion, pet ownership was associated with greater stress ($b = 0.12$, $SE = 0.05$, $p = .010$) compared to those low in extraversion ($b = -0.05$, $SE = 0.05$, $p = .316$).

Summary of Results

Although it might be tempting to make a story out of the few significant associations between pet ownership-related variables and well-being, the vast majority of associations were near-zero. This included examining associations between well-being and overall pet ownership, number of pets, pet species, and relationship quality with pets. For the most part, individual difference characteristics did not moderate associations between pet ownership and well-being, suggesting that the (near-zero) associations in the main analyses are relatively comparable among those with different personalities and attachment orientations. We felt that the overall well-being composite was the most holistic and comprehensive assessment of the outcomes included in the current study; no significant effects were found for that particular composite outcome. Our findings are consistent with the body of research showing null associations of pet ownership on well-being (quantitatively) but positive reports of pet ownership (qualitatively).

Evaluating Significant Effects of the Role of Pet Ownership

Across all models, we ran several statistical tests. The results seen in Table 2 are before any statistical correction was applied. Accepting these results uncritically (i.e., without applying any correction) might lead to an overestimation of the role of pet ownership on psychological well-being (although, admittedly, few effects were found). To manage the risk of false positive associations resulting from our multiple testing approach, we employed the Benjamini and Hochberg (1995) approach. Specifically, this approach controls for the false discovery rate by factoring in the number of tests run. The method orders *p*-values from smallest to largest and then compares each *p*-value to a critical value, $(i/m)Q$, where i is the rank, m is the total number of tests, and Q is the false discovery rate (i.e., .05 in this scenario). The largest *p*-value that is less than $(i/m)Q$ *is significant as are all p-values smaller than this p-value. Applying this correction creates a more stringent alpha criterion as the number of tests increases. The results of this corrective procedure applied to only the confirmatory estimates from* Table 2 *can be found in Supplemental Table 9. Of the few p-values that fell under p = .05 presented in* Table 2 *(n = 12 effects), only one (the pet ownership × openness interaction predicting positive affect) surpassed the new threshold of significance after the* Benjamini and Hochberg (1995) correction. Along with the near-zero effects seen in Table 2, a modest correction also provides an assessment that the quantitative effect of pet ownership (including the number of pets, pet species, the

pet–human relationship quality, and the individual difference characteristics of owners) on well-being is likely not significantly different from zero in most cases.

Exploratory Analyses

Curious readers may also wonder whether individual difference characteristics might moderate associations between the pet characteristics and well-being indices. In other words, among pet owners (rather than comparing pet owners to non-pet owners), number of pets, pet species, and pet relationship quality might indeed be associated with well-being depending on participants' personality and attachment orientation. We pre-registered only the moderating tests of individual difference characteristics on the association between pet ownership and well-being; tests of whether these characteristics moderated the associations between the pet characteristics and well-being were not pre-registered. We chose to evaluate this possibility to provide a more comprehensive assessment of whether individual difference characteristics might alter the experience of pet owners specifically.

To do so, we departed from our pre-registered analyses and examined whether individual difference characteristics moderated the associations between (a) number of pets and well-being, (b) species of pet and well-being, and (c) pet relationship quality and well-being. The results of these analyses suggested that personality largely did not moderate the effects of the number of pets and well-being (2 out of 56 possible moderation tests were significant; 3.57%), pet species and well-being (11 out of 168 possible moderation tests were significant; 6.55%), and pet relationship quality and well-being (2 out of 56 possible moderation tests were significant; 3.57%). These exploratory results suggest that the associations between well-being outcomes and number of pets, pet relationship quality, and pet species are largely not moderated by personality. This is especially true when applying a conservative alpha-level correction or using the *p*-values (many of which are close to $p = .05$—the alpha criterion for the current study) as diagnostic criteria for the evidence of moderation.[6]

Discussion

The current study examined the prospective effect of pet ownership on well-being in a sample of adults assessed three times during the early weeks of the COVID-19 pandemic. As in previous research, people reported both benefits and costs of pet ownership in their open-ended responses (with benefits being mentioned more often than costs). Similar to some previous research, we did not find a reliable association between pet ownership and well-being (Fraser et al., 2020; Herzog, 2011, 2022). By considering pet and owner characteristics, we could shed light on the specific context in which pet ownership is associated with well-being. Specifically, beyond measuring whether someone owns at least one pet, we also examined the number of pets owned, the species of pets owned, the relationship quality owners felt about their pets, and owners' individual difference characteristics. Unfortunately, these analyses did not provide a straightforward account of when and how pets were associated with well-being—essentially, these variables (either modeled as main effects or moderators) were largely unassociated with well-being. The current study is innovative in that it considered many additional factors predicting the association between pet ownership and well-being (operationalized in many ways) over time. Ultimately, our findings are consistent with a large body of research showing null associations of pet ownership on well-being (quantitatively) but positive reports of pet ownership (qualitatively).

Pets and Well-Being During the COVID-19 Pandemic

One relatively robust effect we found in the current study is that people *think* their pets benefited their lives and well-being during the COVID-19 pandemic. When asked why their pets were helpful or not during the pandemic, participants readily offered a slew of benefits. The most common reasons involved providing emotional balance (e.g., through inducing positive emotions and displays of affection) or through what might be considered distraction from or coping with the stressors of the pandemic (e.g., companionship, exercise, entertainment). Costs were mentioned at a much lower rate. These responses are consistent with previous research in that people can provide both positive and negative aspects about pet ownership, but there is an asymmetry in which people mention more—and a wider variety of—positive aspects (Hui Gan et al., 2020; Podberscek, 2006; Shoesmith et al., 2021; Wells, 2009). It is also consistent with a recent report commissioned by the Human Animal Bond Research Institute (HABRI, 2021) showing that 87% of pet owners say they experienced mental health benefits from owning a pet, which increased from 76% in 2016.

However, when examining whether pet ownership was associated with greater well-being during the pandemic, we mostly found small (and more often non-significant) effects in our quantitative analyses. The few significant effects that were found were often seen only among a few indicators and mostly not any others. Some of the effects were confounded with (i.e., became non-significant after controlling for) owners' individual difference characteristics (see Note 5). Given the large number of tests, small effect sizes, and *p*-values bordering the significance threshold (Benjamin et al., 2018), our overall interpretation of the quantitative analyses is that pet ownership is not robustly associated with well-being during the COVID-19 pandemic, regardless of the species of pet owned, how many pets are owned, how happy people are with their relationship with the pet, and the owners' individual difference characteristics, at least in this particular sample.

How could people be so positive about pet ownership (in the qualitative analyses) despite pet ownership being largely unassociated with well-being (in the quantitative analyses)? There are at least two reasons for this discrepancy. First, examining pet ownership, in isolation from other factors, is an imperfect test of examining the contributors to well-being during the pandemic. It is likely that non-pet owners have other things in their lives from which they derive well-being. It is also likely that pet owners have other things in their lives that compromise well-being. On average, the confluence of all these factors may overpower the effects of pet ownership on well-being. For example, some evidence suggests that people may use pets to supplement the few or problematic human relationships in their lives; having so few or problematic human relationships might compromise their well-being (Luhmann & Kalitzki, 2018). In other words, pet owners may derive well-being benefits from their pets; non-pet owners may derive well-being benefits from other sources (e.g., human friends, work, hobbies, entertainment). Unfortunately, we did not ask non-pet owners (or pet owners) about other things in their lives that may have been helpful in navigating the pandemic. Future research should take a more holistic approach to consider the sources of well-being for pet owners and non-pet owners during potentially difficult times.

Second, there may be a *methodological* reason why many studies (including ours) find few quantitative links between pet ownership. For example, using a binary variable (yes vs no; see the "Limitations and Future Directions" section) to model the effects of pet ownership on well-being assessed every two weeks might be missing the important momentary interactions people have with their pets. Assessing well-being in a relatively decontextualized way every two weeks might catch participants with other things on their minds that affect evaluations of well-being (Schwarz & Strack, 1999), such as rising COVID-19 case numbers or updates on lockdown restrictions. Likewise, there is some evidence to suggest that measuring both pet interactions and well-being more deliberately may reveal that associations depend on the type of outcomes people are interested in (i.e., hedonic vs eudaimonic well-being; Barcelos et al., 2021). Thus, interacting with a pet may be associated with greater well-being in the moments of interaction (or shortly afterward), but may not be captured when assessed at one time point (as most previous research) or longitudinally (as in this study). This proposition is consistent with experiments in which participants are randomly assigned to interact with an animal (often a dog), and gains in emotional well-being are seen shortly thereafter (e.g., Crossman et al., 2015). Positive emotions following the interaction were highest among past or current pet owners, suggesting that pet owners benefit more from interacting with a pet in the moment. Unfortunately, only a few time use and daily diary studies examining pet ownership exist that more consistently link pet ownership with human functioning over time (Janssens et al., 2020; Kalenkoski & Korankye, 2022), with most of them focusing on physical activity (Dall et al., 2017; Koohsari et al., 2020). Future research can more deliberately examine how pet interactions are associated with well-being at different time scales (e.g., when a positive interaction is happening).

Why Didn't Pet and Owner Characteristics Predict Well-Being?

We did a relatively thorough test of the boundary conditions that might modify or explain potential associations between pet ownership and well-being during the COVID-19 pandemic. Because there was no significant effect of pet ownership on well-being (in the whole sample), modeling variation in this non-significant effect was less fruitful than we hoped. It isn't easy to generate many convincing reasons beyond those above for why the pet and owner characteristics were not associated with well-being. For example, more pets might be a blessing for some participants and a burden for others (resulting in a null association on average). Many different pet species can provide companionship, with some being easier to manage (e.g., cats) than others (e.g., giraffes), resulting in a null association. Pet relationship quality also has varied effects—people often listed concerns about their pets as one of the ostensible "costs" of pet ownership. These concerns might have been highest among those with very close relationships with their pets (balancing out the benefits of a very close relationship with their pets). Finally, owner characteristics mostly did not moderate the effects of pet ownership on well-being. Although personality and attachment orientations are robustly associated with different indices of well-being (Candel & Turliuc, 2019; Chopik & Lucas, 2019; Hudson et al., 2020), they did not predict well-being more or less so among pet owners. Like with the aforementioned variables, there could be heterogeneity that we are missing, resulting in a non-significant association. For example, for some people high in neuroticism, a pet could provide a way to cope with pandemic stressors. For other highly neurotic people, a pet could be an additional stressor. Our study suggests that, for both personality and attachment orientations, the association between pet ownership and well-being did not vary based on owners' individual difference characteristics.

Limitations and Future Directions

The current study had many strengths. In a pre-registered analysis, we captured longitudinal changes in people's well-being during the acute phase of the COVID-19 pandemic. We assessed well-being in eight different ways and also analyzed participants' open-ended reflections on pet ownership. We also considered additional pet and owner characteristics beyond what previous research has considered to date.

Nevertheless, there are some limitations that are worth mentioning. First, our study examined whether pet ownership at one fixed point in time was associated with higher well-being during the COVID-19 pandemic. Although this

was a useful approach for descriptive purposes, there are other ways to answer this question. For example, does people's well-being change after they adopt a new pet (see Powell et al., 2019 for some preliminary evidence that the effects may depend on socioeconomic status)? Whether or not adopting a pet during the pandemic, which many did (Garcia, 2020), is associated with increased well-being is a relatively open question. However, research on pet ownership outside the context of the pandemic suggests that adopting a companion animal has little impact on feelings of loneliness (Gilbey et al., 2007). Other researchers suggest that a hedonic adaptation occurs, such that the initial pet adoption may boost well-being before the owner's well-being returns to pre-adoption levels, revealing mostly null associations in the literature (Bao & Schreer, 2016). Perhaps a more promising future direction would be to employ more in situ methods, such as daily diary (i.e., momentary) methods or mobile sensing, to capitalize on the promising literature that interactions with animals are associated with boosts in well-being (P. C. Bennett et al., 2015; Crossman et al., 2015; Dall et al., 2017; Janssens et al., 2020; Kalenkoski & Korankye, 2022; Koohsari et al., 2020). Some experimental work suggests that the presence of pets might mitigate the negative effects of rejection on negativity (McConnell et al., 2011). In this same study, the authors found that pet ownership might enhance well-being when they fulfill particular social needs and complemented human-based social support. Future research can tackle this question through multiple methods and broaden our study's approach to examine the impact of pet ownership on well-being.

Second, our measures could have been better. The data for this study came from a COVID-19 study that required a quick mobilization of resources and coordination (Balzarini et al., 2022). As a result, only a few items about pet ownership, at one wave, were included in data collection. The few items related to pet ownership (i.e., species of pet, number of pets, the open-ended item) contained more information than many studies that tested this question. The short-form measures were employed to reduce participant fatigue. It would have been beneficial to have an extended version of pet relationship quality or attachment (T. P. Johnson et al., 1992; Zilcha-Mano et al., 2011), although even studies using established measures find heterogeneous effects (Scoresby et al., 2021). Nevertheless, more details about the pets and ownership history would have been useful to collect. Particularly relevant to the current study is knowing whether the pet was adopted during the pandemic or before (and how long ago) and how people felt toward each pet (among those with multiple pets). Furthermore, not all pets (even within pet species) are the same; there is considerable variability in the dispositions of pets, which has implications for owners' evaluations of their relationships and their well-being (Chopik & Weaver, 2019).

Conclusion

In closure, despite qualitative suggestions otherwise, pet ownership was not reliably associated with well-being, both cross-sectionally and longitudinally, during the early parts of the COVID-19 pandemic. We found that these small and mostly non-significant associations were seen regardless of the number of pets a person owns, the pet species they own, their relationship quality with that pet, or owners' psychological characteristics. We provided several reasons for why pet ownership might not be reliably associated with well-being, ranging from substantive (e.g., there are other things in people's lives, pet ownership comes with benefits and costs) to methodological (e.g., that experience sampling and experimental methods might capture temporary well-being boosts of animal interaction) approach. Future research can more deliberately sample pet and owner characteristics, operationalize pet interactions, and move toward an expanded understanding of what predicted well-being during the COVID-19 pandemic.

Authors' Note

WJC and RBS conceptualized the idea. RB, GZ, and RBS collected the data. WJC analyzed the quantitative data, interpreted the results, and drafted the manuscript. JO and RW analyzed the qualitative data. JO, RW, JRW, RB, GZ, and RBS provided critical feedback. All authors aided in the pre-registration and approve the content of this paper. The authors thank Ayushi Patel for helping with the literature review.

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Supplemental Material

Supplemental material is available online with this article.

Notes

1. In an exploratory (and post-registration) test, we examined whether any of these qualitative codes were associated with our omnibus measure of well-being. The only effect that emerged was that listed "coping" as a benefit of pets during the pandemic was associated with lower well-being ($r = -.20$, $p = .005$). This makes sense given that the code assumes that people have stress or poor well-being in their lives and need a pet to serve this function. Nevertheless, because of the large number of tests and

the low mention of many of the codes, we caution readers to not place too much importance on this finding.

2. After pre-registering and the initial data analysis, a coauthor wondered whether controlling for financial strain might account for the null associations found for pet ownership. We found that, although financial stress was often associated with lower well-being, the effects reported here were the same in this exploratory analysis and using two different measures of financial status (i.e., "How would you describe the money situation in your household right now" [1 = comfortable, 4 = cannot make ends meet] and "To what extent has the recent COVID-19 outbreak negatively impacted your financial situation?" [1 = not at all, 5 = extremely]).
3. After pre-registering and the initial data analysis, a coauthor wondered whether the association between the number of pets owned and negative affect would persist controlling for neuroticism (i.e., that the effect might be attributable to these participants being low in emotional stability). It looks like the effect was not attributable to variation in neuroticism and was of similar size after controlling for it ($r = 0.10$, $p = .027$).
4. After pre-registering and the initial data analysis, the same coauthor from Note 2 suggested that this effect might also be attributable to financial strain or people working from home. Controlling for financial strain (see Note 2) and whether participants were working from home did not change this result.
5. After pre-registering and the initial data analysis, the same coauthor from Note 3 wondered whether the positive associations between dog ownership and these four well-being outcomes persisted after controlling for the individual difference characteristics. Indeed, the effects of dog ownership on life satisfaction ($p = .192$), purpose ($p = .101$), and positive affect ($p = .064$) became non-significant after the inclusion of individual difference characteristics. However, owning a dog was still associated with lower depression ($r = -0.10$, $p = .012$). This suggests that at least some of the positive effects of owning a dog on well-being might be attributable to people with different personalities (which are also associated with higher well-being) being more likely to own dogs (although larger studies than ours have occasionally found this; Fraser et al., 2020).
6. The few exceptions in which individual difference characteristics moderated these associations can be found in Supplemental Table 10. For people high in openness to experience, owning a dog was particularly associated with higher purpose in life, positive affect, and overall well-being. Among people high in conscientiousness, owning a dog was associated with lower loneliness and depression. However, for people low in extraversion (i.e., introverts) or those low in conscientiousness, owning a dog was associated with higher levels of stress. For people low in extraversion (i.e., introverts), owning a cat was associated with less negative affect. Owning an "other" pet was associated with more negative affect among people high in extraversion or agreeableness. Finally, among those high in openness, reporting higher relationship quality was associated with more stress. The remaining moderation effects had simple slopes that were not significantly different from zero. Altogether, among the very few significant moderation effects, it appears that owning a dog was associated with higher well-being among those high in openness and conscientiousness, although these effects were only seen among some outcomes.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.

Albright, A. E., Cui, R., & Allen, R. S. (2022). Pet ownership and mental and physical health in older White and Black males and females. *International Journal of Environmental Research and Public Health*, *19*(9), 5655.

Allen, K. (2003). Are pets a healthy pleasure? The influence of pets on blood pressure. *Current Directions in Psychological Science*, *12*(6), 236–239.

Amiot, C. E., Gagné, C., & Bastian, B. (2022). Pet ownership and psychological well-being during the COVID-19 pandemic. *Scientific Reports*, *12*(1), 1–14.

Applebaum, J. W., Ellison, C., Struckmeyer, L., Zsembik, B. A., & McDonald, S. E. (2021). The impact of pets on everyday life for older adults during the COVID-19 pandemic. *Frontiers in Public Health*, *9*, 652610. https://doi.org/10.3389/fpubh.2021.652610

Applebaum, J. W., Tomlinson, C. A., Matijczak, A., McDonald, S. E., & Zsembik, B. A. (2020). The concerns, difficulties, and stressors of caring for pets during COVID-19: Results from a large survey of U.S. pet owners. *Animals*, *10*(10), 1882. https://www.mdpi.com/2076-2615/10/10/1882

Aschwanden, C. (2014, December 15). Getting a dog? A pet might improve your health. *The Washington Post*. https://www.washingtonpost.com/national/health-science/getting-a-dog-a-pet-might-improve-your-health/2014/12/12/5e00cebe-7f27-11e4-9f38-95a187e4c1f7_story.html

Baird, B. M., Lucas, R. E., & Donnellan, M. B. (2010). Life satisfaction across the lifespan: Findings from two nationally representative panel studies. *Social Indicators Research*, *99*(2), 183–203. https://doi.org/10.1007/s11205-010-9584-9

Balzarini, R. N., Muise, A., Zoppolat, G., Di Bartolomeo, A. A., Rodrigues, D. L., Alonso-Ferres, M., Urganci, B., Debrot, A., Pichayayothin, N., Dharma, C., Chi, P., Karremans, J. C., Schoebi, D., & Slatcher, R. B. (2022). Love in the time of COVID: Perceived partner responsiveness buffers people from lower relationship quality associated with COVID-related stressors. *Social Psychological and Personality Science*, *14*(3), 342–355.

Bao, K. J., & Schreer, G. (2016). Pets and happiness: Examining the association between pet ownership and wellbeing. *Anthrozoös*, *29*(2), 283–296.

Barcelos, A. M., Kargas, N., Maltby, J., Hall, S., Assheton, P., & Mills, D. S. (2021). Theoretical foundations to the impact of dog-related activities on human hedonic well-being, life satisfaction and eudaimonic well-being. *International Journal of Environmental Research and Public Health*, *18*(23), 12382.

Barcelos, A. M., Kargas, N., Maltby, J., Hall, S., & Mills, D. S. (2020). A framework for understanding how activities associated with dog ownership relate to human well-being. *Scientific Reports*, *10*(1), 11363. https://doi.org/10.1038/s41598-020-68446-9

Barklam, E. B., & Felisberti, F. M. (2022). Pet ownership and wellbeing during the COVID-19 pandemic: The importance of resilience and attachment to pets. *Anthrozoös*, *36*(2), 215–236. https://doi.org/10.1080/08927936.2022.2101248

Batz-Barbarich, C., Tay, L., Kuykendall, L., & Cheung, H. K. (2018). A meta-analysis of gender differences in subjective

well-being: Estimating effect sizes and associations with gender inequality. *Psychological Science*, *29*(9), 1491–1503.

Bauer, A., & Woodward, L. (2007). People and their pets: A relational perspective on interpersonal complementarity and attachment in companion animal owners. *Society & Animals*, *15*(2), 169–189.

Becker, M., & Morton, D. (2003). *The healing power of pets: Harnessing the amazing ability of pets to make and keep people happy and healthy*. Hyperion Books.

Benjamin, D. J., Berger, J. O., Johannesson, M., Nosek, B. A., Wagenmakers, E. J., Berk, R., Bollen, K. A., Brembs, B., Brown, L., Camerer, C., Cesarini, D., Chambers, C. D., Clyde, M., Cook, T. D., De Boeck, P., Dienes, Z., Dreber, A., Easwaran, K., Efferson, C., . . . Johnson, V. E. (2018). Redefine statistical significance. *Nature Human Behaviour*, *2*(1), 6–10. https://doi.org/10.1038/s41562-017-0189-z

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society: Series B (Methodological)*, *57*(1), 289–300.

Bennett, B., Cosh, S., Thepsourinthone, J., & Lykins, A. (2022). A mixed-methods assessment of human well-being related to the presence of companion animals during the COVID-19 pandemic. *People and Animals: The International Journal of Research and Practice*, *5*(1), Article 5.

Bennett, P. C., Trigg, J. L., Godber, T., & Brown, C. (2015). An experience sampling approach to investigating associations between pet presence and indicators of psychological wellbeing and mood in older Australians. *Anthrozoös*, *28*(3), 403–420.

Candel, O.-S., & Turliuc, M. N. (2019). Insecure attachment and relationship satisfaction: A meta-analysis of actor and partner associations. *Personality and Individual Differences*, *147*, 190–199.

Carr, D., Friedmann, E., Gee, N. R., Gilchrist, C., Sachs-Ericsson, N., & Koodaly, L. (2021). Dog walking and the social impact of the COVID-19 pandemic on loneliness in older adults. *Animals*, *11*(7), 1852. https://www.mdpi.com/2076-2615/11/7/1852

Cassidy, J., & Shaver, P. R. (2008). *Handbook of attachment: Theory, research, and clinical applications* (2nd ed.). The Guilford Press.

Chopik, W. J., & Lucas, R. E. (2019). Actor, partner, and similarity effects of personality on global and experienced well-being. *Journal of Research in Personality*, *78*, 249–261.

Chopik, W. J., & Weaver, J. R. (2019). Old dog, new tricks: Age differences in dog personality traits, associations with human personality traits, and links to important outcomes. *Journal of Research in Personality*, *79*, 94–108. https://doi.org/10.1016/j.jrp.2019.01.005

Clements, H., Valentin, S., Jenkins, N., Rankin, J., Gee, N. R., Snellgrove, D., & Sloman, K. A. (2021). Companion animal type and level of engagement matter: A mixed-methods study examining links between companion animal guardianship, loneliness and well-being during the COVID-19 pandemic. *Animals*, *11*(8), 2349.

Coy, A. E., & Green, J. D. (2018). Treating pets well: The role of attachment anxiety and avoidance. *Human-Animal Interaction Bulletin*, *6*, 14–31.

Crossman, M. K., Kazdin, A. E., & Knudson, K. (2015). Brief unstructured interaction with a dog reduces distress. *Anthrozoös*, *28*(4), 649–659. https://doi.org/10.1080/08927936.2015.1070008

Crowell, J. A., Fraley, R. C., & Shaver, P. R. (2008). Measurement of individual differences in adolescent and adult attachment. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (2nd ed., pp. 599–634). The Guilford Press.

Dall, P. M., Ellis, S. L. H., Ellis, B. M., Grant, P. M., Colyer, A., Gee, N. R., Granat, M. H., & Mills, D. S. (2017). The influence of dog ownership on objective measures of free-living physical activity and sedentary behaviour in community-dwelling older adults: A longitudinal case-controlled study. *BMC Public Health*, *17*(1), 496. https://doi.org/10.1186/s12889-017-4422-5

Damberg, S., & Frömbling, L. (2022). "Furry tales": Pet ownership's influence on subjective well-being during COVID-19 times. *Quality & Quantity*, *56*(5), 3645–3664. https://doi.org/10.1007/s11135-021-01303-7

de Albuquerque, N. S., Costa, D. B., Rodrigues, G. d. R., Sessegolo, N. S., Machado, J. S., Rossi, T., Moret-Tatay, C., & Irigaray, T. Q. (2022). Personality traits of Brazilian pet owners and nonowners and their association with attachment to pets. *Anthrozoös*, *36*(2), 295–305. https://doi.org/10.1080/08927936.2022.2121046

Denis-Robichaud, J., Aenishaenslin, C., Richard, L., Desmarchelier, M., & Carabin, H. (2022). Association between pet ownership and mental health and well-being of Canadians assessed in a cross-sectional study during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, *19*(4), 2215. https://www.mdpi.com/1660-4601/19/4/2215

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*(1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13

Edelson, J., & Lester, D. (1983). Personality and pet ownership: A preliminary study. *Psychological Reports*, *53*(3, Pt 1), 990.

El-Alayli, A., Lystad, A. L., Webb, S. R., Hollingsworth, S. L., & Ciolli, J. L. (2006). Reigning cats and dogs: A pet-enhancement bias and its link to pet attachment, pet-self similarity, self-enhancement, and well-being. *Basic and Applied Social Psychology*, *28*(2), 131–143.

Enmarker, I., Hellzén, O., Ekker, K., & Berg, A.-G. T. (2015). Depression in older cat and dog owners: The Nord-Trøndelag Health Study (HUNT)-3. *Aging & Mental Health*, *19*(4), 347–352. https://doi.org/10.1080/13607863.2014.933310

Falck, R. S., Liu-Ambrose, T., Noseworthy, M., Kirkland, S., Griffith, L. E., Basta, N. E., McMillan, J. M., & Raina, P. (2022). Can "Rover" help with mental health during the COVID-19 pandemic? Results from the Canadian Longitudinal Study on Aging (CLSA). *Frontiers in Psychiatry*, *13*, 961067.

Fraley, R. C., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The experiences in close relationships—Relationship Structures Questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment*, *23*(3), 615–625.

Fraser, G., Huang, Y., Robinson, K., Wilson, M. S., Bulbulia, J., & Sibley, C. G. (2020). New Zealand pet owners' demographic characteristics, personality, and health and wellbeing: More than just a fluff piece. *Anthrozoös*, *33*(4), 561–578.

Friedmann, E., Katcher, A. H., Lynch, J. J., & Thomas, S. A. (1980). Animal companions and one-year survival of patients

after discharge from a coronary care unit. *Public Health Reports*, *95*(4), 307–312.

Fritz, C. L., Farver, T. B., Kass, P. H., & Hart, L. A. (1995). Association with companion animals and the expression of noncognitive symptoms in Alzheimer's patients. *The Journal of Nervous and Mental Disease*, *183*(7), 459–463.

Garcia, S. E. (2020, March 19). Foster pets are finding homes with quarantined Americans. *The New York Times*. https://www.nytimes.com/2020/03/19/us/coronavirus-foster-pets.html

Gasteiger, N., Vedhara, K., Massey, A., Jia, R., Ayling, K., Chalder, T., Coupland, C., & Broadbent, E. (2021). Depression, anxiety and stress during the COVID-19 pandemic: Results from a New Zealand cohort study on mental well-being. *BMJ Open*, *11*(5), e045325.

Giansanti, D., Siotto, M., Parisi, L., & Aprile, I. (2022). Pet presence can reduce anxiety in the elderly: The Italian experience during COVID-19 lockdown assessed by an electronic survey. *International Journal of Environmental Research and Public Health*, *19*(10), 6135.

Gilbey, A., McNicholas, J., & Collis, G. M. (2007). A longitudinal test of the belief that companion animal ownership can help reduce loneliness. *Anthrozoös*, *20*(4), 345–353.

Gosling, S. D., & Bonnenburg, A. V. (1998). An integrative approach to personality research in anthrozoology: Ratings of six species of pets and their owners. *Anthrozoös*, *11*(3), 148–156.

Gosling, S. D., Sandy, C. J., & Potter, J. (2010). Personalities of self-identified "dog people" and "cat people." *Anthrozoös*, *23*(3), 213–222.

Grajfoner, D., Ke, G. N., & Wong, R. M. M. (2021). The effect of pets on human mental health and wellbeing during COVID-19 lockdown in Malaysia. *Animals*, *11*(9), 2689. https://www.mdpi.com/2076-2615/11/9/2689

Green, J. D., Coy, A. E., & Mathews, M. A. (2018). Attachment anxiety and avoidance influence pet choice and pet-directed behaviors. *Anthrozoös*, *31*(4), 475–494. https://doi.org/10.1080/08927936.2018.1482117

Guastello, A. D., Guastello, D. D., & Guastello, S. J. (2017). *Personality differences between dog people and cat people* (Vol. 2017). CABI International.

HABRI. (2021). *HABRI benchmark survey of U.S. pet owners*. https://habri.org/pet-owners-survey/#2021-survey

Hall, D., & Duke, G. (2021). Therapy dog effects on nursing student stress: A mixed methods study. *Nurse Educator*, *46*(4), E70–E74.

Headey, B. (1999). Health benefits and health cost savings due to pets: Preliminary estimates from an Australian national survey. *Social Indicators Research*, *47*(2), 233–243.

Herzog, H. (2011). The impact of pets on human health and psychological well-being: Fact, fiction, or hypothesis? *Current Directions in Psychological Science*, *20*(4), 236–239. https://doi.org/10.1177/0963721411415220

Herzog, H. (2022, May 27). What you didn't know about having a pandemic pet. *Psychology Today*. https://www.psychologytoday.com/us/blog/animals-and-us/202205/what-you-didnt-know-about-having-a-pandemic-pet

Hudson, N. W., Anusic, I., Lucas, R. E., & Donnellan, M. B. (2020). Comparing the reliability and validity of global self-report measures of subjective well-being with experiential day reconstruction measures. *Assessment*, *27*(1), 102–116. https://doi.org/10.1177/1073191117744660

Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging*, *26*(6), 655–672. https://doi.org/10.1177/0164027504268574

Hui Gan, G. Z., Hill, A.-M., Yeung, P., Keesing, S., & Netto, J. A. (2020). Pet ownership and its influence on mental health in older adults. *Aging & Mental Health*, *24*(10), 1605–1612.

Islam, A., & Towell, T. (2013). Cat and dog companionship and well-being: A systematic review. *International Journal of Applied Psychology*, *3*(6), 149–155.

Ivanski, C., Lo, R. F., & Mar, R. A. (2021). Pets and politics: Do liberals and conservatives differ in their preferences for cats versus dogs? *Collabra: Psychology*, *7*(1), 28391.

Janssens, M., Eshuis, J., Peeters, S., Lataster, J., Reijnders, J., Enders-Slegers, M.-J., & Jacobs, N. (2020). The pet-effect in daily life: An experience sampling study on emotional wellbeing in pet owners. *Anthrozoös*, *33*(4), 579–588.

Jessen, J., Cardiello, F., & Baun, M. M. (1996). Avian companionship in alleviation of depression, loneliness, and low morale of older adults in skilled rehabilitation units. *Psychological Reports*, *78*(1), 339–348.

Jiang, Y., Zilioli, S., Balzarini, R. N., Zoppolat, G., & Slatcher, R. B. (2022). Education, financial stress, and trajectory of mental health during the COVID-19 pandemic. *Clinical Psychological Science*, *10*(4), 662–674.

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (pp. 102–138). The Guilford Press.

Johnson, S. B., & Rule, W. R. (1991). Personality characteristics and self-esteem in pet owners and non-owners. *International Journal of Psychology*, *26*(2), 241–252.

Johnson, T. P., Garrity, T. F., & Stallones, L. (1992). Psychometric evaluation of the Lexington attachment to pets scale (LAPS). *Anthrozoös*, *5*(3), 160–175.

Kalenkoski, C. M., & Korankye, T. (2022). Enriching lives: How spending time with pets is related to the experiential well-being of older Americans. *Applied Research in Quality of Life*, *17*(2), 489–510.

Kidd, A. H., & Kidds, R. M. (1980). Personality characteristics and preferences in pet ownership. *Psychological Reports*, *46*(3), 939–949.

Kim, J., & Chun, B. C. (2021). Association between companion animal ownership and overall life satisfaction in Seoul, Korea. *PLOS ONE*, *16*(9), e0258034. https://doi.org/10.1371/journal.pone.0258034

Kogan, L. R., Currin-McCulloch, J., Bussolari, C., Packman, W., & Erdman, P. (2021). The psychosocial influence of companion animals on positive and negative affect during the COVID-19 pandemic. *Animals*, *11*(7), 2084. https://www.mdpi.com/2076-2615/11/7/2084

Koivusilta, L. K., & Ojanlatva, A. (2006). To have or not to have a pet for better health? *PLOS ONE*, *1*(1), e109

Konok, V., Kosztolányi, A., Rainer, W., Mutschler, B., Halsband, U., & Miklósi, Á. (2015). Influence of owners' attachment style and personality on their dogs' (*Canis familiaris*) separation-related

disorder. *PLOS ONE*, *10*(2), e0118375. https://doi.org/10.1371/journal.pone.0118375

Koohsari, M. J., Shibata, A., Ishii, K., Kurosawa, S., Yasunaga, A., Hanibuchi, T., Nakaya, T., McCormack, G. R., & Oka, K. (2020). Dog ownership and adults' objectively-assessed sedentary behaviour and physical activity. *Scientific Reports*, *10*(1), 17487. https://doi.org/10.1038/s41598-020-74365-6

Kretzler, B., König, H.-H., & Hajek, A. (2022). Pet ownership, loneliness, and social isolation: A systematic review. *Social Psychiatry and Psychiatric Epidemiology*, *57*(10), 1935–1957. https://doi.org/10.1007/s00127-022-02332-9

Krouzecky, C., Aden, J., Hametner, K., Klaps, A., Kovacovsky, Z., & Stetina, B. U. (2022). Fantastic beasts and why it is necessary to understand our relationship—Animal companionship under challenging circumstances using the example of long-COVID. *Animals*, *12*(15), 1892.

Kuehne, J., Lieu, J., Kotera, Y., & Taylor, E. (2022). Pets' impact on peoples well-being in COVID-19: A quantitative study. *Journal of Concurrent Disorders*. https://doi.org/10.54127/FABB9024

Lades, L. K., Laffan, K., Daly, M., & Delaney, L. (2020). Daily emotional well-being during the COVID-19 pandemic. *British Journal of Health Psychology*, *25*(4), 902–911. https://doi.org/10.1111/bjhp.12450

Law, M., Gasteiger, N., Vedhara, K., Massey, A., Jia, R., Ayling, K., Chalder, T., Coupland, C., & Broadbent, E. (2022). Risk factors and changes in depression and anxiety over time in New Zealand during COVID-19: A longitudinal cohort study. *Psych*, *4*(4), 706–716.

Lima, M., Mateus, T. L., & Silva, K. (2022). With or without you: Beneficial and detrimental associations between companion dogs and human psychological adjustment during a COVID-19 lockdown phase. *Anthrozoös*, *35*(5), 713–732.

Löwe, B., Wahl, I., Rose, M., Spitzer, C., Glaesmer, H., Wingenfeld, K., Schneider, A., & Brähler, E. (2010). A 4-item measure of depression and anxiety: Validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. *Journal of Affective Disorders*, *122*(1–2), 86–95. https://doi.org/10.1016/j.jad.2009.06.019

Luhmann, M., & Kalitzki, A. (2018). How animals contribute to subjective well-being: A comprehensive model of protective and risk factors. *The Journal of Positive Psychology*, *13*(2), 200–214.

Marsa-Sambola, F., Williams, J., Muldoon, J., Lawrence, A., Connor, M., & Currie, C. (2017). Quality of life and adolescents' communication with their significant others (mother, father, and best friend): The mediating effect of attachment to pets. *Attachment & Human Development*, *19*(3), 278–297. https://doi.org/10.1080/14616734.2017.1293702

Martin, F., Bachert, K. E., Snow, L., Tu, H.-W., Belahbib, J., & Lyn, S. A. (2021). Depression, anxiety, and happiness in dog owners and potential dog owners during the COVID-19 pandemic in the United States. *PLOS ONE*, *16*(12), e0260676. https://doi.org/10.1371/journal.pone.0260676

Martinez, R. L., & Kidd, A. H. (1980). Two personality characteristics in adult pet-owners and non-owners. *Psychological Reports*, *47*(1), 318.

Martinez-Caja, A. M., De Herdt, V., Enders-Slegers, M.-J., & Moons, C. P. H. (2022). Pet ownership, feelings of loneliness, and mood in people affected by the first COVID-19 lockdown. *Journal of Veterinary Behavior*, *57*, 52–63.

McConnell, A. R., Brown, C. M., Shoda, T. M., Stayton, L. E., & Martin, C. E. (2011). Friends with benefits: On the positive consequences of pet ownership. *Journal of Personality and Social Psychology*, *101*(6), 1239–1252.

McDonald, S. E., O'connor, K. E., Matijczak, A., Tomlinson, C. A., Applebaum, J. W., Murphy, J. L., & Zsembik, B. A. (2021). Attachment to pets moderates transitions in latent patterns of mental health following the onset of the COVID-19 pandemic: Results of a survey of US adults. *Animals*, *11*(3), 895.

Meier, C., & Maurer, J. (2022). Buddy or burden? Patterns, perceptions, and experiences of pet ownership among older adults in Switzerland. *European Journal of Ageing*, *19*(4), 1201–1212. https://doi.org/10.1007/s10433-022-00696-0

Mikulincer, M., & Shaver, P. R. (2017). *Attachment in adulthood: Structure, dynamics, and change*. The Guilford Press.

Miltiades, H., & Shearer, J. (2011). Attachment to pet dogs and depression in rural older adults. *Anthrozoös*, *24*(2), 147–154.

Morgan, D. L. (1993). Qualitative content analysis: A guide to paths not taken. *Qualitative Health Research*, *3*(1), 112–121. https://doi.org/10.1177/104973239300300107

Mueller, M. K., King, E. K., Halbreich, E. D., & Callina, K. S. (2022). Companion animals and adolescent stress and adaptive coping during the COVID-19 pandemic. *Anthrozoös*, *35*(5), 693–712.

Mueller, M. K., Richer, A. M., Callina, K. S., & Charmaraman, L. (2021). Companion animal relationships and adolescent loneliness during COVID-19. *Animals*, *11*(3), 885.

Müllersdorf, M., Granström, F., Sahlqvist, L., & Tillgren, P. (2010). Aspects of health, physical/leisure activities, work and socio-demographics associated with pet ownership in Sweden. *Scandinavian Journal of Public Health*, *38*(1), 53–63.

O'Haire, M. E., McKenzie, S. J., Beck, A. M., & Slaughter, V. (2015). Animals may act as social buffers: Skin conductance arousal in children with autism spectrum disorder in a social context. *Developmental Psychobiology*, *57*(5), 584–595.

Oliva, J. L., & Johnston, K. L. (2021). Puppy love in the time of Corona: Dog ownership protects against loneliness for those living alone during the COVID-19 lockdown. *International Journal of Social Psychiatry*, *67*(3), 232–242. https://doi.org/10.1177/0020764020944195

Packer, R. M. A., O'Neill, D. G., Fletcher, F., & Farnworth, M. J. (2020). Come for the looks, stay for the personality? A mixed methods investigation of reacquisition and owner recommendation of Bulldogs, French Bulldogs and Pugs. *PLOS ONE*, *15*(8), e0237276. https://doi.org/10.1371/journal.pone.0237276

Parslow, R. A., Jorm, A. F., Christensen, H., Rodgers, B., & Jacomb, P. (2005). Pet ownership and health in older adults: Findings from a survey of 2,551 community-based Australians aged 60–64. *Gerontology*, *51*(1), 40–47.

Peacock, M., Netto, J., Yeung, P., McVeigh, J., & Hill, A.-M. (2020). Understanding the relationship between pet ownership and physical activity among older community-dwelling adults—A mixed methods study. *Journal of Aging and Physical Activity*, *28*(1), 131–139. https://doi.org/10.1123/japa.2019-0056

Pereira, M., Lourenco, A., Lima, M., Serpell, J., & Silva, K. (2021). Evaluation of mediating and moderating effects on the relationship between owners' and dogs' anxiety: A tool to understand a

complex problem. *Journal of Veterinary Behavior*, *44*, 55–61. https://doi.org/10.1016/j.jveb.2021.03.004

Perrine, R. M., & Osbourne, H. L. (1998). Personality characteristics of dog and cat persons. *Anthrozoös*, *11*(1), 33–40.

Phillipou, A., Tan, E. J., Toh, W. L., Van Rheenen, T. E., Meyer, D., Neill, E., Sumner, P. J., & Rossell, S. L. (2021). Pet ownership and mental health during COVID-19 lockdown. *Australian Veterinary Journal*, *99*(10), 423–426. https://doi.org/10.1111/avj.13102

Pinquart, M., & Sörensen, S. (2000). Influences of socioeconomic status, social network, and competence on subjective well-being in later life: A meta-analysis. *Psychology and Aging*, *15*(2), 187–224.

Podberscek, A. (2006). Positive and negative aspects of our relationship with companion animals. *Veterinary Research Communications*, *30*, 21–27.

Podberscek, A., & Gosling, S. D. (2000). Personality research on pets and their owners: Conceptual issues and review. In A. Podberscek, E. S. Paul, & J. A. Serpell (Eds.), *Companion animals and us: Exploring the relationships between people and pets* (pp. 143–167). Cambridge University Press.

Powell, L., Edwards, K. M., McGreevy, P., Bauman, A., Podberscek, A., Neilly, B., Sherrington, C., & Stamatakis, E. (2019). Companion dog acquisition and mental well-being: A community-based three-arm controlled study. *BMC Public Health*, *19*, 1–10.

Puskey, J. L., & Coy, A. E. (2020). Exploring the effects of pet preference, presence, and personality on depression symptoms. *Anthrozoös*, *33*(5), 643–657. https://doi.org/10.1080/08927936.2020.1799550

Ratschen, E., Shoesmith, E., Shahab, L., Silva, K., Kale, D., Toner, P., Reeve, C., & Mills, D. S. (2020). Human-animal relationships and interactions during the COVID-19 lockdown phase in the UK: Investigating links with mental health and loneliness. *PLOS ONE*, *15*(9), e0239397. https://doi.org/10.1371/journal.pone.0239397

Robinson, E., Sutin, A. R., Daly, M., & Jones, A. (2022). A systematic review and meta-analysis of longitudinal cohort studies comparing mental health before versus during the COVID-19 pandemic in 2020. *Journal of Affective Disorders*, *296*, 567–576. https://doi.org/10.1016/j.jad.2021.09.098

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, *39*(3), 472–480.

Rusu, A. S., Costea-Barlutiu, C., & Turner, D. C. (2019). Interpersonal and pet attachment, empathy toward animals, and anthropomorphism: An investigation of pet owners in Romania. *People and Animals: The International Journal of Research and Practice*, *2*(1), Article 6.

Schwarz, N., & Strack, F. (1999). Reports of subjective wellbeing: Judgmental processes and their methodological implications. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 61–84). Russell Sage Foundation.

Scoresby, K. J., Strand, E. B., Ng, Z., Brown, K. C., Stilz, C. R., Strobel, K., Barroso, C. S., & Souza, M. (2021). Pet ownership and quality of life: A systematic review of the literature. *Veterinary Sciences*, *8*(12), 332.

Shah, S. M. A., Mohammad, D., Qureshi, M. F. H., Abbas, M. Z., & Aleem, S. (2021). Prevalence, psychological responses and associated correlates of depression, anxiety and stress in a global population, during the coronavirus disease (COVID-19) pandemic. *Community Mental Health Journal*, *57*, 101–110.

Shoesmith, E., Shahab, L., Kale, D., Mills, D. S., Reeve, C., Toner, P., Santos de Assis, L., & Ratschen, E. (2021). The influence of human–animal interactions on mental and physical health during the first COVID-19 lockdown phase in the U.K.: A qualitative exploration. *International Journal of Environmental Research and Public Health*, *18*(3), 976. https://www.mdpi.com/1660-4601/18/3/976

Siegel, J. M. (1990). Stressful life events and use of physician services among the elderly: The moderating role of pet ownership. *Journal of Personality and Social Psychology*, *58*(6), 1081–1086. https://doi.org/10.1037/0022-3514.58.6.1081

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. Oxford University Press.

Smith, C. P. (2000). Content analysis and narrative analysis. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (Vol. 2000, pp. 313–335). Cambridge University Press.

Soto, C. J., & John, O. P. (2017). Short and extra-short forms of the Big Five Inventory-2: The BFI-2-S and BFI-2-XS. *Journal of Research in Personality*, *68*, 69–81. https://doi.org/10.1016/j.jrp.2017.02.004

Stanley, I. H., Conwell, Y., Bowen, C., & Van Orden, K. A. (2014). Pet ownership may attenuate loneliness among older adult primary care patients who live alone. *Aging & Mental Health*, *18*(3), 394–399.

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology*, *53*(1), 80–93.

Straede, C. M., & Gates, R. G. (1993). Psychological health in a population of Australian cat owners. *Anthrozoös*, *6*(1), 30–42.

Tan, J. S. Q., Fung, W., Tan, B. S. W., Low, J. Y., Syn, N. L., Goh, Y. X., & Pang, J. (2021). Association between pet ownership and physical activity and mental health during the COVID-19 "circuit breaker" in Singapore. *One Health*, *13*, 100343.

Vonk, J., Patton, C., & Galvan, M. (2016). Not so cold-blooded: Narcissistic and borderline personality traits predict attachment to traditional and non-traditional pets. *Anthrozoös*, *29*(4), 627–637. https://doi.org/10.1080/08927936.2016.1228762

Watson, D., & Clark, L. A. (1999). *The PANAS-X: Manual for the positive and negative affect schedule—Expanded form* [Unpublished manuscript]. https://www2.psychology.uiowa.edu/faculty/clark/panas-x.pdf

Watson, N. L., & Weinstein, M. L. (1993). Pet ownership in relation to depression, anxiety, and anger in working women. *Anthrozoös*, *6*(2), 135–138.

Wells, D. L. (2009). Associations between pet ownership and self-reported health status in people suffering from chronic fatigue syndrome. *Journal of Alternative and Complementary Medicine*, *15*(4), 407–413. https://doi.org/10.1089/acm.2008.0496

Wells, D. L., Clements, M. A., Elliott, L. J., Meehan, E. S., Montgomery, C. J., & Williams, G. A. (2022). Quality of the human–animal bond and mental wellbeing during a COVID-19 lockdown. *Anthrozoös*, *35*(6), 847–866.

Woike, B. A. (2007). Content coding of open-ended responses. In R. W. Robins, R. C. Fraley, & R. F. Krueger (Eds.), *Handbook of research methods in personality psychology* (pp. 292–307). The Guilford Press.

Xiao, Y., Becerik-Gerber, B., Lucas, G., & Roll, S. C. (2021). Impacts of working from home during COVID-19 pandemic on physical and mental well-being of office workstation users. *Journal of Occupational and Environmental Medicine*, *63*(3), 181–190. https://doi.org/10.1097/jom.0000000000002097

Xin, X., Cheng, L., Li, S., Feng, L., Xin, Y., & Wang, S. (2021). Improvement to the subjective well-being of pet ownership may have positive psychological influence during COVID-19 epidemic. *Animal Science Journal*, *92*(1), e13624.

Zilcha-Mano, S., Mikulincer, M., & Shaver, P. R. (2011). An attachment perspective on human–pet relationships: Conceptualization and assessment of pet attachment orientations. *Journal of Research in Personality*, *45*(4), 345–357. https://doi.org/10.1016/j.jrp.2011.04.001