Pet Ownership and Access as Predictors of Self-Reported Health in a National Sample of U.S. Elders

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We use the 2012 Health and Retirement Study special module on human-animal interaction to explore the effects of pet ownership and access on self-reported health for a representative sample of elders over age 50. We use much-refined measures of types of animal companionship and pet attachment than previous studies and explore the mediation and moderation effects of social support and physical activity. We find significant mediation effects of race and moderation effects of social support and physical activity. A major finding indicates that access to another's pets rather than current ownership of pets is associated with significantly higher self-reported health. This key finding resonates with qualitative studies with small homogenous samples which suggest that responsibility for pets can be associated with poorer health outcomes and distress when elders are unable to financially or physically care for a pet or face the distress of a sick or dying pet.

This project uses Health and Retirement Study data for individuals age 50 and over who responded to a 2012 module on human-animal interaction to explore the effects of pet ownership and access and pet breed type and number on self-reported health. The goals of the project are three-fold. First, the study presents descriptive statistics for a more detailed range and history of animal companionship measures than previous studies. We present measures of contemporaneous and retrospective histories with animal companions, number and type of pets, and pet attachment for a nationally representative sample of elders. Second, we explore the effects on self-reported health of these more detailed and refined pet ownership and access and pet number and type measures. Last, we address whether any effects of pet ownership and pet type are mediated and moderated by key sociodemographic life course controls and social support and physical activity. This study contributes to previous research by exploring more detailed measures of animal companionship and a wider array of sociodemographic life course circumstances than previous research. A key contribution is to examine whether and how human social support and physical activity mediate and moderate pet ownership and access and pet type on self-reported health.

Research on Human and Animal Companion Interactions

Recently research on human and companion animal interactions has benefitted from coordinated attention by public and private scientific think tanks and grant-funding agencies. For instance, collaborations between the National Institute of Health and the Waltham Centre for Pet Nutrition funded several cycles of new experimental, clinical, and survey research on human and companion animal interactions, nurtured the review and critique of the vast existing literature, and set new goals for future research (Griffin et al, 2011). Of these efforts, they noted that "a shortage of robust scientific research still limits our understanding of the effects of human

and animal interactions on human health and development across the different stages of life" (Griffin et al, 2011, pg. 3). In their empirical research and disciplinary review entitled "The State of Human-Animal Studies," Shapiro and DeMello (2010) discuss the explosion in psychological and sociological empirical and largely quantitative studies and humanist and post-humanist treatments of human and animal relationships. In their analysis of this growing and amorphous field of study, they call for greater systematicity in empirical work, more cross-disciplinary studies, and continued focus on how animals connect and perhaps nurture core human values. Last, Knight and Herzog (2009) argue vigorously for research on human and companion animal relationships. They say that such research would flesh out our understanding of the importance of animals and pets in people's lives, illuminate cross-cultural differences in moral judgments and attitudes about the purposes of animals in human communities, aid practitioners and counselors who need information about how animal companions nurture or harm their clients in home settings and how to use them as part of animal-assisted therapies. And, last, Knight and Herzog call for human and animal research to inform policy, as politicians struggle over the changing landscape of the meaning and place of animals in our modern lives and the diversity of public views about animals. Walsh (2009) calls for more research on animal companions, noting significant empirical evidence of physical, mental, and emotional benefits of animals through the critical key of an affectionate bond with the owner.

What does current research suggest about the potential benefits of companion animals, especially for elderly populations? The current literature on human and animal companions is complex, often contradictory, and varies widely by focal topic, methodological technique, and exploration of animals as private pets versus assistants in therapeutic or rehabilitative settings. That said, research strongly suggests health benefits from interactions with companion animals.

For example, Headey and Grabka (2011) explore prospective panel data and a natural social experiment and find strong health benefits of pets. They use 1996 and 2001 data from the German Socio-Economic Panel Study and find that, controlling for numerous sociodemographic factors, the healthiest people, in terms of fewer doctor's visits, were those with pets at both time periods and the second healthiest gained a pet between waves. In a sub-analysis using propensity score matching between pet owners and non-owners, pet owners still held a significant health advantage.

Their second study explored the effects of dog ownership in China with a sample divided evenly between pet owners and non-owners. Pets were banned in China until 1992 when people began actively acquiring animal companions. Again, controlling for a variety of sociodemographic and life course indicators, Headey and Grabka (2011) found a distinct sizeable health advantage for the "new" dog owners, in terms of fewer doctor's visits, fewer sick days absent from work, fewer nights of poor sleep, and better ratings of self-reported overall health, and more time spent in exercise. These salutary effects were strongest for those with greater pet attachment. Johnson's (2011) review of research on dog owners also finds a consistent health advantage with greater time spent walking and moving and a greater motivation and commitment to exercise because of stewardship over a dog companion.

Wood (2011) extends this line of empirical thought by reviewing research on how animal companions benefit communities and not just individuals. She notes a "ripple effect," whereby animal companions act as a form of social capital that facilitates social interactions, empathy, trust, tolerance, civic engagement, and strong social support networks. In fact, in a mixed method study using 12 focus groups and a survey of 339 residents in 3 Perth, Australia suburbs, Wood et al (2007) find with both their quantitative and qualitative data that pets nurture social

interactions, favor exchanges, sense of community, and neighborliness. Animal companions reduce loneliness. And that these feelings extended from pet owners to non-owners from the wider community.

Theory and research suggests that the key mechanism by which animal companions spur these health benefits for individuals and communities is through an affectionate bond between owner and animals. Animal companions may provide a feeling of affectionate bonding that cuts loneliness and comforts or softens distress associated with critical life losses, such as bereavement or divorce (Sable 1995; Turner 2005). In fact, Beck (1999) argues that pets often fulfill a role akin to a family member with all the best qualities. He says that pets may increase the chances for some people to meet others to avoid loneliness, while permitting others to remain alone without a concomitant sense of loneliness.

Wells (2009) discusses companion animals as social lubricants who curtail negative affect, nurture social contacts and bonds between humans, and generally direct proactive health behaviors. Walsh's (2009) review of empirical research finds these benefits especially pronounced for elders. For elderly populations, pet owners report better overall health on multiple indicators and often are measurably higher on physiological and medical diagnostic tools, as well. Further, pets provide elders company and comfort and encourage greater mobility, exercise, and relaxation. Some find that pets help elders develop and stick to a healthful daily routine.

These literature reviews present a plethora of potential health benefits of animal companions for elders. But many argue that existing research is problematic and inconclusive (Herzog 2011). The main concerns center on small homogenous samples, lack of attention to confounding variables, and a relative inattention to the advantages of mixed methods. Winefield,

Black and Chur-Hansen (2008) conducted a survey of 314 community-dwelling older adults to develop a scale of pet attachment and estimate the effects of pet ownership and pet attachment on health and health behaviors. They found that though the pet attachment measure had good internal reliability and the pet ownership measure differentiated types of pets, such as cats and dogs, that the pet measures had no significant effects on health in models that controlled for social support networks and physical activity. They suggest that perhaps a primary cause of the association between pet measures and health effects is the lack of controls for key confounding variables in studies. In a longitudinal Australians study with a large sample of women aged 70-75, Pachana et all (2005) find that sociodemographic characteristics largely differentiate women's opportunities to own pets and these SES measures thus confound any effects of pet ownership on mental and physical health. In addition, Herzog (2011) notes the over-reliance on small homogenous samples. And Esposito et al (2011) call for more research with larger samples that are more representative of race and socioeconomic status. Berk and Katcher (2003) criticize the over-use of clinical samples that focus on only one type of animals and the almost exclusive focus on benefits rather than both benefits and risks of animal companions. They call for more research which addresses Biophilia and social support perspectives that seek to specify exactly how animal companions fit in human relationships. Last, Guzman et al's (2009) groundbreaking study on elder Filipinos uses mixed phenomenological interview and doodling techniques to delineate the concept of "petmanship" to explore what elder Filipinos think they gain from their role as guardian, friend, and steward of their animal companions and what they expect from their animal companions in terms of "pet rules." Their study indicates the advantages of mixed methods for expanding the scope of human and animal companion research.

Community-Dwelling and Institution-Residing Elders and Companion Animals

The empirical literature on the effects of animal companions on elders' health falls into two main streams – research on animal-assisted therapies and visits for elders in palliative or institutional care and research on animal companions for elders living independently. In both cases, the research is inconclusive about the benefits of animal companions on mental, physical, and emotional health. The studies vary widely in methodology, research design quality, dependent variables, sample sizes and heterogeneity, and conceptualization and operationalization of pet ownership, contact, and attachment.

Studies that document few or no benefits of pet ownership usually address loneliness, depression, and physiological indicators. In a study without a control group, Phelps et al (2008) followed 5 elderly nursing home residents for baseline measurements for 4-8 weeks and then again after 6 weekly dog visits. They found dog visits did not enhance mood or reduce depression. In a study of 68 older retirement community residents, 67 of 68 choose to undertake the interview in the presence of a dog, though pet owners and non-owners showed no significant differences in depression (Eshbaugh et al, 2011). Miltiades and Shearer's (2011) study of 117 White rural Pennsylvanian elders recruited from veterinarian offices and dog grooming salons found that higher pet attachment was associated with increased depression and an inability to financially care for the animal's needs with greater distress. In studies with larger quantitative samples of community-dwelling elders, pet ownership was not associated with blood pressure, hypertension, or vascular reactivity (Wright et al, 2007), nor mental and physical health, frequency of social contact and loneliness (Rijken and van Beek, 2011). However, Rijken and van Beek's (2011) large panel study of community-dwelling elders in the Netherlands did find significant differences by pet type, with dog ownership associated significantly with more healthful activity. And Enmarker et al's (2014) cross-sectional study of 12,093 Norwegian

elders found that pet non-owners scored significantly fewer depressive symptoms than dog, and especially cat, owners.

Studies of elders in residential nursing homes divide into experimental clinical trials of animal-assisted therapies and dog visits, surveys of pet attachment, contact, and health, and phenomenological studies of the meanings and purposes of companion animals in nursing home elders' lives. In Krause-Parello and Gulick's (2013) study of a mixed sample of community dwelling and nursing home residents, they found higher pet attachment associated with less loneliness. Experimental research finds dog visits improve elderly nursing home residents' mood and depression, as compared to group visits or human volunteer visits (Lutwack-Bloom, Wiejewicrama, and Smith 2005; Le Roux and Kemp, 2009). In a study without a control group, 20 Japanese elders in palliative care showed improved mood, after a 30 minute interaction with a dog, cat, or rabbit (Kumasaka et al, 2012). Two phenomenological semi-structured interview studies of 8 Japanese women nursing home residents aged 67-94 and 10 elderly pet owners in a semi-autonomous retirement community found that animal companions elicit strong fond emotions and happy memories, generate feelings of empowerment and confidence, and offer restful breaks from daily routines (Kawamura, Niiyama, and Niiyama, 2009; Dookie 2013). In the nursing home residents study, the women had participated in animal-assisted activities for at least 2 years with the same dogs. These women discussed how the dogs encouraged interactions with other residents and communication with volunteers and staff (Kawamura, Niiyama, and Niiyama, 2009).

Empirical research on samples of community dwelling elders focuses on how companion animals influence social supports and loneliness and affect mental and physical health via emotional and behavioral mechanisms. A growing body of literature addresses especially

whether dogs provide unique health benefits for elders. Johnson and Meadows (2002) find that a sample of 24 Latino pet owners aged 50 and over felt great devotion to their pets, valued pets since childhood, and felt healthy and vital. Staats, Wallace, and Anderson (2008) find that avoiding loneliness was the top reason offered for pet ownership in a sample of university faculty, with older women the most likely to select that reason and believe that pets confer health benefits. In a prospective panel study of 938 Medicare enrollees, Siegel (1990) finds pet owners less likely to visit doctors over the year and more resilient in the face of prebaseline life stressors. Stanley et al (2014) find with a large sample that pet ownership was associated with lower levels of loneliness and that pet non-owners who live alone were the most lonely group of elders.

The dog ownership literature is compelling for its focus on people's feelings about their pets, as well as their activities and exercise. A study of 5 elderly women found that blood pressure and heart rate decreased, after a brief 10 minute interaction with a strange dog (Lutak and Nuzzo 2004). In an ethnographic study of 23 Austrian dog-owning single elders aged 70 and over, elders reported that dogs provided a buffer against loneliness associated with loss and bereavement, encouraged social interactions in the community, inspired walking greater distances and durations, and provided structure in daily routines (Scheibeck, Pallauf, Stellwag, and Seeberger, 2011). For a large sample of elders aged 65-95, Gretebeck et al (2013) find that dog-owners surpass pet non-owners on all activity measures. Compared to pet non-owners, dog owners reported significantly more total walking, walking frequency, physical activity, and physical health. In large samples of Japanese and Ottawan elders, dog owners were found to walk more often, walk more minutes, and engage in more physical activity than other pet owners and pet non-owners (Shibata et al, 2012; Toohey et al, 2013). Observational and audio transcription data from 29 elderly residents of two California mobile home parks found that dog

owners walked daily twice as often as pet non-owners (Rogers, Hart, and Boltz, 2001). Moreover, studies find that dog ownership draws social interactions and conversations with community members and social support to elders, while they are dog walking, but even when the dog is absent (Rogers, Hart, and Boltz, 2001; Toohey et al, 2013). Thus, dog ownership may confer health advantages via social support and physical activity mechanisms.

The research on community dwelling elders also contains concerns about the risks of pet ownership. In a grounded theoretical analysis of 12 lesbians aged 65-80, Putney (2014) found pets offered opportunities to feel a life purpose, acceptance, and love. These women expressed contentment that they perceived their pets as unconditionally loving in a hostile environment for sexual minorities. And they felt pride and efficacy in their stewardship of their animals. The companion animals fostered structure, companionship, and exercise. However, as pets aged, sickened, and died or as they became financially costly, animal companions were a source of distress rather than comfort. Last, Wells and Rodi (2000) combined a mixed method approach to explore a survey of a large sample of Australian elders and qualitative interviews with 20 elderly pet-owners in Sydney. They find pet owners are more bored and lonely than pet non-owners and less likely to use community services. These effects of relative isolation and loneliness were not associated with physical limitation status. The qualitative interviews indicated that pet ownership often drew individuals away from human interactions and pet ownership caused acute distress when pets became sick or died or when elders became too disabled to care for pets.

An overall reading of the literature highlights four general weaknesses in research designs that we seek to address in this current study. First, many tentative benefits of pet ownership seem localized to small homogenous samples. Second, the larger survey studies often do not adequately control for correlates that may confound pet effects. Third, we need further

refinements and improvements to the conceptualization and operationalization of contemporaneous and retrospective pet ownership, contact, type and number of pets, and forms of positive and negative pet emotional attachment. Last, a critical goal will be to explore whether and how companion animals influence elders' health, net of social supports and physical activity.

In this study, we use a large representative sample of elders who answered a number of questions about their histories and activities with companion animals for a special topical module on human-animal interactions to explore self-reported health. We propose to examine a refined measure of pet ownership and access, a detailed measure of pet type and number, and then later explore forms of pet attachment and types and duration of physical activities with pets. We explore as well whether sociodemographic and life course correlates serve as key mediators and moderators of pet measures. And we focus especially on mediation and moderation effects of social support and physical activity, using religiosity indices and mild, moderate, and vigorous physical activity indices.

DATA

Data and Sample. This study uses the Health and Retirement Study (HRS) based out of Michigan University. The HRS is a rich longitudinal panel study targeting adults over the age of fifty that began in 1992 and is conducted biannually. Blacks, Hispanics and Floridians are oversample and spouses of respondents are entered permanently into the study. Our data are currently comprised of the final 2010 cross-wave file tracker, 2012 early release core data (from the main questionnaire), and the RAND-formatted 2010 data. Finalized 2012 data will be utilized for our final analyses after its release. The HRS has included several smaller, randomly assigned experimental modules within its biannual questionnaire. We draw upon the animal-human

interaction module from 2012 which targets 2,037 of the current 37,321 HRS respondents. There were 317 cases removed because they are missing on all module variables and seven cases were temporarily removed due to not being on the older version of the file tracker (we will re-evaluate with the latest tracker file). For the purposes of our study, we limited the sample to those over the age of forty-nine, which removed 60 cases of younger respondents, giving an overall sample size of 1,653 cases.

Dependent Variable. We measure self-reported health continuously on a 5-point range, scored from poor, fair, good, very good, to excellent.

Focal Independent Variables

Pet Ownership and Access. We constructed a measure of pet ownership and access from three variables. The Human-Animal Interaction module treated current pet ownership as a dominant category. Thus, the skip map sequence asks individuals about their ownership and relationship with current pets. The questions do not ask current owners about past ownership or relationships. For those who do not currently report having a pet, the questions ask whether they ever had pets. If they do not currently have a pet, they are additionally asked whether they have regular contact with other people's pets. Our focal independent measure has five categories: Currently own a pet; Pet Ownership in the Past and current access to another's pet; Pet Ownership in the past but no current ownership or access; Never owned a pet, but has current access to another's pet; and Never owned a pet nor have current access to another's pet.

Types and Number of Current Pets. The Human-Animal Interaction Module asks about an array of number and type of current pets, including dogs, cats, other small mammals, fish, etc. The question for past ownership asks about the different types of pets owned, but not number. So, we focus on a measure of types of current pet ownership. For those who report currently

owning a pet, we have four categories: Pet owners without a dog or cat; Pet owners with one cat; Pet owners with one dog; Pet owners with multiple cat(s) and/or dog(s).

Main Reasons for Having a Pet. Respondents were presented with a checklist of ten potential reasons for having a pet/pets, including enjoy (love) animals, protection, companionship, playmate for a child, want something I could take care of, want something to keep me busy (occupy the time), want something to keep me active (get exercise), therapy (e.g., guide dog), was given this pet, and other. For those who elected more than one option, respondents were asked which was most important. We created a measure of the main reason for current pet ownership with four categories: Companionship (which included love, companionship, playmate for a child, want something to take care of); Protection; Activity (which included wanti omething to keep me busy, want something to keep me active, and therapy); and Other (for give as gift or other).

Feelings about Pets among Current and Past Owners. Respondents were asked several questions from the Pet Attachment Questionnaire. The items included their level of agreement about whether they considered the pet a friend, talked to the pet, say that pet ownership adds to happiness, talk to others about the pet, play often with the pet, and the pet knows how the respondent feels. These questions were asked of current pet owners and then as retrospective owners for those without current pets, but who had pets in the past.

Sociodemographic Controls

Age, Gender, Race/Ethnicity. We measure age in continuous years, ranging from 50 to 101. We measure gender as a dummy variable with male as the excluded category. We measure race/ethnicity with a set of five dummy variables representing Black, Hispanics, Non-Hispanic Other racial/ethnic minorities, and White Non-Hispanics (excluded category).

Union histories. For these preliminary analyses, we capture union histories in two ways. First, we measure current union status with a six category set of dummy variables. For those in unions, we have two dummy variables for married and cohabiting. For those who are single, we have three dummy variables distinguishing those single by separation or divorce, those by widowhood, and those by never marriage. We have a separate dummy for missing information on marital status. Alternatively, we also test effects of union histories with a set of dummy variables that measures currently married or cohabiting against the excluded category of singlehood. And two dummy variables that capture whether the respondent ever experienced a divorce or ever experienced widowhood.

Educational Attainment. Respondent's education is measured with a set of five dummy variables: less than high school; some college; college educated; and graduate level education. The excluded category is high school attainment. We measure the respondent's mother's education by converting the respondent's reported years of mother's schooling into the same four categories. Mothers' average educational attainment was less than 12 years, so missing information was coded into the less than high school category and a dummy representing missing information was included.

Parental and Grand- and Great-grand Parental Status. We explored the effects of children through two versions of dummy variables, categorical and contrast coded. Respondents were asked to indicate their total number of living biological children and total number of living grand and great-grandchildren through biological relation, adoption, or stepparenthood. We created two categorical measures isolating parenthood from grand- and great-grandparenthood. The categorical version had a dummy variable representing one living child and another dummy for two or more living children. The excluded category represents non-parenthood. The grand and

great-grandchild parental status categorical version mirrors this construction with a dummy measuring that the respondent has only one living grand- or great-grandchild and another dummy for two or more grand or great-grandchildren. The excluded category represents non-grandparenthood.

The contrast coded version also has two dummy variables for both parenthood and grand and great-grandparenthood, with one dummy measuring at least one child, and the second measuring more than one child to capture the effects of entry into the status and then the additional effects of multiple children in that status. In both cases, the excluded category is non-parenthood.

Extreme Religiosity Index. We created an extreme religiosity index summing the extreme values across four religiosity indicators. The index ranged from 0 to 4 with 4 indicating that the respondent attends religious services more than once per week, has friends in their congregation, has relatives in the congregation, and feels that religion is very important.

Vigorous Activity Index. Respondents were asked about their participation in three forms of activity: mildly energetic, moderately energetic, and vigorous. The question for vigorous activity asked, "How often do you take part in sports or activities that are vigorous, such as running or jogging, swimming, cycling, aerobics or gym workout, tennis, or digging with a spade or shovel?" For moderately energetic activity, they were asked, "And how often do you take part in sports or activities that are moderately energetic, such as gardening, cleaning the car, walking at a moderate pace, dancing, floor or stretching exercises?" And last, they were asked, "And how often do you take part in sports or activities that are mildly energetic, such as vacuuming, laundry, home repairs?" Four response categories measured activity that occurred hardly ever or never, one to three times a month, once a week, or more than once a week. We created a

vigorous activity index which summed their responses to this answer and adjusted to a zero point, ranging form 0 to 12 with 12 representing mild, moderate, and vigorous activity occurring more than once a week.

Analytic Plan. For this PAA proposal, we examine two sets of nested regression models for pet ownership and access and pet type and number separately. We begin with the bivariate effects of pet ownership and access or pet type and number, add age, gender, sociodemographic controls, and then the extreme religiosity and vigorous activity indices separately. Then we test interactions of the pet measures separately for gender, extreme religiosity, and vigorous activity. These models will explore baseline effects of these detailed pet measures, mediation effects of sociodemographic controls, and critical social support and physical activity controls, and then moderation effects for social support and physical activity. They are tentative analyses, as we expect to refine a number of measures, explore alternative specifications of social support and physical activity, and use other statistical techniques, such as tobit or logit regressions. See Appendix Table 1 for descriptive statistics for our dependent and independent variables.

RESULTS

Table 1 presents descriptive statistics for our focal independent variable of pet ownership and access. The majority of respondents currently own a pet (45.7%). Approximately another 44% owned a pet in the past. Because of measurement limitations, we cannot measure continuity in pet ownership for those who currently own pets. Approximately ten percent of respondents never had a pet and approximately two-thirds of these non-pet owners do not have access to another's pet.

[Table 1 about Here.]

Table 2 presents descriptive statistics for our focal independent variable of pet type and numbers. Only 2.2% of the sample consists of individuals who have are pet owners, but do not have a cat or dog. Six percent of individuals own a single cat and 15.4% own a single dog. But of pet owners in this sample, most own multiple cats and or dogs. In fact, among those who are current pet owners, the vast majority live in multiple pet households with combinations of cat/s and dog/s (47.9%), and for single pet households, dogs far outnumber cats, with 33.7% of individuals currently owning a single dog compared to 13.6% who own a single cat. Only 4.8% of current pet owners opt for an animal companion which is not a cat or dog. Looking specifically at cats and dogs among pet owners, we find that 22.1% of respondents own a single cat and another 21.4% own multiple cats. Dog ownership is far more pervasive. A full 43.6% of pet owners have a single dog and another 27.0% have multiple dogs (unshown analyses).

[Table 2 about Here.]

Table 3 presents the main reason offered for having a pet among current pet owners. By far the overwhelming reason is companionship and love with 68.9% of respondents offering that as the focal reason. The next largest category is "other" which includes receiving the pet as a gift or another open-ended answer (25.1%). Reasons such as protection as a guard dog or for a companion in exercise and activity pale in comparison with only 3.6% and 2.4% reporting them as main reasons respectively. Thus, the descriptive statistics indicate that the vast majority of respondents in these data owned pets and believe that the primary for pet ownership is the love and companionship a pet may provide.

[Table 3 about Here.]

Table 4 drives this point home by presenting the pet attachment items that ask respondents about the qualities and intensities of their relationship with their pet/s. The items

range from 89% to 97% percent agreement about considering the pet a friend, the pet adding happiness to life, talking directly to the pet and talking about the pet to others, playing often with the pet. Fully 89% of respondents report that their pet knows how they feel. In unshown analyses, we investigated reports of feelings about pets for a combined measure of contemporary reports for current pet owners and retrospective reports of feelings for past pet owners. The findings are largely the same. Retrospectively, the vast majority of past pet owners value the social and emotional perceived benefits of pets.

[Table 4 about Here.]

Table 5 presents nested models for our regressions of self-reported health on pet ownership and access as the focal independent variable. For our five-item dependent variable, 7.2% of the sample report their health as poor, 18.8% fair, 32.7% good, 31.0% very good, and 10.4% as excellent. In future specifications, we will explore other model specifications, such as logit. But we present these tentative models. In Model 1, we test the bivariate association and find that, as expected, as compared to current pet ownership, the effect of never having owned an animal companion and not having current access to one is associated with lower ratings of health. But we also find a significant positive association for individuals who owned pets in the past, though are not currently pet owners, but who have access to someone else's pet. The effect of not having the responsibility for pet ownership, but having access to animal companionship is associated with significantly higher health ratings than current pet ownership.

In unshown analyses, as we add individual indicators into the model, we find that age and gender do not mediate the effects of pet ownership and access. But when race/ethnicity is entered into the model, the negative effect of never having owned pets and not having current access becomes non-significant. However, the effect of past ownership and current access

remains significant in our final baseline model. Note that this robust finding is not mediated by the extreme religiosity and vigorous activity indices.

We do not find any significant interactions by pet ownership and gender. But we do find evidence of nearly significant interactions with the extreme religiosity index and the vigorous activity index.

[Table 5 about Here.]

Table 6 presents nested models for our regressions of self-reported health on type and number of pets. These models present a more complicated story than for pet ownership and access. And we are not fully satisfied with the specification of this focal independent measure. The multiple pets category can include combinations of multiple cats, but no dog, multiple dogs, but not cats, etc. We believe that we need to explore the especial effects of multiple dog ownership to understand these patterns by race/ethnicity. Race/ethnicity looms large in these models. In the bivariate model, pet type and number has no significant effects. But, compared to pet non-owners, the effect of owning multiple pets becomes strongly significantly negative on self-reports of health, as soon as race/ethnicity is entered into the models. As compared to Non-Hispanic Whites, Blacks and Hispanics have substantially lower ratings of their health. We also find significant interactions of pet type and numbers with the extreme religiosity and vigorous activity indices, though not with gender.

[Table 6 about Here.]

NEXT STEPS

Our current study has some notable limitations. These data are cross-sectional and while a significant improvement over previous measures, the main focal variable still prohibits a retrospective history of pet ownership and feelings for those who are current owners. That said,

the large representative sample, detailed histories of contemporaneous and retrospective activities and feelings with pets, and wealth of sociodemographic, social support, and physical activity measures make this project a potential addition to research on companion animals and elders' health. For future analyses, we intend to improve our current analyses in five ways. First, we will add a measure of wealth or financial status. Second, we will disentangle how our pet ownership and access and type and number of pets measures interact with race/ethnicity and socioeconomic status. Much of the current literature uses homogenous samples that examine one particular racial/ethnic group, mostly Whites, who are generally of the upper middle class. In some studies, poor or working poor samples are used. With this larger more representative sample of the Health and Retirement Study, we want to develop a theoretically informed perspective about the possible moderating effects of pet ownership on elders' lives for different racial/ethnic and class groups. Third, we will explore whether pet attachment and feelings about current and past pets are associated with self-reported health. Our measures are an improvement over past research which only focuses on current pet owners. Additionally, we have information about the length of time since previous pet owners owned a pet, so we will explore a refinement of our pet ownership and access measure. Fourth, we will explore alternative specifications of social support, including religious, community-based, and family and friendship social support networks. Fifth, we want especially to disentangle the effects of vigorous activity on self-reported health by examining in detail the numerous measures of type and duration of physical activity with pets, especially dog-walking, and subjective reports of whether pets are felt to increase or decrease physical activities.

References

Beck, Alan M. 1999. Companion animals and their companions: Sharing a strategy for survival. *Technology & Society* 19: 281-285.

Beck, Alan M. and Aaron H. Katcher. 2003. Future directions in human-animal bond research. *American Behavioral Scientist* 47: 79-93.

Dookie, Amanda L. 2013. Perspectives of animal assisted activities on empowerment, self-esteem and communication with caregivers on elders in retirement homes. *Activities, Adaptation & Aging* 37: 189-212.

Enmarker, Ingela, Ove Hellzén, Knut Ekker, and Anne-Grethe T. Berg. 2014. Depression in older cat and dog owners: the Nord-Trøndelag Health Study (HUNT)-3. *Aging & Mental Health* online.

Esposito, Layla, Peggy McCardle, Valerie Maholmes, Sandra McCune, and James A. Griffin. 2011. Introduction. Pgs. 1-5 in *How Animals Affect Us: Examining the Influence of Human-Animal Interaction on Child Development and Human Health.* Peggy McCardle, Sandra McCune, James A. Griffin, and Valerie Maholmes (Eds.). Washington, DC: American Psychological Association.

Gretebeck, Kimberlee A., Kaitlyn Radius, David R. Black, Randall J. Gretebeck, Rosemary Ziemba, and Lawrence T. Glickman. 2013. Dog ownership, functional ability, and walking in community-dwelling older adults. *Journal of Physical Activity and Health* 10: 646-655.

Griffin, James A., Sandra McCune, Valerie Maholmes, and Karyl Hurley. 2011. Human-animal interaction research: An introduction to issues and topics. Pgs 3-9 in *Animals in Our Lives: Human-Animal Interaction in Family, Community, and Therapeutic Settings.* Peggy McCardle, Sandra McCune, James A. Griffin, Layla Esposito, and Lisa S. Freund (Eds.) Baltimore: Paul H, Brookes Publishing Co.

De Guzman, Allan B., Denise S. Cucueco, Ian Benedict V. Cuenco, Nigel Gerome C. Cunanan, Robel T. Dabandan, and Edgar Joseph E. Dacanay. 2009. Petmanship: Understanding elderly Filipinos' self-perceived health and self-esteem captured from their lived experiences with pet companions. *Educational Gerontology* 35: 963-989.

Eshbaugh, Elaine M., John W. Somervill, Justina H. Kotek, Elizabeth Perez, Kayla R. Nalan, Claire E. Wilson, and Quinn T. Bullis. 2011. Brief report: Presence of a dog, pet attachment, and loneliness among elders. *North American Journal of Psychology* 13: 1-4.

Heady, Bruce and Markus Grabka. 2011. Health correlates of pet ownership from national surveys. Pgs 153-162 in *Animals in Our Lives: Human-Animal Interaction in Family, Community, and Therapeutic Settings.* Peggy McCardle, Sandra McCune, James A. Griffin, Layla Esposito, and Lisa S. Freund (Eds.) Baltimore: Paul H, Brookes Publishing Co.

Herzog, Harold. 2011. The impact of pets on human health and psychological well-being: Fact, fiction, or hypothesis? *Current Directions in Psychological Science* 20: 236-239.

Johnson, Rebecca A. 2011. Animal-assisted interventions in health care contexts. Pgs. 183-192 in *Animals in Our Lives: Human-Animal Interaction in Family, Community, and Therapeutic Settings.* Peggy McCardle, Sandra McCune, James A. Griffin, Layla Esposito, and Lisa S. Freund (Eds.) Baltimore: Paul H, Brookes Publishing Co.

Johnson, Rebecca A. and Richard L. Meadows. 2002. Older Latinos, pets, and health. *Western Journal of Nursing Research* 24: 609-620.

Kawamura, Namiko, Nasayoshi Niiyama, and Harue Niiyama. 2009. Animal-Assisted activity: Experiences of institutionalized Japanese older adults. *Journal of Psychosocial Nursing* 47: 41-47.

Knight, Sarah and Harold Herzog. 2009. All creatures great and small: New perspectives on psychology and human-animal interactions. *Journal of Social Issues* 65: 451-461.
Krause-Parello and Elsie E. Gulick. 2013. Situational factors related to loneliness and loss over time among older pet owners. *Western Journal of Nursing Research* 35: 905-919.
Kumasaka, Takayuki, Hideo Masu, Mika Kataoka, Akiko Numao. 2012. Changes in patient mood through animal-assisted activities in a palliative care unit. *International Medical Journal* 19: 373-377.
LeRoux, Mareianna and Rene Kemp. 2009. Effect of a companion dog on depression and anxiety levels of elderly residents in a long-term care facility. *Psychogeriatrics* 9: 23-26.
Luptak, Jane E. and Nancy A. Nuzzo. 2004. The effects of small dogs on vital signs in elderly women: A pilot study. *Cardiopulmonary Physical Therapy* 15: 9-12.
Lutwak-Bloom, Patricia, Rohan Wijewickrama, and Betsy Smith. 2005. Effects of pets versus people visits with nursing home residents. *Journal of Gerontological Social Work* 44: 137-159.
Miltiades, Helen and Juliette Shearer. 2011. Attachment to pet dogs and depression in rural older adults. *Anthrozoös* 24: 147-154.
Pachana, Nancy A., Jessica H. Ford, Brooke Andrew, and Annette J. Dobson. 2005. Relations between companion animals and self-reported health in older women: Cause, effect or artifact? *International Journal of Behavioral Medicine* 12: 103-110.
Phelps, Kristin A., Raymond G. Miltenberger, Tess Jens, and Heather Wadeson. 2008. An investigation of the effects of dog visits on depression, mood, and social interaction in elderly individuals living in a nursing home. *Behavioral Interventions* 23: 181-200.
Putney, Jennifer M. 2014. Older lesbian adults' psychological wellbeing: The significance of pets. *Journal of gay & lesbian social services* 26: 1-17.
Rijken, Mieke and Sandra van Beek. 2011. About cats and dogs…Reconsidering the relationship between pet ownership and health related outcomes in community-dwelling elderly. *Social Indicators Research* 102: 373-388.
Rogers, John, Lynette A. Hart, and Ronald P. Boltz. 2001. The role of pet dogs in casual conversations of elderly adults. *The Journal of Social Psychology* 133: 265-277.
Sable, Pat. 1995. Pets, attachment, and well-being across the life cycle. *Social Work* 40: 334-341.
Scheibeck, R., M. Pallauf, C. Stellwag, B. Seeberger. 2011. Elderly people in many respects benefit from interaction with dogs. *European Journal of Medical Research* 16: 557-563.
Shapiro, Kenneth and Margo DeMello. 2010. The state of human-animal studies. *Society and Animals* 18: 307-318.
Shibata, Ai, Koichiro Oka, Shigeru Inoue, Hayley Christian, Yoshinori Kitabatake, Teruichi Shimomitsu. 2012. Physical activity of Japanese older adults who own and walk dogs. *American Journal of Preventative Medicine* 43: 429-433.
Siegel, Judith 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: 1081-1086.
Staats, Sara, Heidi Wallace and Tara Anderson. 2008. Reasons for companion animal guardianship (pet ownership) from two populations. *Society and Animals* 16: 279-291.

Stanley, Ian H., Yeates Conwell, Connie Bowen and Kimberly A. VanOrden. 2014. Pet ownership may attenuate loneliness among older adult primary care patients who live alone. *Aging & Mental Health* 18: 394-399.

Toohey, A.M., G.R. McCormack, P.K. Doyle-Baker, C.L. Adams, and M.J. Rock. 2013. Dog-walking and sense of community in neighborhoods: Implications for promoting regular physical activity in adults 50 years and older. *Health & Place* 22: 75-81.

Turner, Wendy G. 2005. The role of companion animals throughout the family life cycle. *Journal of Family Social Work* 9: 11-21.

Walsh, Froma. 2009. Human-animal bonds I: The relational significance of companion animals. *Family Process* 48: 462-480.

Wells, Deborah L. 2009. The effects of animals on human health and well-being. *Journal of Social Issues* 65: 523-543.

Wells, Y. and H. Rodi. 2000. Effects of pet ownership on the health and well-being of older people. *Australasian Journal on Ageing* 19: 143-148.

Winefield, Helen R., Anne Black, and Anna Chur-Hansen. 2008. Health effects of ownership of and attachment to companion animals in an older population. *International Journal of Behavioral Medicine* 15: 303-310.

Wood, Lisa Jane. 2011. Community benefits of human-animal interactions…the ripple effect. Pgs. 23-41 in *How Animals Affect Us: Examining the Influence of Human-Animal Interaction on Child Development and Human Health.* Peggy McCardle, Sandra McCune, James A. Griffin, and Valerie Maholmes (Eds.). Washington, DC: American Psychological Association.

Wood, Lisa J., Billie Giles-Corti, Ma K. Bulsara, and Darcy A. Bosch. 2007. More than a furry companion: The ripple effect of companion animals on neighborhood interactions and sense of community. *Society and Animals* 15: 43-56.

Wright, Joel David, Donna Kritz-Silverstein, Deborah J. Morton, Deborah L. Wingard, and Elizabeth Barett-Connor. 2007. Pet ownership and blood pressure in old age. *Epidemiology* 18: 613-618.

Table 1. Pet Ownership and Access

	%
Currently Own Pet	45.7
Had Pet and Current Access to Pet	20.6
Had Pet but No Current Access to Pet	23.8
Never Had Pet but Current Access to Pet	3
Never Had Pet and No Current Access to Pet	6.8
	n = 1,653

Table 2. Type and Number of Pets

	%
No Pets	54.3
Pet/s, but no Dog or Cat	2.2
Sole Cat	6.2
Sole Dog	15.4
Multiple Cat(s)/Dog(s)	21.9
	n = 1,653

Table 3. Main Reason for Currently Having a Pet

	%
Companionship	68.9
Protection	3.6
Activity	2.4
Other	25.1
	n = 753

Table 4. Feelings About Pets among Current Owners

	%	n
My Pet is a Friend	90.7	756
My Pet Adds to My Happiness	93.5	753
I Talk to My Pet	96.7	756
I Talk about My Pet	88.4	756
I Play with My Pet	85.3	753
My Pet Knows How I Feel	88.5	722

Table 5. Regression Models of Pet Ownership and Access on Self-Reported Health								
	Model 1		**Model 2**		**Model 3**		**Model 4**	
Intercept	3.2	***	2.2	***	2.27	***	2.12	***
Pet Ownership								
Owned, Access	0.14	*	0.14	**	-0.02		0.36	***
Owned, No Access	-0.09		0.06		-0.05		0.09	
Never Owned, Access	-0.12		-0.09		-0.22		0.16	
Never Owned, No Access	-0.24	**	0.1		0.01		0.22	
Sociodemographic Variables								
Age			0		0		0	
Female			0.13	***	0.13	***	0.13	***
Black			-0.18	***	-0.2	***	-0.18	***
Hispanic			-0.31	**	-0.31	***	-0.3	***
Other Race/Ethnicity			-0.11		-0.11		-0.1	
Cohabiting			-0.09		-0.08		-0.09	
Separated/Divorced			-0.29	***	-0.29	***	-0.29	***
Widowed			-0.09		-0.1		-0.1	
Never Married			-0.06		-0.07		-0.07	
Married Missing			0.03		0.02		0.04	
Respondent's Education								
Less than High School			-0.09		-0.08		-0.09	
Some College			0.25	***	0.25	***	0.24	
College			0.34	***	0.34	***	0.34	
Graduate/Professional			0.34	***	0.34	***	0.34	
Mother's Education								
Less than High School			-0.08		-0.08		-0.08	
Some College			-0.04		-0.04		-0.03	
College Plus			0.07		0.06		0.06	
Education Missing			-0.22	**	-0.22	**	-0.22	**

Table 5 Continued. Regression Models of Pet Ownership and Access on Self-Reported Health								
Parenting and Grandparenting								
At least one child			0.13		0.13		0.13	
More than one child			0.04		0.05		0.04	
Unknown Number of Children			-0.26		-0.26		-0.24	
At least one grand- or great-grandchild			-0.09		-0.09		-0.08	
More than one grand- or great grandchild			-0.13		-0.14		-0.14	
Unknown Number of Grands			0.09		0.09		0.07	
Social Support and Activity								
Extreme Religiosity Index			0.05	**	0		0.05	***
Vigorous Activity Index			0.1	***	0.1	***	0.11	***
Interactions								
Religiosity*Had, Access					0.1	*		
Religiosity*Had, No Access					0.08			
Religiosity*Never Had, Access					0.08			
Religiosity*Never Had, No Access					0.06			
Activity*Had, Access							-0.03	*
Activity*Had, No Access							0	
Activity*Never Had, Access							-0.03	
Activity*Never Had, No Access							-0.02	
N=1653		0.01	0.23		0.23		0.23	
Adj. R-Squared								
* Significant at 1.645, ** Significant at 1.960, *** Significant at 2.326								

Table 6. Regression Models of Pet Type and Numbers on Self-Reported Health								
	Model 1		**Model 2**		**Model 3**		**Model 4**	
Intercept	3.18	***	2.32	***	2.3	***	2.38	***
Pet Type and Numbers								
Pet, but Neither Cat nor Dog	0.21		0.2		0.59	**	-0.09	
Sole Cat	0.15		0.05		0.06		0.3	
Sole Dog	0.01		-0.09		-0.09		-0.19	
Multiple Cat(s)/Dog(s)	-0.02		-0.17	***	0.05		-0.41	***
Sociodemographic Variables								
Age			0		0		0	
Female			0.14	***	0.13	***	0.14	***
Black			-0.2	***	-0.22	***	-0.2	***
Hispanic			-0.32	***	-0.32	***	-0.31	***
Other Race/Ethnicity			-0.12		-0.13		-0.12	
Cohabiting			-0.08		-0.07		-0.09	
Separated/Divorced			-0.3	***	-0.3	***	-0.29	***
Widowed			-0.11		-0.11		-0.12	
Never Married			-0.07		-0.08		-0.07	
Married Missing			-0.01		0		-0.02	
Respondent's Education								
Less than High School			-0.09		-0.09		-0.09	
Some College			0.23	**	0.23	**	0.24	***
College			0.34	***	0.34	***	0.34	***
Graduate/Professional			0.33	***	0.34	***	0.33	***
Mother's Education								
Less than High School			-0.09		-0.09		-0.09	
Some College			-0.04		-0.04		-0.03	
College Plus			0.07		0.06		0.05	
Education Missing			-0.22	***	-0.22	***	-0.22	***

Table 6 Continued. Regression Models of Pet Type and Numbers on Self-Reported Health								
Parenting and Grandparenting								
At least one child			0.14		0.14		0.14	
More than one child			0.04		0.05		0.05	
Unknown Number of Children			-0.23		-0.24		-0.23	
At least one grand- or great-grandchild			-0.11		-0.1		-0.11	
More than one grand- or great grandchild			-0.1		-0.12		-0.1	
Unknown Number of Grands			0.09		0.08		0.05	
Social Support and Activity								
Extreme Religiosity Index			0.05	***	0.08	***	0.05	**
Vigorous Activity Index			0.1	***	0.1	***	0.09	***
Interactions								
Religiosity*Had, Access					-0.24	*		
Religiosity*Had, No Access					0			
Religiosity*Never Had, Access					0.01			
Religiosity*Never Had, No Access					-0.15	***		
Activity*Had, Access							0.04	
Activity*Had, No Access							-0.03	
Activity*Never Had, Access							0.02	
Activity*Never Had, No Access							0.03	**
N=1653								
Adj. R-Squared		0	0.23		0.23		0.23	
* Significant at 1.645, ** Significant at 1.960, *** Significant at 2.326								

Appendix Table 1. Descriptive Statistics

Variable	%	
Dependent		
Self-Rated Health	(Mean = 3.19)	(SD = 1.08)
Poor	7.2	
Fair	18.8	
Good	32.7	
Very Good	31.0	
Excellent	10.4	
Independent		
Pet Ownership and Access		
Own	45.7	
Owned and Current Access	20.6	
Owned and No Access	23.8	
Never Owned but Access	3.0	
Never Owned and NoAccess	6.8	
Dog/Cat Ownership		
No Pets	54.3	
No Dog/Cat	2.2	
1 Cat	6.2	
1 Dog	15.4	
Multiple Cat(s)/Dog(s)	21.9	
Sociodemographic Characteristics		
Age	(Mean = 67.3)	(SD = 10.43)
Gender		
Female	61.4	
Male	38.6	
Race/Ethnicity		
White, Non-Hispanic	67.8	
Black, Non-Hispanic	17.4	
Other, Non-Hispanic	2.2	
Hispanic	12.6	

Union Status		
Married	61.1	
Cohabiting	5.6	
Separated /Divorced	13.6	
Widowed	14.6	
Never Married	5.0	
Ever Divorced	36.4	
Ever Widowed	18.4	
Sociodemographic Characteristics		
Education		
Less than High School	16.0	
High School Degree	53.5	
Some College	6.7	
4-yr Degree	14.3	
MA/Professional	9.6	
Mother's Education		
Less than High School	46.3	
High School Degree	40.2	
Some College	6.4	
College Degree	7.1	
Parental Status		
No Children	11.7	
1 Child	9.9	
2 or More Children	78.5	
Grandchildren/Great-Grandchildren		
No Grandchildren	24.5	
1 Grandchild	6.0	
2 or More Grandchildren	69.5	
Social Support and Activity Indices		
Extreme Religiosity Index	(Mean = 1.61)	(SD = 1.19)
Activity Index	(Mean = 6.65)	(SD = 3.59)
		n = 1,653