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Dogs, Physical Activity, and Walking (Dogs PAW): Acceptability and Feasibility of a Pilot Physical Activity Intervention

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1 **Abstract:**

2 Background. The aims of this study were to describe the development of and investigate the
3 feasibility and acceptability of a pilot randomized controlled physical activity intervention based
4 on social cognitive theory which used a dog walking strategy.

5 Methods. Participants (n=49) were randomized into an intervention or control group. Overall,
6 participants were middle-aged (mean=45.7±13.4 years), Caucasian, and on average considered
7 obese with an average BMI of 30.0±5.5. Descriptive statistics were used to summarize
8 participant characteristics and analyze the feasibility and acceptability data. Regression models
9 were used to: 1) examine significant differences between intervention and control groups across
10 time (baseline to post-intervention) and 2) examine if changes in theoretical constructs from
11 baseline to post-intervention resulted in changes in dog walking in both the intervention and
12 control group.

13 Results. Participants agreed that the intervention emails were easy to read and understand
14 (mean=4.3±0.7). Participants reported that the frequency of emails was adequate (mean=4.3±0.8)
15 but there was lower agreement that the emails encouraged an increase in dog walking
16 (mean=3.6±1.2). Post-intervention, the control group increased weekly dog walking to 19.4±4.9
17 minutes while the intervention group increased to 79.3±11.2 minutes.

18 Conclusions. Preliminary results suggest this pilot intervention is an acceptable and feasible
19 strategy for promoting dog walking among dog owners.

20

21 **Keywords: social cognitive theory, pets, exercise**

22

23 **Introduction**

24 The proportion of U.S. adults who meet physical activity (PA) guidelines remains low (Centers
25 for Disease Control and Prevention (CDC), 2013). Promotion of moderate-intensity PA, such as
26 walking, is becoming common and a promising strategy to promote walking is via dog walking.
27 Promotion of dog walking can be an effective population-level public health approach to
28 increase walking since it is estimated that over 40% of U.S. households own a dog (American
29 Pet Products Association, 2013) and up to 70% of dog owners do not walk their dog enough to
30 achieve health benefits (Christian et al., 2013; Reeves, Rafferty, Miller, & Lyon-Callo, 2011).
31 Lack of adherence to physical activity has been attributed to feelings of non-purposeful activity,
32 lack of enjoyment and lack of an exercise partner (Dishman, Heath, Lee, 2013). Dog walking
33 can address these barriers because it is a purposeful activity and the dog can be viewed as an
34 ‘exercise partner’.

35

36 Several cross-sectional studies suggest that dog walking is positively associated with meeting PA
37 recommendations (Christian et al., 2013; Hoerster, Mayer, Sallis, Pizzi, Talley, Pichon, & Butler,
38 2011; Lentino, Visek, McDonnell, & DiPetro, 2012; Reeves et al., 2011; Richards, McDonough,
39 Edwards, Lyle, & Troped, 2013a); however, studies also suggest that many dog owners do not
40 walk their dogs at a level sufficient to achieve health benefits (Bauman, Russell, Furver, &
41 Dobson, 2001; Cutt, Giles-Corti, & Knuiaman, 2008; Reeves et al., 2011). Cross-sectional
42 research supports that perceived motivation, feelings of obligation to the dog, self-efficacy, and
43 social support for walking provided by the dog are important correlates of dog walking (Brown
44 & Rhodes, 2006; Hoerster et al., 2011; Richards et al., 2013a).

45

46 Given the high rates of dog ownership in the U.S. and other industrialized countries and evidence
47 from cross-sectional studies which conclude that dog owners have the potential to walk more,
48 interventional research is now warranted. To date, only three dog walking intervention studies
49 have been published (Johnson & Meadows, 2010; Kushner, Blatner, Jewell, & Rudloff, 2006;
50 Rhodes, Murray, Temple, Tuokko, & Higgins, 2012).

51

52 The People and Pets Exercising Together (PPET) study was a one year controlled weight loss
53 study which recruited overweight people with overweight dogs (Kushner et al., 2006). This
54 intervention used a nonrandomized design, was logistically complex and required a significant
55 amount of time for both researchers and participants. Participants met weekly for the first 16
56 weeks, then once a month at months 5, 6, 9, and 12. Meetings were led by a registered dietitian
57 who instructed participants in recognizing and adopting healthy eating, exercise, and coping
58 patterns. Both the dog owners (n=36) and non-dog owner group (n=56) significantly increased
59 their physical activity at the end of one year and there was no significant difference in weight
60 loss between groups, making it difficult to distinguish what the mediating factor was for this
61 intervention.

62

63 The second study (n=26) utilized “loaner” therapy dogs to examine walking adherence in low
64 income residents of a subsidized housing unit (Johnson & Meadows, 2010). This study was
65 successful in reducing dog walker weight and increasing physical activity in these adults.

66 However, this study has limited external validity because of the very specific population studied
67 and was logistically complex as it involved the use of therapy “loaner” dogs who each had a
68 volunteer handler during each dog walk.

69

70 A recent pilot intervention study (n=58) showed providing education about the health benefits of
71 dog walking resulted in significant increases in dog walking (Rhodes et al, 2012). While this
72 study utilized an RCT design, it only followed participants for 12 weeks post-intervention so the
73 long-term effectiveness cannot be established. Furthermore, both the intervention group and
74 control group significantly increased their physical activity, making it difficult to distinguish the
75 effectiveness of the intervention. In addition, this pilot was not informed by a health behavior
76 theory which could substantially increase the effectiveness of physical activity interventions.

77

78 The purpose of the current study is to describe the development of a 3-month social cognitive
79 theory-based, randomized controlled trial, pilot intervention designed to increase dog walking
80 among dog owners and to evaluate the feasibility and acceptability of this intervention.

81

82 **Methods**

83 *Intervention development*

84 Dogs, Physical Activity, and Walking (Dogs PAW) is a pilot randomized controlled trial
85 intervention designed to increase dog walking among dog owners. Dogs PAW was developed to
86 be in-line with Bandura's social cognitive theory (SCT) (Bandura, 1998) which states that health
87 behavior is affected through the interactions between the person, their behavior, and the social
88 and physical environment. The central SCT construct, self-efficacy, refers to an individual's
89 confidence in the ability to perform a behavior, overcome barriers to that behavior, and exert
90 control over the behavior through self-regulation and goal setting. In SCT, the environment is
91 broadly defined to include social environmental factors such as social support. Outcome

92 expectations are the consequences an individual anticipates from taking behavioral action and
93 outcome expectancies are the value an individual places on those particular outcomes. It is
94 believed that self-efficacy has a direct influence on physical activity and also acts as a mediator
95 of other SCT constructs such as social support (Maddux, 1995). Self-efficacy is also thought to
96 influence outcome expectations and expectancies, which then directly influence health behavior
97 (Bandura, 1998; Maddux, 1995). Reinforcements and barriers are also important constructs in
98 SCT which can increase or decrease the occurrence of health behavior.

99

100 This pilot intervention was also developed based on the psychosocial correlates of dog walking
101 found in two previous studies (Brown & Rhodes, 2006; Richards et al., 2013a). One study, found
102 that a feeling of obligation to the dog was a strong correlate of dog walking (Brown & Rhodes,
103 2006). In a second study, self-efficacy for dog walking, dog-related outcome expectancies,
104 family social support, dog social support, and neighborhood walking environment were
105 associated with a 1.5 to 3.9 greater odds of being a dog walker (Richards et al, 2013a).

106

107 Based on these previous findings, a pilot intervention was developed to implement strategies to
108 influence theoretical constructs of self-efficacy, self-regulation, outcome expectations and
109 expectancies, and social support. This intervention used email contacts to provide motivational
110 cues to promote dog walking. The literature supports that periodic email messages enhance the
111 effectiveness of health promotion interventions (Fry, 2009). The emails were designed to
112 influence self-efficacy through a variety of mechanisms such as: educating dog owners about the
113 health benefits of dog walking for themselves and their dogs (outcome expectations); explaining
114 how participants could gain a sense of control over their behavior through goal setting (self-

115 regulation); providing a dog walking log sheet to help keep track of dog walks and assess goal
116 attainment; discussing the role of the dog as a motivator for dog walking (a mechanism for social
117 support and encouragement); encouraging participants to walk the dog with friends and family
118 (social support); promoting known reinforcements of dog walking (i.e. improved dog behavior,
119 sense of accomplishment, socialization) and how to overcome barriers to dog walking (i.e. time
120 constraints and poor dog walking behaviors) (Table 1). The intervention emails also attempted to
121 create a sense of obligation to walk the dog by including general dog walking information such
122 as a chart indicating how much walking specific dog breeds need, leash walking strategies, and
123 general dog walking tips. Participants assigned to the intervention group received twice weekly
124 email messages for the first four weeks of the intervention followed by weekly email messages
125 for the next eight weeks. Participants in the control group received one baseline email which
126 requested them to not change their current dog walking behavior.

127

128 *Measures*

129 Participants completed a survey of socio-demographic information which included age, gender,
130 race, ethnicity, highest level of education, marital status, and annual household income. Body
131 mass index (BMI) was calculated based on self-reported height and weight using the following
132 formula: $\text{weight (lb)} / [\text{height (in)}]^2 \times 703$ (CDC, 2011). Participants were classified as
133 overweight if BMI was 25.0-29.9 and obese if BMI was ≥ 30.0 .

134

135 Participants also completed the Dogs and Walking Survey (DAWGS) tool at baseline and post-
136 intervention (Richards, McDonough, Edwards, Lyle & Troped, 2013b). The DAWGS is a
137 psychometrically sound instrument which examines individual and interpersonal correlates of

138 dog walking. The development and psychometric testing of the DAWGS has been previously
139 reported (Richards et al, 2013b). The DAWGS includes items to assess dog walking behaviors,
140 self-efficacy for dog walking, outcome expectations and outcome expectancies of dog walking,
141 and social support for dog walking from friends, family, and the dog(s).

142

143 The self-efficacy for dog walking measure consisted of two factors of Likert-scale items: making
144 time (5 items) (e.g., walked the dog even in the dark; get up early to walk the dog) and resisting
145 relapse (4 items) (e.g., walk the dog when you have social obligations; walk the dog when family
146 is asking for more time from you). Outcome expectation items were used to assess the benefits
147 participants believe they derive from walking their dog(s). Outcome expectancy items were used
148 to assess the value placed on each specific outcome. The outcome expectation and expectancy
149 measures each consisted of two factors: owner-specific outcomes (5 Likert-scale items) (e.g.,
150 improve health, improve mood, companionship) and dog-specific outcomes (2 Likert-scale
151 items) (e.g., improve dog behavior and have a happy dog). The social support for dog walking
152 items measured social interactions and activities aimed at supporting dog walking behavior that
153 the individual perceived to be receiving from their dog(s), family, and friends. This measure
154 consisted of Likert-scale items and comprised three factors: dog social support (3 items) (e.g.,
155 having my dog makes me walk more; my dog provides support for me to go on walks), family
156 social support (4 items) (e.g., family change their schedule to walk the dog with me; family plan
157 activities with me that include dog walking) and friend social support (4 items) (e.g., friends
158 walk the dog with me; friends encourage me to walk).

159

160 To assess the perceptions of acceptability of the intervention, participants were asked ten 5-point
161 Likert scale questions (1=strongly disagree; 5=strongly agree). Questions included: the emails
162 were easy to read; the frequency of the emails was adequate; and the advice appeared to be
163 credible. Participants were also asked how often he/she read the emails (never, rarely,
164 sometimes, quite often, always). In addition, three open-ended questions were asked to determine
165 what aspects of the intervention emails were helpful, seemed unnecessary, and if they would
166 recommend this intervention to a fellow dog owner.

167

168 *Participants and recruitment*

169 To ensure sufficient statistical power (power = 0.80, when alpha=0.05) 19 dog-owner pairs were
170 needed in each group for a total sample size of 38. To account for potential study dropout, our
171 goal was to recruit at least 21 pairs per group for a total sample size of 42.

172

173 Pet dogs and their owners were recruited through email contacts, veterinary contacts, social
174 media, and flyers. Inclusion criteria were dog owners 18 years of age and older who reported
175 little (<20 minutes a week) or no dog walking in a typical week. Participants also needed to have
176 easy access and report regular use of email. Exclusion criteria for owners included: cardiac or
177 pulmonary disease, joint instability, pregnancy, and known thyroid disease. Seventy-nine
178 participants expressed interested in the study. After screening participants for eligibility, 49
179 participants signed informed consent (see figure 1). Participants were then randomly assigned to
180 the intervention or control group. As an incentive, all participants, regardless of group
181 assignment, received a health screening at the beginning of the study and will receive an
182 additional screening at completion of the study. The health screening was conducted by a

183 registered nurse (RN) and included a lifestyle questionnaire, height, weight, blood pressure,
184 pulse, total cholesterol, high-density lipoprotein, and blood glucose. This RN had no knowledge
185 of who was in the intervention or control group. Procedures were approved by the Purdue
186 University Committee on the Use of Human Research Subjects.

187

188 FIGURE 1 HERE

189

190 Despite randomization, there was a significant age difference between the intervention and
191 control group (see Table 2). Other than age, there were no other significant differences between
192 the intervention and control group in demographics, physical activity, or theoretical constructs at
193 baseline. Participants were middle-aged (mean=45.7±13.4 years) and all were Caucasian. On
194 average, participants were considered overweight with an average BMI of 30.0±5.5.

195

196 *Data analysis*

197 Descriptive statistics were used to summarize participant characteristics and analyze the
198 feasibility and usability data. Means and standard errors were calculated for continuous variables
199 and frequencies and percentages for categorical variables. Chi-square and two-sample t-tests
200 were used to assess differences between the intervention and control group at baseline and
201 between baseline and post-intervention. Data were analyzed using SAS 9.3(SAS Institute Inc,
202 2009). Statistical significance was set at $p < 0.05$.

203

204 Data was examined and assumptions of normality, constant variance, and independence were
205 met. To assess for significant differences from baseline to post-intervention in weekly minutes of

206 dog walking between both the intervention and control group, a mixed linear model in which
207 subjects were assumed to have an unstructured covariance matrix across time was used.

208
209 To examine if changes in theoretical constructs from baseline to post-intervention resulted in
210 changes in dog walking in both the intervention and control group, a linear regression model was
211 used in conjunction with ridge regression to deal with multicollinearity issues between several of
212 the theoretical constructs.

213

214 **Results**

215 On average, participants agreed that the intervention emails were easy to read (mean=4.2±0.8)
216 and understand (mean=4.3±0.7) (see supplementary table online). In addition, participants
217 reported that the frequency of emails was adequate (mean=4.3±0.8). There was lower agreement
218 that the emails encouraged an increase in dog walking (mean=3.6±1.2). Furthermore,
219 participants reported slightly more agreement that the benefits for their dog (mean= 3.7±1.1)
220 encouraged increased dog walking than their own benefits (mean=3.5±1.0). Fifty percent of
221 participants in the intervention group reported always reading the intervention emails, 23%
222 reported reading the emails quite often, 14% reported reading the emails sometimes, and 14%
223 reported rarely reading the emails.

224

225 When asked what aspects of the intervention emails participants felt were helpful, three
226 participants stated that the emails themselves provided encouragement to increase dog walking.
227 Participants also reported that the general dog walking information such as the needed frequency
228 of dog walking and the health outcomes for themselves and their dogs was motivation to increase

229 their walking. When asked about what could be improved in the emails, three participants stated
230 that the emails could be made more personal by including participant names. In addition, two
231 participants stated it would be helpful to ask them to specifically track their dog walks and report
232 back to the research team weekly about their progress. All participants indicated they would
233 recommend the intervention to a fellow dog owner.

234
235 At baseline all participants walked their dog less than ten minutes per week. Post-intervention,
236 the control group increased dog walking to 19.4 ± 4.9 minutes while the intervention group
237 increased weekly minutes of dog walking to 79.3 ± 11.2 minutes. When examining differences
238 between groups (intervention and control) and time (baseline to post-intervention), there was a
239 significant difference between group and time ($p < 0.01$). Specifically, there was a significant
240 interaction between the intervention group at time 1 (baseline) compared to the intervention
241 group at time 2 (post-intervention) ($\beta = -70.0 \pm 8.1$; $p < 0.01$). There was not a significant interaction
242 between the control group at time 1 compared to time 2 ($\beta = -11.8 \pm 7.8$; $p < 0.44$).

243
244 There were no significant changes in the theoretical constructs from baseline to post-intervention
245 in the control group (see Table 3). In the intervention group, only dog social support significantly
246 increased from baseline to post-intervention. In the linear regression model, changes in
247 theoretical constructs in the control group did not significantly impact changes in weekly
248 minutes of dog walking. However, in the intervention group, changes in both family social
249 support ($\beta = 24.9 \pm 9.9$; $p = 0.02$) and self-efficacy: resisting relapse ($\beta = 27.1 \pm 9.5$; $p < 0.01$)
250 significantly positively impacted changes in weekly minutes of dog walking.

251

252 **Discussion**

253 In line with a recent call to advance dog walking research methods (Christian et al., 2013), the
254 present study sought to develop and implement a randomized, controlled intervention to increase
255 dog walking among dog owners. Based on prior findings that obligation to the dog (Brown &
256 Rhodes, 2006), dog-related social support, dog-specific outcomes, and self-efficacy were strong
257 correlates of dog walking (Richards et al, 2013a), this pilot intervention attempted to influence
258 these constructs using emails in an ultimate attempt to increase dog walking among dog owners
259 who currently were not regularly walking their dog. The current study examined the feasibility
260 and acceptability of this intervention and examined changes in theoretical constructs and dog
261 walking immediately post-intervention. While participants in both the intervention and control
262 group increased their dog walking; only the intervention group had a significant interaction
263 between baseline and post-intervention. In the intervention group, the increase in dog walking
264 could be considered a large effect size (e.g. >60 minutes per week). These preliminary results
265 support that physical activity can be increased using dog walking as an intervention strategy.

266
267 When examining the changes in theoretical constructs from baseline to post intervention, there
268 were no significant changes in the control group. In the intervention group, only dog social
269 support significantly increased from baseline to post-intervention. Previous research has shown
270 that dog support is a strong correlate for dog walking (Christian et al., 2010; Hoerster et al, 2011;
271 Richards et al, 2013a). For example, one cross-sectional study showed that when dog support
272 increased by one unit, there was an increase in weekly dog walking of 42 minutes (Richards et
273 al, 2013a).

274

275 When examining the impact that changes in theoretical constructs from baseline to post-
276 intervention had on changes in weekly minutes of dog walking, there were no significant
277 findings in the control group. However, in the intervention group, changes in both family social
278 support and self-efficacy: resisting relapse significantly positively impacted changes in weekly
279 minutes of dog walking. Overall, these findings are in-line with Bandura's (1998) SCT and
280 indicate that self-efficacy and a supportive social environment are positively related to increases
281 in dog walking behaviors. In addition, these findings align well with The Guide to Community
282 Preventive Services (2002) recommendations for social support interventions to increase PA as
283 dogs specifically can provide social support by being a companion for PA (Epping, 2011).

284

285 Generally speaking, the data showed that this pilot intervention is a feasible and acceptable
286 strategy to increase dog walking among dog owners. Most participants reported that the
287 intervention emails were easy to read and understand. In addition, participants reported that the
288 dog walking advice was credible and useful. However, there was slightly lower agreement that
289 the intervention emails encouraged participants to increase dog walking even though on average,
290 participants agreed that email was a good delivery mode for this intervention and the intervention
291 group did significantly increase dog walking post-intervention. While the emails themselves may
292 not have initially been viewed as encouraging, the emails may have been a catalyst to increase
293 dog walking which led to increased perceptions of social support and self-efficacy. Future
294 studies will examine this hypothesis in a mediation model. Furthermore, increasing the
295 personalization of the emails was suggested by participants and may enhance feelings of
296 accountability to the intervention which could lead to further increases in dog walking.

297

298 A major strength of this study was the use of a health behavior theory, social cognitive theory, in
299 the development of this pilot intervention. To the authors' knowledge, this is the first theory-
300 based dog walking intervention to be developed and tested. It is also important to note some of
301 the limitations of this study. This pilot study had a relatively small sample and therefore
302 replication is warranted in a larger trial with more diverse populations. In addition, this study
303 relied on self-report for dog walking and overall PA which is prone to recall and social
304 desirability bias. Objective assessments of PA during dog walking with the use of pedometers or
305 accelerometers should be considered in future research. However, the survey items measuring
306 dog walking and the theoretical constructs have previously been tested and were shown to be
307 reliable and valid measures. Importantly, the results presented here are only immediately post-
308 intervention. Future studies will follow participants for one year and will further examine
309 longitudinal changes in theoretical constructs and dog walking.

310

311 **Conclusions**

312 The preliminary results of this study support that this pilot intervention is an acceptable and
313 feasible strategy for increasing dog walking among dog owners. Future studies will follow these
314 participants for one year and assess longer-term changes in dog walking behavior. Results
315 suggest that increasing self-efficacy for dog walking by fostering social support and providing
316 education on the benefits of dog walking for both the owner and the dog can promote increases
317 in dog walking which can ultimately result in increased overall physical activity.

318

319 The results of this study are specific to dog walking; however, findings also support the role of
320 SCT constructs to walking behaviors in general. Family social support, dog social support, and

321 self-efficacy were shown to be important correlates of increased dog walking behavior.
322 Correlates of social support and self-efficacy have also been shown to impact walking and other
323 forms of PA (Dishman et al., 2013). The role of social support from the dog also supports the
324 idea that motivation in the form of obligation to someone or something else may be a catalyst for
325 PA. A sense of this obligation could be fostered by providing information on the expected
326 outcomes or benefits of PA for this other person or dog. By further exploring and attempting to
327 influence the factors that motivate dog owners to walk their dog, this knowledge could be used to
328 help understand and increase walking behaviors in general. Future studies will assess the
329 contribution of dog walking on total walking and overall physical activity.

330

331 In conclusion, using a dog walking strategy for physical activity promotion has the potential to
332 facilitate long-term behavior change as people who own dogs typically sustain dog ownership for
333 many years. This strategy also has the potential for wide public health reach since 40% of U.S.
334 households own at least one dog with a majority not being regularly walked (American Pet
335 Products Association, 2013). Health care providers and health promotion professionals can
336 promote physical activity among their patients by recommending dog walking as a purposeful
337 and enjoyable form of regular physical activity.

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406

407

Table 1. Content of Intervention E-mails

Time	SCT variable	Intervention content
Wk 1	Self-regulation	Goal setting: how to create a specific action plan
	Outcome	Describe anticipated result of dog walking, benefits of exercise for dogs and owners
	Dog obligation	Foster a sense of dog obligation by promoting owner's responsibility to walk their dog
Wk 2	Self-regulation	Goal setting and self-monitoring using an on-line activity tracker and pedometer step counts
	Reinforcements	Motivational messages
Wk 3	Self-regulation	Self-monitoring, including an on-line dog walking calorie counter
	Self-efficacy	Time management strategies
Wk 4	Self-regulation	Progress towards goals reviewed
	Self-efficacy	Overcoming barriers
	Social support	Social support can be provided by creating expectations, contracting with oneself or someone else, by having an exercise buddy (i.e. the dog)
Wk 5	Self-regulation	Self-monitoring
	Outcomes	Reinforce the anticipated result of dog walking for dog and owner
	Environment	Geographic mapping tool to find, create, map walking paths
Wk 6	Self-regulation	Review of goal progress and Self-monitoring
	Self-efficacy	Time management and Relapse prevention
Wk 7	Self-regulation	Goal setting and Self-monitoring
	Self-efficacy	Time management and Overcoming barriers
Wk 8	Self-regulation	Review of goal progress; Self-monitoring
	Self-efficacy	Time management and Relapse prevention
Wk 9	Social support	Encourage walking with friends, family, groups
	Environment	Geographic mapping tool to find, create, map walking path
Wk 10-12	Self-regulation	Review of goal progress; Self-monitoring
	Self-efficacy	Time management and Overcoming Barriers
	Reinforcements	Motivational messages about health outcomes for dog and owner

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Table 2. Sociodemographic and physical activity characteristics of participants

Characteristic	Overall <i>n</i> =49		Control <i>n</i> =25		Intervention <i>n</i> =24		<i>p</i> ^a
	Mean±SE		Mean±SE		Mean±SE		
Age	45.7±13.4		41.8±13.3		49.7±12.4		0.04
Body mass index	30.0±5.5		29.6±5.6		30.3±5.2		0.35
Weekly minutes of:							
Dog Walking	8.1±1.3		7.5±1.8		9.3±2.0		0.50
Moderate-intensity PA	65.0±13.9		76.7±14.3		57.8±25.7		0.53
Vigorous-intensity PA	57.7±10.7		70.2±13.7		49.6±17.4		0.36
Total Walking	85.6±10.4		77.5±15.1		98.5±15.3		0.37
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>p</i> ^b
Gender							0.43
Male	10	20.4	4	16.0	6	25.0	
Female	39	79.6	21	84.0	18	75.0	
Marital status							0.20
Married/partnered	35	71.4	20	80.0	15	62.5	
Single	7	14.3	4	16.0	3	12.5	
Divorced/separated	5	10.2	1	4.0	4	16.7	
Widowed	2	4.1	0	0.0	2	8.3	
Weight status							0.61
Normal	9	18.3	4	16.0	4	16.7	
Overweight	16	32.7	10	40.0	7	29.2	
Obese	24	49.0	11	44.0	13	54.2	
Income							0.27
<\$50,000	10	20.4	3	12.0	7	29.2	
\$50,000-\$89,999	16	32.7	10	40.0	6	25.0	
≥\$90,000	23	46.9	12	48.0	11	45.8	
Education							0.10
High school or technical/trade school	5	10.2	1	4.0	4	16.7	
2-4 year college	28	57.1	17	68.0	11	45.8	
Masters/professional degree	13	26.5	7	28.0	6	25.0	
Doctoral degree	3	6.1	0	0.0	3	12.5	
Employment							0.40
Full-time	36	75.0	20	80.0	16	69.6	
Not employed full-time	12	25.0	5	20.0	7	30.4	

^a T-test *p*-value; ^b χ^2 *p*-value

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Table 3. Means and standard errors of the theoretical constructs at baseline and post-intervention

	Control <i>n</i> =24		Intervention <i>n</i> =23	
	Baseline Mean±SE	Post-intervention Mean±SE	Baseline Mean±SE	Post-intervention Mean±SE
Self-efficacy				
Resisting Relapse	3.03±0.21	2.78±0.16	3.15±0.16	3.20±0.21
Making Time	3.25±0.18	2.88±0.17	3.30±0.12	3.16±0.20
Outcome Expectations				
Owner-specific	3.82±0.13	3.88±0.10	4.11±0.11	3.69±0.24
Dog-specific	4.28±0.08	4.00±0.11	4.39±0.11	3.86±0.26
Outcome Expectancies				
Owner-specific	3.75±0.13	3.80±0.10	3.97±0.18	3.67±0.21
Dog-specific	4.28±0.10	4.25±0.11	4.27±0.17	4.00±0.22
Social Support				
Dog-support	2.75±0.19	3.21±0.23	3.01±0.20	3.87±0.28*
Friend-support	1.31±0.10	1.24±0.18	1.55±0.11	1.88±0.21
Family-support	1.85±0.17	1.80±0.08	1.93±0.19	2.37±0.26

416 *significant difference between baseline and post-intervention ($p<0.05$)