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Dog walking among adolescents: Correlates and contribution to physical activity

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ABSTRACT

Purpose. To assess the association of dog walking with adolescents' moderate-to-vigorous physical activity (MVPA) and body mass index (BMI), and identify correlates of dog walking.

Methods/design. Participants were 12–17 year-olds (n = 925) from the Baltimore, MD and Seattle, WA regions. Differences in accelerometer-assessed minutes/day of MVPA and self-reported BMI (percentile) were compared among adolescents (1) without a dog (n = 441) and those with a dog who (2) did (≥1 days/week, n = 300) or (3) did not (n = 184) walk it. Correlates of (1) dog walking (any vs. none) among adolescents with dogs (n = 484), and (2) days/week of dog walking among dog walkers (n = 300) were investigated. Potential correlates included: demographic, psychosocial, home environment, perceived neighborhood environment, and objective neighborhood environment factors.

Results. 52% of adolescents lived in a household with a dog, and 62% of those reported dog walking ≥1 day/week. Dog walkers had 4–5 more minutes/day of MVPA than non-dog-walkers and non-dog-owners. BMI was not associated with dog walking or ownership. Among households with dogs, adolescents who lived in objectively walkable neighborhoods were 12% more likely to walk their dog than those in less walkable neighborhoods. Among dog walkers, having a multi-family home, college-educated parent, lower perceived traffic safety, higher street connectivity and less mixed use were related to more days/week of dog walking.

Conclusions. Dog walkers had 7–8% more minutes/day of MVPA than non-dog walkers, and correlates of dog walking were found at multiple levels of influence. Results suggest multilevel interventions that include both environmental and psychosocial components to increase dog walking should be evaluated.

Background

The National Health and Nutrition Examination Survey (NHANES) found that only 8% of US adolescents met the recommended 60 min of physical activity a day, based on objective measures (Troiano et al., 2008). While 84% of adolescents reported walking as a source of physical activity (Brener et al., 2013), GPS-measured minutes of walking in this population appear low (Carlson et al., 2015). Therefore, walking may be a promising approach to increase adolescents' physical activity.

Because nearly half of US households have a dog (American Pet Products Manufacturers Association, 2012), dog walking could be an important contributor to physical activity, but many adult and adolescent dog owners report little or no dog walking (Christian et al., 2013a; Salmon et al., 2010; Timperio et al., 2008). A meta-analysis of 17 studies found that dog ownership and dog walking were associated with greater overall physical activity. Only 4 studies used objective measures of physical activity, and few studied adolescents or children (Christian et al., 2013b). A review of 9 dog walking studies among adults calculated the odds of meeting moderate intensity physical activity guidelines and concluded that dog walkers were 2.5 times more likely to meet the guidelines (Soares et al., 2015). Identifying factors, like motivators and barriers, related to dog walking is important because results can inform interventions to increase dog walking (Cutt et al., 2008).

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Multiple levels of correlates should be examined, because ecological models posit that variables at individual, social, community environment, and policy levels influence behaviors (Sallis and Owen, in press). Correlates of dog walking in previous studies included those at the individual level (i.e., race/ethnicity, income, illness), social level (i.e., social support, walking as a family, neighborhood social cohesion), perceived environment level (i.e., perceived crime) and objective environment level (i.e., weather and neighborhood walkability) (Salmon et al., 2010; Toohey et al., 2013; Coleman et al., 2008). Few studies applied principles of ecological models by examining multiple levels and interactions (i.e. moderators) across levels.

A systematic review of dog walking studies found only 2 studies examined children or adolescents (Christian et al., 2013a), and 18% of youth aged 10–12 years walked their dogs at least 3 times per week (Salmon et al., 2010; Timperio et al., 2008). One of the studies found owning a dog was associated with 29 additional minutes of moderate to vigorous physical activity (MVPA) per day among younger female children, yet no effects for males or older females (Salmon et al., 2010). Children who lived in households with dogs were 49% more likely to achieve physical activity recommendations (Christian et al., 2012). The current study filled gaps in the literature by quantifying the contribution of dog walking to objectively-measured total physical activity in adolescents and investigating a broader range of correlates of dog walking at multiple levels.

The first objective of the present paper was to quantify the difference in MVPA and weight status (i.e. BMI) between adolescents living in households 1) without dogs, 2) with a dog but did not walk it, and 3) who reported any dog walking. A second objective was to explore the subsample of dog owners to assess ecological correlates of walking the dog at all versus none. A third objective was to assess correlates of dog walking frequency (days/week) among dog walkers. A final objective was to explore cross-level interactions in both dog household subsamples (i.e. dog owners and dog walkers) to identify moderators of associations.

Methods

Study design and participants

The present study used data from the Teen Environment and Neighborhood (TEAN) observational study (Carlson et al., 2014, 2015). Participants were adolescents aged 12–17 living in the Seattle, WA or Baltimore, MD regions in 2009–2011 ($n = 925$). Participants were one adolescent and one parent/guardian selected from neighborhoods (i.e., census block groups) defined by high or low walkability (based on GIS measures of built environment factors) and stratified by high or low income (based on Census 2000 data), similar to methods described previously (Frank et al., 2010). Households with adolescents in selected block groups were identified from a marketing company and recruited by mail and telephone. Overall participation rate was 36% and did not vary by quadrant. Compared to Census demographics, the study sample had somewhat higher education and household income. Adolescents and parents each completed a survey to assess demographics, psychosocial characteristics and perceived neighborhood environment (available at http://sallis.ucsd.edu/Documents/Measures_documents/TEAN%20Survey%20ADOL%20FINAL%20010509.pdf). Adolescents wore an accelerometer for one week to determine daily minutes of MVPA. The Institutional Review Board of San Diego State University approved the study, parents/guardians signed informed consents, and adolescents signed assent forms.

Measures

Dog ownership and dog walking (survey data)

Adolescents were asked if their family owned a dog (yes/no). If yes, the adolescent was asked how many days a week he/she walked the dog (0 to 7 days).

Psychosocial and perceived environment variables (survey data)

Self-efficacy for physical activity was determined by asking the adolescents 6 items that assessed confidence in doing physical activity despite barriers (e.g., "do physical activity even when the weather is bad, or when sad or stressed"). Response options ranged from 1 = "I'm sure I can't" to 5 = "I'm sure I can" and were averaged to create a scale (Cronbach's alpha = .76; test–retest intraclass correlation coefficient (ICC) = .71) (Norman et al., 2005).

Decisional balance for physical activity was assessed with 5 "pro" items (Cronbach's alpha = .81; test–retest ICC = .74) and 5 "con" items (Cronbach's alpha = .53; test–retest ICC = .86) where each item was rated from 1 = strongly disagree to 4 = strongly agree (Norman et al., 2005). "Pro" items focused on benefits of physical activity (e.g., would have fun) and the "con" items focused on negatives of physical activity (e.g., time away from being with friends). Decisional balance was measured by subtracting the mean for the 5 "cons" items from the mean of the 5 "pros" items, resulting in a variable ranging from −5 to 5.

Enjoyment was measured with 1 item asking whether the adolescent enjoyed doing physical activity, with response options ranging from 1 = "strongly disagree," to 5 = "strongly agree."

Rules were measured by having adolescents report on 13 rules (yes/no) their parent(s) enforced regarding physical activity (e.g. "come in before dark," "do not go places alone") (Cronbach's alpha = .87; test–retest ICC = .68; unpublished data) with items summed to create an index.

Adolescents were asked whether they owned 4 types of portable electronics (e.g., cell phone, iPod/MP3 player), yielding a summed score ranging from 0 to 4. Participants reported which of 6 electronic devices were in their bedroom (e.g. TV, computer), yielding a summed score ranging from 0 to 6 (test–retest ICC ≥ .60 for both scales) (Rosenberg et al., 2010).

A subset of the Neighborhood Environment Walkability Scale for Youth (NEWS-Y) was completed by both the adolescent and parent. Parent sections included neighborhood aesthetics with 4 items (e.g. interesting things to look at), traffic safety with 3 items (e.g. most drive above the speed limit), pedestrian safety with 3 items (e.g. crosswalks and signals present), crime safety with 1 item (high crime rate), and stranger danger with 4 items (e.g. afraid of my child being taken or hurt by stranger). Response options ranged from 1 (strongly disagree) to 4 (strongly agree) where larger numbers represented more favorable conditions for physical activity. The adolescent sections of the NEWS-Y included traffic safety, pedestrian safety, crime safety and stranger danger. Means of item values were calculated for multiple item sections. Test–retest ICCs for subscores ranged from 0.61 to 0.78 for adolescents and parents (Rosenberg et al., 2009).

Weight status (survey data)

In the survey, adolescents were provided instructions on how to accurately measure and record their weight and height. BMI percentiles were based on CDC BMI-for-age growth charts (Kuczmarski et al., 2000).

Objective built environment (GIS data)

Built environment features were derived from county tax assessor data, regional land use at the parcel level, and street networks and integrated into GIS. Variables were calculated for 1 kilometer street network buffers around participants' homes (Frank et al., 2010). A walkability index was created by summing the sample z-scores for each of 4 built environment measures: (1) housing units per residential land area, (2) intersection density, (3) retail floor area ratio, and (4) mixed use including residential, retail, food and entertainment, and office land use