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Attachment to pets and psychosocial functioning in women with histories of childhood abuse

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Abstract:

Background: Childhood abuse is associated with poorer psychosocial functioning across adulthood. Companion animals may provide emotional comfort, routine, and perceived support, but it remains unclear whether attachment to pets is associated with psychosocial resources among women with histories of childhood abuse. We examined associations between pet attachment and life engagement, mastery, optimism, and social connectedness among women with childhood abuse histories.

Methods: We conducted an exploratory cross-sectional analysis using data from the Mind–Body Study, a substudy of the Nurses' Health Study II in which women reporting childhood abuse were oversampled. The analytic sample included 99 women with a history of childhood abuse who reported current pet ownership and completed six items from the Lexington Attachment to Pets Scale. Outcomes included life engagement, mastery, optimism, and social connectedness, assessed using the Life Engagement Test, Pearlin Mastery Scale, Life Orientation Test–Revised, and Berkman–Syme Social Network Index. Multivariable models examined associations of overall pet attachment and individual attachment items with each psychosocial outcome.

Results: Participants had a mean age of 60.8 years; 58 women referred to dogs and 29 referred to cats as the pet with whom they spent the most time. Overall pet attachment scores were not significantly associated with life engagement, mastery, optimism, or social connectedness. In exploratory item-level analyses, agreement that pet ownership added to happiness was associated with greater mastery ($\beta = 1.39$, $p = 0.035$). Among dog owners, talking to one's dog was associated with higher life engagement ($\beta = 0.35$, $p = 0.045$).

Conclusions: In this exploratory cross-sectional study of women with histories of childhood abuse, overall pet attachment was not associated with psychosocial functioning. However, specific emotional and relational aspects of pet attachment were associated with greater mastery and life engagement. These findings should be interpreted cautiously and warrant replication in larger, longitudinal studies that assess human attachment, pet-related routines, and caregiving context.

Introduction

Systematic reviews, meta-analyses and longitudinal studies demonstrate that childhood abuse is consistently associated with elevated risk of depression, anxiety, suicidal behavior, and broader impairments in psychological functioning in adulthood[1–4]. Early abuse undermines self-efficacy[5,6], optimism[7,8], and social trust[9,10], thereby reducing resources necessary for mental resilience[11,12]. Psychosocial functioning—the ability to carry out social roles and perform activities in daily life[13]— is a central dimension of human adaptation[14,15]. We focused on psychosocial resources that may support daily functioning, including sustaining purpose[16], maintaining perceived control[17] and optimism[18], and engaging in supportive social relationships[19,20]. Classic theoretical frameworks have long emphasized the role of such resources in human health. Pearlin and Schooler[21] identified life mastery as a fundamental coping resource shaping individuals' ability to influence life circumstances. Similarly, Scheier and Carver's[22] work on dispositional optimism underscored the importance of positive expectancies for motivation and adaptation. This suggested that psychological and social resources form the foundation of effective self-regulation and long-term health. Later empirical studies supported these ideas. Higher levels of purpose[23], life mastery[21,24], and optimism[25–27] were consistently associated with resilience to stress, adaptive health behaviors, and reduced risk of morbidity and mortality. Social connectedness, likewise, provides critical

support for emotional regulation and physical health, while social isolation has been identified as a significant risk factor for early mortality[28]. Collectively, these findings underscore psychosocial functioning as a multidimensional construct with profound implications for both psychological and physical well-being.

Adverse childhood experiences, particularly sexual and physical abuse, represent potential disruptors of psychosocial functioning. At the same time, heterogeneity in these outcomes among childhood abuse (CA) survivors suggests that specific protective factors may confer resilience against long-term consequences of CA[23,29], underscoring the need for identifying these factors. One emerging line of research suggests that attachment to pets may be associated with psychosocial functioning. Animals may provide emotional comfort and opportunities for social connection, which may be particularly important for people who have experienced early life adversity[30]. Although empirical evidence is still limited, these findings raise the possibility that some aspects of the pet attachment are associated with psychosocial resources in adulthood and warrants further study among women with histories of childhood abuse. In our recent cross-sectional study[31], we examined pet attachment and symptoms of depression and anxiety in middle-aged and older women, including an oversample of women with histories of childhood abuse. Higher pet attachment was statistically significantly associated with lower generalized anxiety scores and dog attachment in particular showed associations with reduced depression, psychological distress, and anxiety. These associations were stronger among women with childhood abuse history. Emerging evidence also suggests that observed associations between pet attachment and mental health may reflect, in part, underlying attachment orientations to humans. In a cross-sectional survey of dog owners, Lass-Hennemann et al[32]. reported that the association between stronger dog attachment and higher mental health burden was accounted for by insecure attachment to humans. Building on this literature, we examine whether stronger emotional bonds with pets are associated with

higher levels of mastery, optimism, and social connectedness among women with a history of CA. Given the limited prior evidence on pet attachment and psychosocial functioning—particularly in survivors of childhood abuse—these analyses were designed as exploratory.

METHODS

Mind Body Study

In 2013, 688 participants of the Nurses' Health Study 2 (NHS2), a longitudinal cohort of U.S. registered nurses, were invited to the Mind-Body Study (MBS), aimed at assessing psychosocial influences on cancer-relevant biomarkers. Eligible women had contributed blood and urine samples in 1996–1999 (N=29,611) and in one later follow-up biospecimen wave[33]. To increase the prevalence of CA in the MBS cohort, women reporting CA were oversampled (33% in MBS vs 14% in NHS2)[33]. Relative to the NHS2, MBS participants were older, had lower BMI (body mass index), more frequently reported childhood abuse, more often used psychotropic medications and less often had diabetes or hypertension (Supplemental Table 1 in Huang et al. (2019)[33]). Among 688 invited, 293 (42.6%) enrolled. Online questionnaires were administered twice (March 2013; February 2014) with response rates exceeding 70% (N_{2013}=228 (77.8%); N_{2014}=208 (71%))[33]. Further details were described elsewhere[31,33]. The MBS study protocol was approved by the institutional review boards of the Brigham and Women's Hospital and Harvard T.H. Chan School of Public Health, and written informed consent was obtained from all participants.

Assessment of pet attachment

In the two online MBS surveys, respondents reported current pet ownership (dog, cat, bird, fish, other, or none; single response). Participants who reported owning a pet completed six items from the previously published Lexington Attachment to Pets Scale (LAPS)[34], referring to the pet with whom they spent the most time. These six items assessed owners' affective and behavioral attachment to the pet: "I consider my pet a friend", "I talk to my pet", "Owning a

pet adds to my happiness", "I talk to others about my pet", "I often play with my pet", "My pet is considered part of the family". Each item was rated on a 4-point scale (0–3), resulting in a total LAPS score ranging from 0 to 18 points, with higher scores indicating stronger attachment. No pet attachment questionnaire items were developed de novo for the present study.

Participants who completed at least one LAPS assessment were included. Our main LAPS exposure was defined as the mean LAPS score across available assessments. We adopted this approach to maximize the use of available data and to reduce measurement error, given the LAPS's moderate 1-year reproducibility in the MBS (ICC=0.58; 95% CI 0.46–0.70)[33]. More details on the LAPS exposure definition can be found in Table 1 in Zebrowska et.al[31]. To examine specific aspects of pet attachment in greater detail, we also analyzed each individual LAPS component – averaged over available assessments- as secondary exposures.

Childhood abuse assessment and definition.

Childhood abuse (CA) was derived based on the NHS2 Violence Questionnaire in two steps. To oversample CA in the MBS, a selection indicator was created combining a child trauma index (mean of 5 maltreatment items, coded as 0–4 and categorized using prespecified cut points: ≤0.4, ≤0.8, ≤1.4, >1.4) and a childhood sexual abuse score (sum of 4 unwanted sexual experience items before age 18, coded as 0–2, set to missing if >1 item missing, and categorized as 0, 1–2, 3–4, ≥5). These ordinal components were summed, and women with a combined score ≥4 were eligible for sampling. Further, CA was represented using a combined physical or sexual abuse indicator in ages 0–17, coded as: 1 = none, 2 = physical abuse only, 3 = sexual abuse only, and 4 = both physical and sexual abuse. Participants were classified as exposed to CA if they reported any physical and/or sexual abuse (values 2–4) and unexposed if they reported none (value 1). Responses outside these categories were treated as missing.

Final study sample

Among 214 Mind–Body Study (MBS) participants who completed at least one questionnaire and reported on current pet ownership, 140 women reported owning a pet and completed the Lexington Attachment to Pets Scale (LAPS) at least once. These women constituted the analytic sample for pet-attachment analyses. Because the primary objective of the present study is to examine psychosocial functioning among women with a history of CA, our main analyses focus on the subset of 99 pet-owning participants with available LAPS data who reported CA. Results from models pooling women with and without childhood abuse (N=140) are presented in the Supplementary Material (eTables 3, 5, 7, 9).

Outcomes

Psychosocial functioning was assessed using four previously published and validated measures that capture distinct but complementary dimensions of purpose, control, optimism, and social connectedness. The Life Engagement Test (LET) assesses purpose in life (6 items; 1–5; range 6–30; set to missing if ≥2 items missing)[35]. The Life Orientation Test–Revised (LOT-R) assesses dispositional optimism (6 items; 0–4; range 0–24; missing if ≥1 item missing)[22]. The Pearlin Mastery Scale (PMS) assesses perceived control/mastery (7 items; 1–4; range 7–28; missing if ≥1 item missing)[21] Social integration was assessed with the Berkman–Syme Social Network Index (BSSNI; range 0/1–4; missing if any component item missing)[36]. All outcomes showed moderate-to-high 1-year reproducibility in the MBS (ICCs 0.51–0.81)[33], we therefore averaged each measure across available assessments. The BSSNI is typically analyzed categorically[36–38]. We classified the averaged score into 4 levels (≤1, >1–≤2, >2–≤3, >3–≤4)[36] and, due to sparse cells after stratification by pet type, further dichotomized it as a Social Isolation Indicator (SII; 1 = ≤2 vs 0 = >2).

Modelling strategy

We used averaged continuous LAPS and its six components as exposures. Since LET and LOT-R showed left skewed distributions in our study sample (eFigures 1-2), we modeled these two outcomes using beta-binomial regression and a logit link function in SAS PROC GLIMMIX. The PMS was approximately normally distributed (eFigure 3), therefore we used multivariable generalized linear models (SAS PROC GENMOD) with an identity link[39]. For the SII we applied logistic regression models (SAS PROC LOGISTIC) with Firth correction[40]. Further modeling details can be found in Supplementary Material.

For all outcomes, we performed a series of incremental adjustments. After fitting an age-adjusted model, we added BMI, marital status (married/not married), number of stressful events during past 6 months, presence of life-threatening events (anytime in lifetime) and alcohol consumption (in g/day) in model M0. Since marital status is a component of the BSSNI, we omitted it from the multivariable model when analyzing SII. We then added physical activity in metabolic equivalent of task (MET)-hours/week (model M1) and further neighborhood socioeconomic status (nSES)[41] (model M2). Finally, we fitted model M3 (M0 + nSES) to check the influence of nSES when physical activity was not included. For continuous covariates we averaged values across their available assessments. Covariates were selected a priori as potential confounders and no data-driven model selection procedures were used.

For models M0-M3, we also evaluated whether results differed when stratifying by pet type (dog/cat). Age-adjusted models used the maximum available sample for each outcome. Multivariable models (M0–M3) were estimated in a common complete-case sample with exposure, outcome, and covariates. We did not apply formal corrections for multiple comparisons because the primary goal is to identify patterns that may inform future,

adequately powered confirmatory studies. All analyses were conducted using SAS software, version 9.4 (SAS Institute, Inc., Cary, NC) and Python v3.8.2.

RESULTS

Table 1 presents baseline characteristics in our study sample overall and by pet type. Among 99 pet-owning women with a history of childhood abuse, overall attachment to pets was high (median LAPS 17.0; interquartile range (IQR)13.5–18.0) and was similar across pet types (Table 1). Dog owners (n=58) and cat owners (n=29) reported comparably high agreement of individual attachment items (median 3.0 for most items), with slightly lower ratings for "I often play with my pet" among cat owners (median 2.0; IQR 2.0–3.0). Psychosocial functioning scores were also generally high (median LOT-R 20.0; LET 27.0; PMS 22.75), and 27.3% of participants met criteria for social isolation (SII=1) (Table 1).

Results from the age-adjusted and multivariable-adjusted models M0-M3 did not differ substantially (eTables 3-10), therefore, in the following we discuss only results from model M1. The mean LAPS score was not associated with purpose in life (LET), optimism (LOT-R), mastery (PMS), or social isolation (SII), either in age-adjusted models or after multivariable adjustment (Tables 2–5). Across LAPS components, the most notable pattern was observed for the item "I talk to my pet," which was positively associated with life engagement among dog owners (M1: β=0.35, p=0.046), whereas estimates for cat owners were not suggestive of an association (Table 2). No consistent associations were observed between any attachment measure and LOT-R (Table 3). The item "Owning a pet adds to my happiness" showed a positive association with PMS among any-pet-owners (M1: β=1.39, p=0.035) (Table 4). None of the LAPS' measures or components were consistently associated with the SII (Table 5).

In sensitivity analyses that additionally included women without CA (total N=140; eTables 3, 5, 7, and 9), associations between the overall LAPS score and psychosocial outcomes were similarly null across models. More apparent associations with PMS were observed for "owning a pet adds to my happiness" (βs ranging 1.10–1.32) and "my pet is considered part of the family" (βs ranging 0.63–1.09), with similar patterns among dog owners (eTable 7). No consistent associations were observed for LET, LOT-R, or SII.

DISCUSSION

In this exploratory cross-sectional study of middle-aged and older women with a history of CA, the overall LAPS score, was not associated with life engagement, dispositional optimism, mastery, or social isolation. However, item-level appraisals showed suggestive associations: endorsing "owning a pet adds to my happiness" was associated with higher mastery, and "talking to my pet" was associated with higher life engagement among dog owners.

Our results align with prior evidence in general populations suggesting that potential psychosocial benefits of pet companionship may depend less on ownership *per se* and more on the quality of the relationship and specific interactions with the animal. In a cross-sectional study of dog owners, multiple relationship dimensions were associated with owner mental well-being, with variation by domain[42]. Related work suggests that specific dog-related activities (e.g., walking, training, social interactions) may differentially relate to hedonic vs eudaimonic well-being, supporting the idea that item-level appraisals (e.g., "adds to my happiness," "talking to my pet") may be more informative than a global attachment score[43]. These associations may be weaker when behavioral problems introduce strain in the dog–owner relationship[44] Cat–human interactions may follow different patterns. Qualitative evidence indicates that cat-related activities can support well-being but that perceived costs and behavioral issues also shape owners' experiences, potentially contributing to weaker or more heterogeneous associations among cat owners[45].

Experiencing CA is associated with elevated risk of insecure attachment patterns in human relationships, which may in turn relate to poorer psychosocial wellbeing and greater social isolation later in life[46,47]. Some research further suggests that individuals with insecure interpersonal attachment style may nonetheless form strong, emotionally salient bonds with pets and may use pets as sources of comfort or support[48,49]. In some samples, adults with histories of CA reported higher emotional closeness to pets[50]. For some survivors of CA, pets may represent an additional relational context that is perceived as supportive, predictable, or emotionally comforting. At the same time, perceived support from pets may reflect caregiving roles and daily responsibilities within the relationship, which can shape how owners interpret and report closeness and support[51].

This study has several notable strengths. First, the well-characterized MBS sample, which was specifically designed to assess psychosocial and stress-related variables, allows for characterization of participants' mental health, stress, and relational contexts. Second, we assessed a large number of potential confounders, which increases confidence that the observed associations are not explained by at least these alternative factors. Third, the availability of repeat assessments strengthens the temporal interpretation of our findings and reduces the impact of measurement error. Finally, the unique focus on abuse survivors provides rare insight into this understudied population, allowing us to examine the complex human–animal relationship in a unique cohort with an overrepresentation of women with a history of CA—a group in whom the process of forming a bond with an animal may differ from that in the general population and may be of particularly high personal significance to the pet owner.

Despite the promising patterns observed, several limitations also warrant mention. Similar to our prior cross-sectional study of depression and anxiety outcomes[31], suggestive associations in the current study were most apparent among dog-owners group, and were not consistently observed among cat owners, which may reflect modest subgroup sizes or potential

differences between dog and cat owners that were not fully captured by measured covariates. Another important limitation is the cross-sectional design, which precludes causal inference. Reverse causation is plausible if women with higher mastery or life engagement are more likely to attribute greater happiness or meaning to their relationship with a pet, or to endorse specific relational appraisals (e.g., "adds to my happiness," "I talk to my pet"). Furthermore, we lacked a validated measure of adult human attachment, which could confound associations between pet attachment and psychosocial functioning. Prior cross-sectional work suggests that associations between stronger dog attachment and poorer mental health may reflect insecure human attachment[32], and our social connectedness measure (BSSNI) does not capture attachment orientation or relationship security. Further, our measure of CA focused on physical and sexual abuse and related maltreatment indicators. Other attachment-relevant disruptions (e.g., parental separation, divorce or foster care) were not comprehensively captured and could not be evaluated, underscoring the need for studies incorporating broader caregiving-disruption histories. Finally, all participants were women from the NHS2, which may limit generalizability to the broader population of individuals affected by CA, including men, and underscores the need for further longitudinal studies in more diverse samples of people with CA. Since all participants were registered nurses, educational attainment was relatively homogeneous, limiting our ability to evaluate whether associations differed by education level that may influence both pet-related experiences and psychosocial functioning.

In this exploratory cross-sectional study of middle-aged and older women with childhood abuse histories, overall LAPS-measured pet attachment was not associated with life engagement, optimism, mastery, or social isolation. However, selected relationship appraisals (e.g. perceiving that pet ownership adds to happiness and, among dog owners, talking to one's pet) were associated with higher mastery and greater life engagement in women. These findings

are hypothesis generating and should be evaluated in larger, longitudinal studies that assess adult human attachment and pet-related routines and caregiving context.

DECLARATIONS

Ethics approval and consent to participate

The MBS study protocol was approved by the institutional review boards of the Brigham and Women's Hospital and Harvard T.H. Chan School of Public Health. All methods were carried out in accordance with relevant guidelines and regulations, including the Declaration of Helsinki. Written informed consent was obtained from all participants.

Consent for publication

Not applicable

Availability of data and materials

The data analyzed in this study are from the Mind–Body Study, a substudy of the Nurses' Health Study 2. The data are not publicly available because they contain participant information subject to confidentiality protections and cohort governance restrictions. Qualified researchers may request access to Nurses' Health Study data through the established Nurses' Health Study data access procedures, subject to appropriate approvals.

Competing interests

Dr. Żebrowska has received a sponsorship from Nestlé-Purina Petcare Global Resources.

Dr. Vyas has received research support from Nestlé-Purina Petcare Company, Mars Edge, Alzheimer's Association and American Foundation for Suicide Prevention.

Dr. Westgarth has received research support from MARS Petcare/Waltham Petcare Science Institute, Dogs Trust, and BSAVA Petsavers. She has also previously received consultancy fees from Waltham Petcare Science Institute, Royal Canin.

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Authors' contributions

All authors read and approved the final version of the manuscript.

MZ: conceptualization, data curation, formal analysis, investigation, methodology, project administration, resources, software, writing – original draft; C.W.: conceptualization, writing– review and editing; S.S.: technical review; writing– review and editing; O.A.Z: writing– review and editing; C.M.V: methodology, writing– review and editing;

T.H: writing– review and editing; F.L, C.H, A.H.E, J.E.C, B.R, I.K, O.I.O: conceptualization, methodology, writing– review and editing; E.S.S: conceptualization, funding acquisition, supervision, writing – original draft, writing– review and editing. M.Z and S.S accessed and verified the underlying data.

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Table 1: Characteristics of the N=99 Mind-Body Study's participants who reported on pet ownership and declared history of childhood abuse, averaged over available assessments, by pet type.

	Any Pet Owners (N=99)	Dog Owners (N=58)	Cat Owners (N=29)	Mixed owners (N=12)
Exposure[a]; median (Q1; Q3)				
LAPS	17.00 (13.50;18.00)	17.00 (14.00;18.00)	16.50 (14.00;18.00)	17.00 (10.75;18.00)
Exposure components [a] ; median (Q1; Q3)				
"I consider my pet a friend"	3.00 (2.00;3.00)	3.00 (2.00;3.00)	3.00 (2.00;3.00)	2.75 (1.75;3.00)
"I talk to my pet"	3.00 (2.50;3.00)	3.00 (2.00;3.00)	3.00 (2.50;3.00)	3.00 (2.25;3.00)
"Owning a pet adds to my happiness"	3.00 (2.50;3.00)	3.00 (2.50;3.00)	3.00 (2.50;3.00)	3.00 (2.00;3.00)
"I talk to others about my pet"	3.00 (2.00;3.00)	3.00 (2.00;3.00)	3.00 (2.00;3.00)	2.75 (2.00;3.00)
"I often play with my pet"	3.00 (2.00;3.00)	3.00 (2.00;3.00)	2.00 (2.00;3.00)	2.75 (2.00;3.00)
"My pet is considered part of the family"	3.00 (2.50;3.00)	3.00 (2.50;3.00)	3.00 (2.50;3.00)	3.00 (2.00;3.00)
Continuous outcomes: median (Q1; Q3)				
Life Orientation Test	20.00 (16.00;23.00)	20.25 (16.00;22.00)	19.50 (15.50;22.00)	21.75 (17.50;23.50)
Life Engagement Test	27.00 (24.40;29.00)	27.00 (24.50;29.00)	25.00 (24.00;29.00)	26.25 (24.45;29.00)
Pearlin Mastery Scale	22.75 (20.00;25.25)	22.00 (20.00;26.00)	23.00 (20.50;24.50)	23.75 (20.00;24.50)
Dichotomous outcome: N (%)				
Social Isolation Indicator	27 (27.3%)	16 (27.6%)	8 (27.6%)	3 (25.0%)
Demographic and psychosocial characteristics[b]				
Age	60.78 (4.17)	60.29 (4.15)	61.55 (4.14)	61.24 (4.38)
BMI[d]	27.31 (6.07)	27.15 (5.13)	27.01 (7.32)	28.84 (7.19)
Alcohol consumption[d] (g/day)	26.99 (26.65)	26.64 (26.39)	24.81 (23.67)	33.97 (35.02)
Physical activity (METs hours per week)[c]	8.06 (11.82)	9.13 (13.61)	5.13 (6.88)	9.96 (11.48)
Socio economic status (nSES)	0.45 (4.42)	0.98 (4.57)	-0.70 (3.92)	0.62 (4.64)
Married	73 (73.74%)	45 (77.59%)	18 (62.07%)	10 (83.33%)
Number of stressful events during past 6 months	1.38 (1.47)	1.32 (1.46)	1.26 (1.10)	1.96 (2.17)
Life-threatening events, ever in life	47 (47.47%)	24 (41.38%)	17 (58.62%)	6 (50.00%)

[a] 0: strongly disagree; 1: disagree; 2: agree; 3: strongly agree; [b] Values are means ± SD or percentages; [c] Assessed in 2001;[d] Assessed in 2011.

Table 2: Association between the mean Lexington Attachment to Pets Scale (LAPS) and its components and Life Engagement Test (LET**)** among Mind Body Study participants who reported on LAPS and declared history of childhood abuse (N=99).

			Any Pet Owners				Dog Owners				Cat Owners			
Outcome	**Exposure**	**Model**	**N**	**β**	**SE**	**p**	**N**	**β**	**SE**	**p**	**N**	**β**	**SE**	**p**
LET	LAPS	Age adj.	99	0.0214	0.0269	0.4282	58	0.0559	0.0351	0.1170	29	0.0425	0.0765	0.5836
		M1	96	0.0194	0.0257	0.4521	56	0.0355	0.0357	0.3247	28	0.0613	0.0880	0.4944
	I consider my pet a friend	Age adj.	99	0.0387	0.1084	0.7219	58	0.1222	0.1363	0.3737	29	-0.0353	0.2466	0.8872
		M1	96	0.0409	0.1049	0.6978	56	0.0498	0.1355	0.7147	28	-0.0476	0.2806	0.8672
	I talk to my pet	Age adj.	99	0.1615	0.1277	0.2089	**58**	**0.4237**	**0.1686**	**0.0149**	29	0.0775	0.3059	0.8019
		M1	96	0.1546	0.1207	0.2036	**56**	**0.3458**	**0.1683**	**0.0455**	28	0.0106	0.3026	0.9725
	Owing a pet adds to my happiness	Age adj.	99	0.1836	0.1693	0.2810	58	0.3959	0.2103	0.0650	29	0.2383	0.4087	0.5649
		M1	96	0.1321	0.1587	0.4077	56	0.2794	0.2125	0.1949	28	0.4261	0.4186	0.3215
	I talk to others about my pet	Age adj.	99	0.0246	0.1475	0.8680	58	0.1857	0.1918	0.3372	29	0.1223	0.4366	0.7816
		M1	96	0.0385	0.1463	0.7929	56	0.0644	0.1949	0.7424	28	0.4965	0.5331	0.3634
	I often play with my pet	Age adj.	99	0.0937	0.1324	0.4808	58	0.1189	0.1773	0.5051	29	0.4473	0.3473	0.2091
		M1	96	0.0592	0.1287	0.6466	56	0.0254	0.1808	0.8890	28	0.3609	0.3437	0.3069
	My pet is considered part of the family	Age adj.	99	0.1387	0.1614	0.3923	58	0.3409	0.2040	0.1005	29	0.3116	0.4194	0.4640
		M1	96	0.1445	0.1535	0.3491	56	0.2569	0.1976	0.1999	28	0.4442	0.4605	0.3468

Age adj.: models containing exposure and age.
M1: models containing exposure, age, body mass index (BMI), **marital status,** number of stressful events during past 6 months, a presence of life-threatening events (anytime in lifetime), alcohol consumption, physical activity (METs);
β – standardized regression coefficients from beta-binomial regression; **SE** - standard errors, **p** - p-values from beta-binomial regression models.

Table 3: Association between the mean Lexington Attachment to Pets Scale (LAPS) and its components and Life Orientation Test -Revised (LOT-R) among Mind Body Study participants who reported on LAPS and declared history of childhood abuse (N=99).

			Any Pet Owners				Dog Owners				Cat Owners			
Outcome	**Exposure**	**Model**	**N**	**β**	**SE**	**p**	**N**	**β**	**SE**	**p**	**N**	**β**	**SE**	**p**
LOT-R	**LAPS**	Age adj.	99	-0.0016	0.0264	0.9505	58	0.0303	0.0357	0.4011	29	-0.0669	0.0747	0.3787
		M1	96	-0.0012	0.0287	0.9668	56	0.0101	0.0399	0.8021	28	0.0098	0.0895	0.9143
	I consider my pet a friend	Age adj.	99	-0.0814	0.1072	0.4493	58	0.0488	0.1414	0.7314	29	-0.3774	0.2381	0.1250
		M1	96	-0.0721	0.1187	0.5449	56	-0.0121	0.1567	0.9388	28	-0.1700	0.2799	0.5510
	I talk to my pet	Age adj.	99	0.0693	0.1236	0.5763	58	0.2716	0.1741	0.1246	29	-0.1569	0.2846	0.5862
		M1	96	0.0485	0.1353	0.7211	56	0.1688	0.1976	0.3972	28	-0.0554	0.3137	0.8617
	Owing a pet adds to my happiness	Age adj.	99	0.1314	0.1622	0.4200	58	0.1996	0.2211	0.3706	29	0.2862	0.3646	0.4396
		M1	96	0.1349	0.1750	0.4428	56	0.0973	0.2424	0.6899	28	0.5606	0.3835	0.1601
	I talk to others about my pet	Age adj.	99	0.0189	0.1381	0.8914	58	0.2627	0.1832	0.1571	29	-0.4803	0.4149	0.2575
		M1	96	0.0495	0.1508	0.7433	56	0.1895	0.2096	0.3706	28	-0.0083	0.5152	0.9873
	I often play with my pet	Age adj.	99	-0.0136	0.1267	0.9148	58	0.0199	0.1748	0.9096	29	0.0839	0.3236	0.7975
		M1	96	-0.0548	0.1406	0.6979	56	-0.0917	0.2026	0.6530	28	0.1173	0.3415	0.7351
	My pet is considered part of the family	Age adj.	99	-0.0643	0.1613	0.6911	58	0.0743	0.2132	0.7289	29	-0.4306	0.4095	0.3026
		M1	96	-0.0256	0.1784	0.8864	56	0.0056	0.2371	0.9811	28	-0.0135	0.4570	0.9768

Age adj.: models containing exposure and age.
M1: models containing exposure, age, body mass index (BMI), **marital status,** number of stressful events during past 6 months, a presence of life-threatening events (anytime in lifetime), alcohol consumption, physical activity (METs);
β - standardized regression coefficients from beta-binomial regression; **SE** - standard errors, **p** - p-values from beta-binomial regression models.

Table 4: Association between the mean Lexington Attachment to Pets Scale (LAPS) and its components and Pearlin Mastery Scale (PMS) among Mind Body Study participants who reported on LAPS and declared history of childhood abuse (N=99).

			Any Pet Owners				Dog Owners				Cat Owners			
Outcome	**Exposure**	**Model**	**N**	**β**	**SE**	**p**	**N**	**β**	**SE**	**p**	**N**	**β**	**SE**	**p**
PMS	**LAPS**	Age adj.	96	0.0748	0.1088	0.4937	57	0.2082	0.1421	0.1486	29	-0.1522	0.3143	0.6322
		M1	93	0.0922	0.1064	0.3885	55	0.1530	0.1524	0.3205	28	0.1893	0.3550	0.6001
	I consider my pet a friend	Age adj.	96	-0.2618	0.4328	0.5467	57	0.0067	0.5602	0.9906	29	-1.1636	1.0356	0.2714
		M1	93	-0.1002	0.4271	0.8151	55	-0.1534	0.5961	0.7981	28	-0.2578	1.2073	0.8332
	I talk to my pet	Age adj.	96	0.3241	0.5222	0.5364	57	1.1875	0.7071	0.0989	29	-1.1992	1.2082	0.3301
		M1	93	0.4230	0.5096	0.4089	55	0.9059	0.7417	0.2282	28	-0.3241	1.2955	0.8051
	Owing a pet adds to my happiness	Age adj.	96	**1.3566**	**0.6628**	**0.0435**	57	1.8235	0.8726	0.0414	29	1.9095	1.5973	0.2427
		M1	93	**1.3936**	**0.6497**	**0.0348**	55	1.4259	0.9355	0.1343	28	2.9454	1.5360	0.0703
	I talk to others about my pet	Age adj.	96	0.3791	0.5826	0.5169	57	0.9442	0.7541	0.2160	29	-0.1726	1.8234	0.9253
		M1	93	0.4552	0.5727	0.4289	55	0.6412	0.8223	0.4395	28	2.1028	2.0786	0.3244
	I often play with my pet	Age adj.	96	0.1607	0.5448	0.7687	57	0.9553	0.7065	0.1820	29	-0.8508	1.3747	0.5414
		M1	93	0.0305	0.5307	0.9544	55	0.6716	0.7676	0.3862	28	-0.5688	1.3690	0.6824
	My pet is considered part of the family	Age adj.	96	0.8905	0.6495	0.1737	57	1.4447	0.8278	0.0866	29	0.5182	1.6930	0.7620
		M1	93	1.1004	0.6384	0.0884	55	1.3015	0.8588	0.1365	28	2.0067	1.7457	0.2646

Age adj.: models containing exposure and age.
M1: models containing exposure, age, body mass index (BMI), **marital status**, number of stressful events during past 6 months, a presence of life-threatening events (anytime in lifetime), alcohol consumption, physical activity (METs); **β** - effect estimates; **SE** - standard errors, **p** - p-values from linear regression models.

Table 5: Association between the mean Lexington Attachment to Pets Scale (LAPS) and its components and dichotomized Berkman–Syme Social Network Index (Social Isolation Indicator (SII)) among Mind Body Study participants who reported on LAPS and declared history of childhood abuse (N=99).

			Any pet				Dog				Cat			
	Exposure	**Model**	**N**	**Ncase**	**OR**	**95%CI**	**N**	**Ncase**	**OR**	**95%CI**	**N**	**Ncase**	**OR**	**95%CI**
SII	**LAPS**	**Age adj.**	99	27	0.992	(0.86,1.15)	58	16	0.964	(0.80,1.17)	29	8	1.120	(0.77,1.68)
		M1	99	27	0.993	(0.86,1.15)	58	16	0.932	(0.76,1.15)	29	8	0.981	(0.61,1.58)
	I consider my pet a friend	**Age adj.**	99	27	0.741	(0.43,1.29)	58	16	0.689	(0.34,1.41)	29	8	0.916	(0.27,3.34)
		M1	99	27	0.734	(0.42,1.28)	58	16	0.618	(0.28,1.32)	29	8	0.600	(0.09,2.66)
	I talk to my pet	**Age adj.**	99	27	0.844	(0.44,1.69)	58	16	0.708	(0.28,1.83)	29	8	1.138	(0.28,5.74)
		M1	99	27	0.879	(0.46,1.73)	58	16	0.649	(0.24,1.75)	29	8	0.942	(0.21,4.24)
	Owing a pet adds to my happiness	**Age adj.**	99	27	0.970	(0.41,2.52)	58	16	0.803	(0.27,2.82)	29	8	2.969	(0.40,42.67)
		M1	99	27	0.961	(0.41,2.51)	58	16	0.639	(0.18,2.40)	29	8	1.363	(0.13,19.87)
	I talk to others about my pet	**Age adj.**	99	27	0.945	(0.46,2.12)	58	16	0.699	(0.27,1.92)	29	8	2.367	(0.28,33.05)
		M1	99	27	0.927	(0.45,2.04)	58	16	0.555	(0.18,1.64)	29	8	1.119	(0.06,26.71)
	I often play with my pet	**Age adj.**	99	27	1.654	(0.78,3.97)	58	16	1.361	(0.52,4.18)	29	8	2.555	(0.48,16.46)
		M1	99	27	1.648	(0.79,3.92)	58	16	1.166	(0.41,3.66)	29	8	2.080	(0.37,26.88)
	My pet is considered part of the family	**Age adj.**	99	27	1.024	(0.44,2.56)	58	16	1.156	(0.38,4.05)	29	8	0.990	(0.14,7.92)
		M1	99	27	0.984	(0.42,2.47)	58	16	1.082	(0.35,3.83)	29	8	0.452	(0.04,4.70)

Age adj.: models containing exposure and age.
M1: models containing exposure, age, body mass index (BMI), number of stressful events during past 6 months, a presence of life-threatening events (anytime in lifetime), alcohol consumption, physical activity (METs)
Ncase denotes number of "socially isolated" participants (i.e., those with SII=1); OR - odds ratios; **95%CI** - 95% confidence intervals from the logistic models for SII.

Supplementary Files

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