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Short Communication

Dog attachment and perceived social support in overweight/obese and healthy weight children

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ABSTRACT

The development of effective and sustainable interventions to treat childhood obesity remains both a priority and a challenge. Previous studies support that dogs provide social support in overweight adults in obesity interventions, but the child-dog relationship is not as well understood. The goal of the study was to examine the child-dog relationship among children to inform novel childhood obesity interventions including dogs. A cross-sectional study was conducted in the Living Laboratory® at the Museum of Science, Boston in 2015. Children aged 8–13, with a dog in the household, answered surveys on pet attachment (Pet Relationship Scale), perceived social support from parents and close friends (Child and Adolescent Social Support Scale), and had a height and weight measurement taken for calculation of body mass index percentile. Overweight and obese children (≥85th body mass index percentile) had greater mean attachment score to their dog and less mean perceived social support from their parents and friends combined compared to healthy weight children (73.1 ± 5.6 vs. 68.5 ± 7.2, $p = 0.037$; 110.5 ± 13.5 vs. 122.9 ± 14.8, $p = 0.015$, respectively; $n = 43$). In conclusions, children who are overweight/obese report greater mean dog attachment and lower mean perceived social support, supporting the concept that pet dogs are considered part of overweight/obese children's social support networks. Future studies are warranted to evaluate the impact of including pet dogs as additional health support in child obesity interventions.

1. Introduction

For the first time, our current generation of children may have lower life expectancy while facing an ever-increasing economic burden due to costs from obesity and associated co-morbidities. (Wang & Dietz, 2002) Additional challenges, such as anxiety, depression, and other mental health challenges associated with obesity, may hinder obesity treatment. (Vander Wal & Mitchell, 2011) Behavior modification for children must be comprehensive and sustainable, which would benefit from an element of enjoyment to maintain engagement. (Epstein et al., 1998; Epstein & Wrotniak, 2010; Alberga et al., 2013) For successful obesity treatment, it is also desirable that children are provided with mental health support, such as social support, to provide motivation. (Goldschmidt et al., 2014)

Interactions with pets or visitation from therapy animals has been associated with mental and physical health benefits. (Friedmann & Son, 2009) Children often demonstrate high levels of attachment to their pets and frequently consider them family members. (Albert & Bulcroft, 1988) Pets can provide for children a trust and social support that is not always possible from human conspecifics, even friends or family members. (Albert & Bulcroft, 1988) Human-animal interaction has also been shown to improve sustained focus, emotional stability, attitudes towards learning, and progress on individual goals—essential qualities for establishing and maintaining lifestyle behavior changes. (Barker & Wolen, 2008) When these benefits of human-animal interaction are applied to obesity interventions in adults, studies suggest that incorporating animals into interventions has the potential to provide enjoyment, motivation, and increased physical activity. (Wohlfarth et al., 2013; Kushner et al., 2006; Morrison et al., 2013).

The dog-owner therapeutic relationship has been initially explored in overweight adult populations, and preliminary studies suggest that overweight adults have different relationships with dogs compared to healthy weight adults. One study found that increasing body mass

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index (BMI) is associated with greater pet attachment and less perceived social support. (Stephens et al., 2012) However, this has not been studied in overweight children. More in-depth knowledge is needed to understand this relationship in children, especially children who are overweight/obese. Therefore, the goal of this study was to increase knowledge of the child-dog relationship in overweight/obese and healthy weight children by evaluating the associations between weight status, dog attachment, and perceived social support.

2. Methods

2.1. Study population

Child museum visitors aged 8–13 years were eligible to participate in the study. Exclusion criteria included children without a dog in the household at the time of the study, those visiting the museum without a parent/legal guardian (e.g., with a school trip), or those not fluent in English. Ethical approval was obtained from the Social, Behavioral and Educational Institutional Review Board of Tufts University and the Ethical Review Board of the Boston Museum of Science. Parents/legal guardians provided written consent and children provided written assent to participate.

2.2. Measures

The study was conducted at the Living Laboratory® at the Museum of Science, Boston. Data collection occurred between April 2015 through October 2015. The Living Laboratory® program allows for children who visit the museum with their parent/legal guardian to actively participate in research projects and learn about the research process. As visitors walked by a designated section of the museum, the Living Laboratory ®, they were approached by study investigators, who explained the purpose of the Living Laboratory®, summarized the study and protocol and asked if they would like to participate (if eligible). While children were filling out surveys, parents/legal guardians were asked to provide privacy for their child to fill out the survey that may have family-related questions (i.e., parents/legal guardians were within sight while the study was conducted, but were not allowed to view completed surveys that the children filled out). During this time, parent/legal guardians completed a brief demographic survey which included information on family income, number of children and pets in household, and pet demographic information. Children filled out surveys on dog attachment [modified Pet Relationship Scale (PRS)] (Lago et al., 1988) and perceived social support [Child and Adolescent Social Support Scale (CASSS)]. (Malecki & DeMaray, 2002) The PRS is a 22-item rating scale with a four-point Likert-type format (from Strongly Disagree to Strongly Agree) to determine overall dog attachment, with questions such as "I talk to my pet about things that bother me" and "My pet knows when I'm upset and tries to comfort me." The PRS was reviewed for readability for the target age group and modified to remove words that were above third grade reading level. Participants were asked to answer for their favorite pet dog (if they owned more than one). The CASSS is a 40-item frequency rating scale measuring perceived social support on a six-point Likert scale and has been validated for children aged 8–13. Only the parent and close friend subscales were evaluated in this study. Incentives are not allowed as part of the Museum of Science policies, however, stickers were permitted to be given out to anyone who spoke with investigators.

Child height and weight was measured using a stadiometer (Seca Model 213 Portable Stadiometer Height-Rod, Seca North America, Chino, CA, USA) and scale (Seca Clara Model 803 Digital Personal Scale, Seca North America, Chino, CA, USA) and recorded without visibility for visitors. Outerwear was removed, but shoes were not due to the public setting of the research. BMI percentile was calculated according to methods established by the Centers for Disease Control. (Center for Disease Control, 2015) Weight status was categorized into two groups: overweight/obese (≥85th BMI percentile) and healthy weight children (<85th BMI percentile). Underweight children (<5th BMI percentile, $n = 1$) were excluded from final analysis.

2.3. Statistical analysis

Data are presented as mean ± standard deviation for normally distributed data and median (range) for skewed data. Analyses were performed using two-sample *t*-tests, Mann Whitney *U* tests, Chi-square tests (or Fisher's exact tests) and Pearson correlation. All statistical analyses were performed using SPSS v.22.0 (IBM Corp., Armonk, NY, USA). A *p*-value <0.05 was considered statistically significant.

3. Results

Of the 43 child participants, 27.9% ($n = 12$) were categorized as overweight/obese (≥85th BMI percentile) and 72.1% ($n = 31$) were categorized as healthy weight (<85th BMI percentile), Table 1. Child characteristics were similar between the two groups, and participants in both groups were predominately female, Table 1. Parent/legal guardian-reported demographics were also similar between groups, with the exception of education level, where the overweight/obese group had more parents/legal guardians reporting high school education or less (Table 1; $p = 0.001$). Dog characteristics were similar between the two groups, with the exception of older dog age in the overweight/obese group ($p = 0.002$).

Overweight/obese children had significantly greater mean dog attachment scores compared to healthy weight children (Table 2; $p = 0.037$). Overweight/obese children also had significantly lower mean total (parent and close friend) perceived social support scores compared to healthy weight children (Table 2; $p = 0.015$). When evaluated separately, overweight/obese children had significantly less mean perceived social support from close friends compared to healthy weight

Table 1
Subject characteristics of a survey conducted in the Living Laboratory® at the Museum of Science, Boston in 2015 and expressed in median (range) or count (percentage) between overweight/obese and healthy weight groups.

Variable	Overweight/obese	Healthy weight	*P* value
n	12	31	–
Child characteristics			
BMI	24.2 (19.7–35.4)	16.9 (14.8–20.6)	–
BMI percentile	95.4 (88.6–99.2)	51.1 (5.0–84.0)	–
Age (yrs)	10.5 (8–12)	11.0 (8–13)	0.698
Gender			
Female, n (%)	11 (91.7%)	20 (64.5%)	0.075
Children in household			
Only children, n (%)	3 (25.0%)	4 (12.9%)	0.335
Parent/legal guardian Characteristics			
Age (yrs)	46 (36–61)	43 (36–54)	0.229
Education level			
High school or less, n (%)	4 (33.3%)	0 (0.0%)	0.001
Household yearly income level			0.321
Less than $10,000, n (%)	0 (0.0%)	0 (0.0%)	
$10,000–$29,999, n (%)	1 (11.0%)	0 (0.0%)	
$30,000–$49,999, n (%)	0 (0.0%)	1 (3.0%)	
$50,000–$74,999, n (%)	1 (11.0%)	3 (9.0%)	
$75,000–$99,999, n (%)	2 (22.0%)	4 (13.0%)	
$100,000 +, n (%)	5 (56.0%)	24 (75.0%)	
Race			
White, n (%)	12 (100.0%)	29 (93.5%)	0.368
Dog characteristics			
Age (yrs)	6.5 (4–11)	3.1 (1–14)	0.001
	Number of dogs in the household		
Only dog, n (%)	10 (90.9%)	22 (71.0%)	0.182

Table 2
Comparison of mean dog attachment scores and perceived social support scores from a survey conducted in the Living Laboratory® at the Museum of Science, Boston in 2015 between overweight/obese and healthy weight children.

Variable (mean)	Overweight/obese	Healthy weight	*P* value
n	12	31	–
Dog attachment score	73.1 ± 5.6	68.5 ± 7.2	0.037
Perceived social support scores			
Total score	110.5 ± 13.5	122.9 ± 14.8	0.015
Parent/legal guardian subscale	58.3 ± 7.6	62.0 ± 8.3	0.179
Close friend subscale	52.2 ± 9.5	60.9 ± 9.2	0.013

children (Table 2; $p = 0.013$), however, there was not a statistically significant difference in perceived social support from parents/legal guardians (Table 2; $p = 0.179$). Secondary analyses indicated that there were no statistically significant correlations between dog attachment score and total perceived social support ($r = -0.010$, $p = 0.948$), nor between dog attachment score and the parent or close friend subscales ($r = 0.007$, $p = 0.965$; $r = -0.028$, $p = 0.861$, respectively).

4. Conclusions

The findings of the current study support that overweight/obese children are more attached to their pet dogs than healthy weight children and have less perceived social support from friends, consistent with findings in adults. The mechanism behind this association is unknown, but it has been speculated that pet dogs may serve as a surrogate support network for their owners, particularly when owners have less perceived peer social support. (Stephens et al., 2012) Child obesity has been associated with numerous mental health concerns as well as a social stigma, which is consistent with the findings in this and other studies where overweight/obese children report less perceived social support from peers. However, because dog attachment was also measured in the same population, this study highlights a potential mechanism that explains a higher dog attachment in overweight/obese children, in which dogs could be taking the place of peer social support due to the unconditional love from dogs that children report.

Provision of a surrogate support network may be a complex mechanism, which could explain the lack of a significant correlation between dog attachment and perceived social support. Future studies with a larger sample size could address potential nuances of the complex support network in children and also whether an association between dog attachment and perceived social support differs in healthy weight and overweight/obese populations. The predominance of female participants and the difference in median age of the dogs could also be explored in future studies to include gender and dog age as covariates.

Limitations of the study must be considered, such as generalizability and sample size, since this population only reflects those parents/legal guardians who chose to visit a museum focusing on science education. As a pilot study, sample size was small and thus did not allow analyses to control for covariates. With a smaller sample size, these results may not be generalizable to all overweight/obese children and further studies are warranted to confirm these pilot findings. However, even with a small sample size, demographic results showed that individuals from varied socioeconomic backgrounds participated, although not a diverse racial/ethnic background warranting future studies.

Future studies could expand the study population to consider other companion animals or a more diverse racial/ethnic background and geographic population of participants that could allow for multivariate analysis. Covariates that could affect the human-animal bond, such as age of the dog (and thus a longer duration of ownership) or number of siblings, could be addressed in analyses of future studies with a larger sample size. Additionally, future studies could compare CASSS scores from children with a dog to those in a cohort of both healthy and overweight children without a dog. Overall, the study findings support that dogs play an important role in the social support network of children, particularly in overweight/obese children. Future studies could leverage this human-animal bond to determine the clinical significance of these findings in weight loss interventions.

Conflict of interest

The authors declare there is no conflict of interest.

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References

Alberga, A.S., Medd, E.R., Adamo, K.B., et al., 2013. Top 10 practical lessons learned from physical activity interventions in overweight/obese children and adolescents. Appl. Physiol. Nutr. Metab. 38 (3), 249–258.

Albert, A., Bulcroft, K., 1988. Pets, families, and the lifecourse. J Marriage Fam. 50, 543–552.

Barker, S.B., Wolen, A.R., 2008. The benefits of human-companion animal interaction: a review. J. Vet. Med. Educ. 35 (4), 487–495.

Center for Disease Control, 2015. BMI Percentile Calculator for Child and Teen. Metric Version.Available at:. http://nccd.cdc.gov/dnpabmi/Calculator.aspx (Accessed on October 10, 2015).

Epstein, L.H., Wrotniak, B.H., 2010. Future directions for pediatric obesity treatment. Obesity 18 (S1), S8–12.

Epstein, L.H., Myers, M.D., Raynor, H.A., Saelens, B.E., 1998. Treatment of pediatric obesity. Pediatrics 101, 554–570.

Friedmann, E., Son, H., 2009. The human-companion animal bond: how humans benefit. Vet. Clin. N. Am. Small Anim. Pract. 39 (2), 293–326.

Goldschmidt, A.B., Best, J.R., Stein, R.I., Saelens, B.E., Epstein, L.H., Wilfley, D.E., 2014. Predictors of child weight loss and maintenance among family-based treatment completers. J. Consult. Clin. Psychol. 82 (6), 1140–1150.

Kushner, R.F., Blatner, D.J., Jewell, D.E., Rudloff, K., 2006. The PPET study: people and pets exercising together. Obesity 14 (10), 1762–1770.

Lago, D., Kafer, R., Delaney, M., Connell, C., 1988. Assessment of favorable attitudes toward. pets: development and preliminary validation of self-report pet relationship scales. Anthrozoös 1 (4), 240–254.

Malecki, C.K., DeMaray, M.K., 2002. Measuring perceived social support: development of the child and adolescent social support scale (CASSS). Psychol Sch. 39, 1–18.

Morrison, R., Reilly, J.J., Penpraze, V., et al., 2013. Children, parent/legal guardians and pets exercising together (CPET): exploratory randomized controlled trial. BMC Public Health 13, 1096.

Stephens, M.B., Wilson, C.C., Goodie, J.L., Netting, F.E., Olsen, C.H., Byers, C.G., 2012. Health perceptions and levels of attachment: owners and pets exercising together. J. Am. Board Fam. Med. 25 (6), 923–926.

Vander Wal, J.S., Mitchell, E.R., 2011. Psychological complications of pediatric obesity. Pediatr. Clin. N. Am. 58 (6), 1393–1401.

Wang, G., Dietz, W.H., 2002. Economic burden of obesity in youths aged 6 to 17 years: 1979–1999. Pediatrics 109, E81.

Wohlfarth, R., Mutschler, B., Beetz, A., Kreuser, F., Korsten-Reck, U., 2013. Dogs motivate obese children for physical activity: key elements of a motivational theory of animal-assisted interventions. Front. Psychol. 4, 796.