Using Intervention Mapping to Develop a Resource to Promote Dog Walking Among Dog Owners

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ABSTRACT

USING INTERVENTION MAPPING TO DEVELOP A RESOURCE TO PROMOTE DOG WALKING AMONG DOG OWNERS

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This study used intervention mapping to develop a print intervention that promotes dog walking for physical activity among dog owners. Twenty-six adult dog owners were recruited to participate in an interview about dog walking. Eight major themes emerged from the individual interviews: obligation to the dog, motivation from the dog, self-efficacy, dog’s health, owner’s health, socialization, “an active dog is a better-behaved dog”, and having a routine. Determinants of dog walking identified in the interviews and in a literature review were used to create a matrix of change objectives. Theory-based methods and practical applications were chosen for the brochure, which was then developed and piloted among five participants. The resulting brochure is based on theory and evidence and can be used to promote regular dog walking. Future research should focus on implementation and evaluation of this resource as well as the development of other interventions targeting dog owners.
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1.0 Introduction and Literature Review

The literature review will discuss (a) the importance of physical activity, (b) current physical activity recommendations, (c) the prevalence of physical activity among adults, (d) the prevalence of walking behaviour (e) physical activity levels of dog owners (f) the correlates of walking, (g) the correlates of dog walking, (h) the role that veterinarians play in promoting dog walking, (i) which interventions are currently in place to promote physical activity among dog owners, (j) the use of print materials in physical activity/health promotion interventions, and (k) the Intervention Mapping (IM) approach.

1.1 Importance of Physical Activity

Being physically active on a regular basis is associated with many physical and psychological health benefits. For instance, physical activity has been found to be associated with a decreased risk of many chronic diseases, such as diabetes, cardiovascular disease, obesity, osteoporosis, and certain types of cancers (Colley, Garriguet, Janssen, Craig, Clarke, & Tremblay, 2011; Warburton, Nicol, & Bredin, 2006). Additionally, longitudinal research has suggested that regular moderate-intensity activity may help to prevent some of the weight gain that is commonly associated with ageing (Littman, Kristal, & White, 2005).

Other studies examining the relationship between physical activity and health status have suggested that physical activity may also have positive effects on an individual’s mental health, including a reduced risk of depression and lower stress and anxiety levels (Gilmour, 2007; Strohle et al., 2007). A review by Teychenne, Ball, and Salmon (2008) examining the relationship between physical activity and the likelihood of
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depression in adults found that the majority of studies investigated found that both shorter and longer durations of physical activity, as well as both moderate and vigorous intensities of activity, were associated with a decreased likelihood of depression. Although, in 4 out of 6 observational studies, it was found that there was a stronger association between vigorous activity and a decreased likelihood of depression compared to moderate-intensity activity and depression. In spite of this, the evidence from this review suggests that physical activity may play a protective role against depression and depressive symptoms (Teychenne, Ball, & Salmon, 2008).

Another review investigating the relationship between physical activity and general mental health (i.e., psychological distress) found that there is evidence in the literature to support a dose response relationship between physical activity and mental health (Kim et al., 2012). They found that adults who are physically active within a range of 2.5 to 7.5 hours per week were more likely to have better general mental health status than individuals who were physically active outside of this range. That is to say, adults who were physically active at low levels (i.e., less than 2 hours per week) and those who were active at high levels (i.e., more than 7 hours per week) were found to have poorer mental health. However, participants taking part in 5-7 hours of physical activity per week were found to have the best mental health status (Kim et al., 2012).

Physical activity may play a role in an improved health-related quality of life (HRQL), as is suggested in an investigation by Brown et al. (2004). HRQL involves an individual’s overall perception of his/her physical, mental and social health (Bize et al., 2007; Klavestrand & Vinegard, 2009). In the Brown et al. (2004) study, adults who reported meeting the recommendations for physical activity were more likely to report
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less “unhealthy” days (the number of days in the last 30 days that they reported having either poor mental or physical health) than those who were inactive or not meeting the recommendations.

Two systematic reviews found that cross-sectional studies have consistently shown positive associations between self-reported physical activity levels and HRQL but that there is limited evidence from randomized controlled trials and cohort studies to be able to draw final conclusions about this relationship (Bize et al., 2007; Klavestrand & Vinegard, 2009).

1.2 Current Physical Activity Recommendations

In Canada, the current recommendation that was released in 2011 for adults between the ages of 18-64 is to achieve 150 minutes of moderate-to-vigorous intensity physical activity (MVPA) per week, accrued in at least 10-minute bouts (The Canadian Society for Exercise Physiology, 2013). Examples of moderate intensity activities include walking, gardening, or bike riding, and vigorous activities include jogging, swimming or cross-country skiing. The Canadian guidelines also suggest doing bone-and muscle-strengthening exercises, such as lifting weights, at least two days per week.

The Physical Activity Guidelines for Americans (PAGA) are similar but slightly different than the Canadian recommendations. PAGA also suggests accumulating 150 minutes of moderate-intensity activity per week, performed in bouts of at least 10 minutes. However, PAGA also says 75 minutes per week of vigorous-intensity physical activity would be acceptable in achieving considerable health benefits. More specifically than the Canadian guidelines, PAGA advises increasing the amount of moderate-intensity activity to 300 minutes per week or vigorous activity to 150 minutes per week to achieve
further health benefits (US Department of Health and Human Services, 2008). Both countries recommend muscle- and bone-strengthening exercise 2 days per week.

Accumulating 10,000 steps per day is often the recommendation for achieving health benefits as a result of regular walking (Tudor-Locke & Bassett, 2004). Although this recommendation has its advantages, such as it is easy to remember and offers a specific goal for people to strive for, it does have a number of limitations. These limitations include an inadequate amount of evidence to support accumulating 10,000 steps, it does not encompass activity intensity, and it is likely not suitable for all population groups such as children, older adults, and individuals with chronic diseases (Marshall et al., 2009; Tudor-Locke & Bassett, 2004). Nonetheless, there have been studies that suggest that this goal is feasible for healthy adults to reach and that there may be health benefits associated with reaching 10,000 steps per day (Chan, Ryan, & Tudor-Locke, 2004).

A different recommendation that takes activity intensity into account is to walk at least 3,000 steps for 30 minutes on 5 days of the week (Marshall et al., 2009; Tudor-Locke et al., 2005). Evidence is accumulating that supports walking at a rate of 100 steps per minute to achieve moderate-intensity physical activity (Marshall et al., 2009; Tudor-Locke et al., 2005, 2011). In a review by Tudor-Locke et al. (2011), they found that 100 steps/minute represents a reasonable guideline for defining moderate-intensity walking. This was concluded in five different controlled studies measuring the number of steps and activity intensity using treadmills, tracks or hallways to determine steps per minute. Therefore, to reach the guidelines of 150 minutes per week of moderate-intensity activity, an individual would need to walk at this rate (100 steps/minute) for 150 minutes during a
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week. This 150 minutes should be spread throughout the week according to PAGA and can include options such as: 30 minutes of walking on 5 days of the week, 37.5 minutes of walking on 4 days of the week, or 50 minutes of walking on three days of the week (which could be broken down into two 20-minute sessions and one 10-minute session of walking during those three days).

Although studies examining cadence (steps per minute) and achieving moderate-intensity activity have concluded that approximately 100 steps per minute equates to moderate-intensity walking, there is some variation between men and women where the recommended cadence for men is slightly lower than that for women (Rowe et al., 2011; Marshall et al., 2009; Tudor-Locke et al., 2011). Rowe et al. (2011) suggest that this gender difference may be due to differences in height and stride length. This study supports the general guide of 100 steps per minute for promoting a basic public health message, as walking at a moderate-intensity was found in the study to be associated with 103 steps per minute. However, it also proposes taking height into account when prescribing strict walking recommendations as step rate can vary by more than 20 steps per minute for adults, depending on their height/stride length. For example, a shorter individual with a shorter stride length may not reach a moderate level of intensity if instructed to walk 100 steps per minute and consequently not achieve the same health benefits (Rowe et al., 2011).

1.3 Prevalence of Physical Activity Among Adults

According to the Canadian Health Measures Survey (CHMS), which objectively measured physical activity levels using accelerometers between 2007 and 2009, approximately 85% of Canadian adults are not meeting the Canadian and World Health
Organization’s recommendations of 150 minutes of MVPA per week (Colley et al., 2011). The results from CHMS also showed that Canadians between the ages of 20 to 79 spend 69% of their hours awake doing sedentary behaviours such as watching television or sitting at a computer. Similarly, only a third of Canadian adults involved in the CHMS study reached or surpassed the suggested 10,000 steps per day (Colley et al., 2011).

Another Canadian study investigating the percentage of Canadians who adhere to the physical activity guidelines, using self-reported data, found that roughly 65% of adults were meeting the recommendations (Bryan & Katzmarzyk, 2009a). The data were collected from the National Population Health Surveys (1994-1998 data) and the Canadian Community Health Surveys from 2001 to 2007. Between these time periods, it was found that the prevalence of achieving the recommended level of physical activity set by Canada’s Physical Activity Guide had increased from 54% in 1994 to 65% in 2007. These results are much higher than those found in the CHMS which suggests that only 15% of adults are meeting the recommendations. This is likely due to the nature of using self-report measures, which are prone to bias, versus using objective measures such as those used in the CHMS.

The prevalence of physical inactivity among adults in the United States is similar to that found in Canada. Results from the 2011 Behavioral Risk Factor Surveillance System (BRFSS) found that 52% of participants achieved the guidelines for aerobic activity whereas only 29% met the guidelines for muscle-strengthening activities (Centers for Disease Control and Prevention, 2013). This study also found that only one in five adults reported achieving the recommended levels of both aerobic and muscle-strengthening activities as per the 2008 PAGA (Centers for Disease Control and
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Prevention, 2013). The BRFSS is a self-report survey while the CHMS used accelerometers. This difference likely played a role in the results that both studies found.

1.4 Walking for Physical Activity

Walking is a form of moderate-intensity physical activity that is affordable and generally easy to perform as no equipment or skill is specifically needed (Brown & Rhodes, 2006; Bryan & Katzmarzyk, 2009b). According to Bryan & Katzmarzyk (2009b), only 30% of Canadian adults between the ages of 18 to 55 reported walking regularly for exercise. Regular walkers were more often found to be women, older adults, lower-income groups, and individuals with a lower body mass index (Bryan & Katzmarzyk, 2009b). In the United States, 49% of surveyed adults self-reported walking regularly for physical activity (Reis, Macera, Ainsworth, & Hipp, 2008).

People walk for different purposes, such as for leisure or for transportation. Regardless of the domain of walking, walking for any reason can help individuals meet public health recommendations for physical activity. A study by Kruger et al. (2008) examined the prevalence of leisure and transportation walking among adults in the United States and found that 42% of adults walked for leisure and 28% walked for transportation purposes. It was also found that different demographic correlates are associated with each domain of walking. For instance, the prevalence of walking for leisure increased as education level increased but decreased as income level increased. Walking for transportation was most prevalent among black non-Hispanic men and Asian/Native Hawaiian/Pacific Islander women, whereas walking for leisure was reported more often among Asian/Native Hawaiian/Pacific Islander men and white non-Hispanic women (Kruger et al., 2008). It is important to keep in mind the different domains of walking.
when investigating physical activity levels as some people may not walk very much for leisure but may spend a lot of time walking as part of their occupation or for transportation. These other types of walking are sometimes not captured when only investigating leisure activities (Bates et al., 2005). Bates et al. (2005) found that the prevalence of walking, as reported using a survey that included both leisure and non-leisure walking, was almost twice as high than that which was reported when using only a leisure-time survey.

Walking for physical activity has been targeted for public health interventions to increase physical activity levels due to there being relatively few barriers to walking as well as research that has found walking to be the most prevalent form of physical activity (Bryan & Katzmarzyk, 2009b). One such intervention in Canada is called Canada on the Move, which was a nation-wide initiative to promote walking and pedometer use (Craig, Tudor-Locke, & Bauman, 2007). The results of this intervention after 12 months indicated that those who owned a pedometer were more likely to self-report a sufficient level of walking than those who did not. This supports other evidence that has suggested pedometers or other self-monitoring devices can help motivate people to walk and help set achievable goals for themselves (Craig, Tudor-Locke, & Bauman, 2007).

1.5 Correlates of Walking

A study looking at the correlates of walking found that the odds of walking at the recommended level (defined as 12 or more sessions of walking in the last 2 weeks, totaling 360 minutes or more) was 58% higher for individuals who owned a dog versus those who did not (Giles-Corti & Donovan, 2003). Some other correlates that were found to be significantly associated with walking at the recommended levels include a high
level of perceived behavioural control, high intention to be physically active in the next
two weeks, sport recreation or outdoor club membership, and number of significant
others who exercised with the respondent in the last 3 months (Giles-Corti & Donovan,
2003).

Socio-economic status (SES) has also been found to be associated with walking
behaviour. Janssen et al. (2010) found that Australian adults with lower SES were
significantly less likely to take part in leisure-time walking than adults with higher SES.
Enjoyment was found to be the strongest correlate of leisure-time walking for those in the
higher SES group while perceived barriers was the correlate more strongly associated
with leisure-time walking for the lower SES adults (Janssen et al., 2010). This finding
suggests that the higher the perception of barriers to leisure-time walking in lower SES
adults, the less likely they are to participate in leisure-time walking. Social support from
family and friends was also examined as correlates of leisure-time walking among SES
groups and it was found that although support from friends was significantly associated
with walking for both lower and higher SES groups, support from family was only
significantly associated with walking for the lower SES group.

Many studies have identified environmental correlates of walking as very
important factors in walking behaviour. For instance, in another Australian study by
Bentley et al. (2010), it was found that structural features of urban environments such as
having paths closer to roads as well as a variety of buildings and scenery such as stores
and schools were more associated with time spent walking. It has also been found that
walkers are more likely to report more aesthetically pleasing environments, more
convenient environments, and having either another person or pet to walk with (Ball et
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al., 2001). This is valuable research for urban planners and policy makers to take into account when building communities focusing on increasing physical activity levels. Saelens and Handy’s (2008) review of the built environment correlates of walking found that in previously published reviews and in scientific studies there is a consistent positive relationship between walking for transportation and density (referring to the population), distance to nonresidential destinations, and land-use mix (meaning there is a variety of land uses in the area such as residential, commercial, industrial, and agricultural).

1.6 Physical Activity Levels of Dog Owners

Approximately 35% of Canadian households own a dog (Perrin, 2009). This is very similar to the United States where roughly one third of households have a pet dog (Hoerster et al., 2011). This information is relevant to physical activity research as it has been suggested in previous studies that dog owners spend more time in moderate-intensity activity than do non-dog owners (Brown & Rhodes, 2006). This is supported in a review on dog ownership and adult physical activity levels by Cutt et al. (2007) that found that there is ample evidence that dog ownership is associated with substantial health benefits. A more recent review on dog ownership and physical activity by Christian et al. (2013) found that dog owners participated in more walking and physical activity than non-dog owners. They also found that about 60% of dog owners walked their dogs with a median duration of 160 minutes per week and a frequency of 4 walks per week. Although there has been research suggesting a relationship between dog ownership and increased physical activity levels, there is a large proportion of dog owners who do not walk their dogs. Other studies investigating dog-walking and physical activity have found that about one third of dog owners do not walk their dogs.
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regularly (Cutt et al., 2008a; Hoerster et al., 2011). Brown and Rhodes (2006) suggest that although dog owners tend to walk more than non-dog owners, the increased walking levels of dog owners may be more associated with a sense of obligation for a dog rather than simply owning a pet dog.

There is increasing support for dog walking as a practical form of physical activity. Individuals who walk their dogs are more likely to meet the physical activity recommendations for MVPA than non-dog walkers and non-dog owners, and there are fewer obese dog-walkers compared to non-dog-walkers and non-dog owners (Coleman et al., 2008; Cutt et al., 2008a; Hoerster et al., 2011; Oka & Shibata, 2012b). Similarly, a longitudinal study of older dog owners (ages 71 to 82) found that dog owners who walked their dog regularly (at least three times per week) were more likely to achieve 150 minutes of walking per week and had faster walking speeds than dog owners who did not walk regularly. Three years later, it was found that dog-walkers at baseline were twice as likely as dog owners who do not walk the dog and non-dog owners to achieve the recommended walking levels three years later (Thorpe et al., 2006). Another study investigating community-dwelling older adults and dog walking found that dog owners who reported walking with their dogs for 30 minutes at least 3 times per week were significantly more likely to report more total walking, walking frequency, leisure and total physical activity, and a higher total functional ability than both non-dog owners and dog owners who did not walk their dogs regularly (Gretebeck et al., 2013).

1.7 Correlates of Dog Walking

Some of the key correlates of dog-walking that have emerged from the literature include self-efficacy, obligation, motivation, dog attachment, walkability of
neighbourhood, and receiving social support from the dog to walk (Brown & Rhodes, 2006; Coleman et al., 2008; Cutt et al., 2008a; Cutt et al., 2008b; Hoerster et al., 2011; Oka & Shibata, 2012a, 2012b). Although the current thesis will focus on determinants of dog walking that are modifiable at the individual level, such as self-efficacy and motivation, determinants that are modifiable at the environment level such as walkability of the neighbourhood are also important to briefly note as an introduction to the correlates of dog walking. Coleman et al. (2008) found that dog owners who walk their dogs are more likely to live in a highly walkable neighbourhood compared to dog owners who do not walk their dogs. Neighbourhood walkability can be included as part of the built environment, which was discussed previously as a correlate of walking, as walkability is determined by factors such as the quantity of paths and trails, street connectivity, land-use mix, and residential density (De Meester et al., 2013).

A number of socio-demographic factors have also been found to be associated with dog walking. A study by Degeling, Burton, and McCormack (2012) found that dog owners in Calgary who live in attached homes, such as apartment buildings, walk their dogs more frequently than do dog owners living in detached homes. However, dog owners living in detached homes were still as likely to achieve 150 minutes of dog walking per week as those living in attached homes. Also, women were more likely than men to reach 150 minutes of dog walking in a usual week (Degeling, Burton, & McCormack, 2012). This conflicts with other research, which has found males to be more likely to walk the dog than women (Hoerster et al., 2011). Oka and Shibata (2012a) found other socio-demographic factors to be associated with dog walking in Japan. They found that adults aged 50 and over were significantly more likely to participate in dog
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walking than younger adults aged 20 to 29, and dog walkers were significantly less likely to be not married (Oka and Shibata, 2012a).

Dog owners’ level of attachment to their dog is another correlate of dog walking. Oka and Shibata (2012a) found that dog walkers had higher levels of attachment to their dog than did non-dog walkers, suggesting that dog attachment may be a better predictor of dog walking than socio-demographic factors, which were also investigated. The same authors conducted another study using the Transtheoretical Model to investigate psychosocial and environmental factors associated with the stages of change in dog walking behaviour (pre-contemplation, contemplation, preparation, action, and maintenance). They found that dog owners in the pre-contemplation stage, which was defined in this study as the participant did not walk their dog and had no intention of doing so in the next six months, had much lower levels of self-reported dog attachment than did those in all other stages (Oka & Shibata, 2012a).

Results from a qualitative study involving Canadian dog owners support that caring for a dog can help promote physical activity levels of humans (Degeling & Rock, 2013). Participants discussed how caring for their pet dog acted as a driver to become more physically active outdoors as they needed to meet the physical and social needs of their dogs. Cases where caring for a dog did not promote physical activity of the owners involves instances where the dog became ill or injured and was therefore incapable of walking long distances. Participants from this study also reported walking less after their dog passed away.

As mentioned above, obligation to walk the dog has been found to be correlated with dog walking in several studies. For instance, Hoerster et al. (2011) found dog-
walking obligation to be significantly higher amongst dog walkers than non-dog walkers. These results are consistent with those found by Brown and Rhodes (2006) and Oka and Shibata (2012b). Brown and Rhodes (2006) suggest that although dog owners tend to walk more than non-dog owners, a sense of responsibility and obligation for the health of the dog may be a key mediator in the relationship between dog ownership and walking. Similarly, Oka and Shibata (2012b) examined factors associated with the stages of change for dog-walking behaviours, through the pre-contemplation stage (no intention to start walking the dog in the next six months) to the maintenance stage (currently walk the dog regularly and have been doing so for the last six months). They found that dog obligation was one of the most influential factors distinguishing between the 5 stages of change for dog walking (pre-contemplation, contemplation, preparation, action, and maintenance). The results indicated a general pattern of increasing levels of obligation as you move through the higher levels of readiness to change. Gretebeck et al. (2013) also suggest that obligation to care for a pet may be an effective way to motivate older dog owners to walk more. A suggested strategy to provide dog owners with a sense of obligation to walk their dogs is to emphasize the role that walking can play in improving the dog’s health, both physically and mentally (Hoerster et al., 2011).

Another correlate of dog walking is the owner’s self-efficacy (Hoerster et al., 2011; Oka & Shibata, 2012a; Cutt et al., 2008b). Self-efficacy is an individual’s belief in his/her power to produce desired effects (Bandura & Locke, 2003). It can affect how well people motivate themselves to persevere through challenges and difficulties and may allow one to think in either a self-enhancing or self-debilitating way (Bandura & Locke, 2003). Bandura suggests that self-efficacy be measured by asking respondents to rate
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their level of confidence in their ability to perform certain tasks (Bandura, 2006). Cutt et al. (2008b) found that dog owners in general expressed greater confidence in their ability to adhere to walking regularly while Hoerster et al. (2011) found that dog-walking self-efficacy was significantly higher amongst dog walkers compared to non-dog walkers. It was also found that self-efficacy was a strong predictor of the stages of change for dog walking (Oka & Shibata, 2012a).

Hoerster et al. (2011) suggest that obligation and self-efficacy may be good modifiable determinants to target for interventions aimed at dog owners to initiate dog walking. Then, if the dog enjoys being walked, it may begin to encourage the owner to take it for walks thereby helping to maintain the behaviour.

Experiencing a sense of encouragement or social support from the dog has also been found to be an important determinant of dog walking (Cutt et al., 2007, 2008a; Hoerster et al., 2011). Cutt et al. (2008a) found that not walking the dog was significantly more likely among dog owners who did not feel that their dog provided a sense of motivation or social support to walk. This is comparable to results from another study that found dog-encouragement to be a significant correlate of walking among dog walkers (Hoerster et al., 2011). A literature review on dog ownership and owner physical activity levels identified several research studies with results supporting that dog ownership may provide social support to the dog owner to walk the dog (Cutt et al., 2007). The dog may serve as a form of social support in the sense that it provides the dog owner with company while walking or might also allow the owner to feel safer while walking (Cutt et al., 2007). For those dog owners who are not naturally motivated by their dogs nor perceive their dogs as a form of social support, Cutt et al. (2008a) suggests
additional interventions and motivation such as increased “social pressure” from others to increase dog walking.

To summarize, the majority of Canadian adults are not sufficiently active (Colley et al., 2011). Walking is the most prevalent form of physical activity and is a simple activity to do with very few barriers (Bryan & Katzmarzyk, 2009b). Approximately 35% of Canadian households own a dog (Perrin, 2009), but a large portion (~30%) of that population does not regularly walk their dog (Cutt et al., 2008a; Hoerster et al., 2011). Recent research has found that dog walkers are more likely to reach the recommended levels for MVPA than dog owners who do not walk their dogs (Coleman et al., 2008; Cutt et al., 2007; Hoerster et al., 2011; Oka & Shibata, 2012b). Therefore, dog owners are a suitable target for physical activity promotion interventions as there is a large population of dog owners (Perrin, 2009) and research has found dog walking to be effective in increasing physical activity levels (Coleman et al., 2008; Cutt et al., 2007; Hoerster et al., 2011; Oka & Shibata et al., 2012b). Multiple correlates of dog walking have been identified in the recent literature including environmental factors, socio-demographic factors, dog attachment, obligation, self-efficacy, and dog encouragement (Brown & Rhodes, 2006; Coleman et al., 2008; Cutt et al., 2008a; Hoerster et al., 2011; Oka & Shibata, 2012a, 2012b).

1.8 The Role That Veterinarians Play in Promoting Dog-Walking

Veterinarians are well respected and trusted sources of information for pet owners when it comes to learning how to better take care of pets (Cutt et al., 2008a). For this reason, it is reasonable to assume that veterinarians may also play an important role in promoting and encouraging dog walking among dog owners. A study found that dog
owners whose dog-walking levels had been assessed by a veterinarian were significantly more likely to walk their dog than those who had not. However, the same study also found that the majority of dog owners reported that their veterinarian did not ask how regularly they walk their dog (Hoerster et al., 2011).

The multi-dimensional owner-dog-veterinarian relationship is very complex and on a typical day, veterinarians may find that they are spending much of their time in communication with the owners (Lund et al., 2009). This regular interaction could provide a channel for addressing the current prevalence of obesity among both pets and humans through veterinarians promoting owners to walk their dogs on a regular basis (Cutt et al., 2008a). Lue, Pantenburg, and Crawford (2008) found that veterinary clients’ perceptions of the value of the advice being given to them for caring for their pet is driven by how well the veterinarian explains the reasons for their recommendations. Therefore, explaining the health benefits of dog walking for the dog and the dog owner could be a useful strategy to increase dog walking among dog owners.

The results of a qualitative study by Coe, Adams, and Bonnett (2008) also support the importance of veterinarian-client communication. Five main themes emerged from their focus groups with veterinarians and pet owners. These themes were educating clients, providing choices, using 2-way communication, breakdowns in communication, and challenges that veterinarians encountered when communicating with clients. For educating clients, pet owners expressed that they expected their veterinarians to explain important information, provide up-front information, and have the information available to them in various forms. Pet owners also shared that they expected to be provided with choices, meaning they are given multiple options and would like their veterinarians to
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respect their decisions. Two-way communication involves using language that clients can understand and listening to the clients. Examples of breakdowns in communication that pet owners shared included feeling misinformed or unheard, while veterinarians expressed communication challenges with clients involving monetary concerns, time limitations, and when there is more than one client involved (Coe et al., 2008). These findings can be useful for veterinarians trying to decide how to best communicate with their clients about the importance of dog walking.

The same authors conducted another qualitative study looking at veterinarians’ and pet owners’ perceptions of the monetary aspects of veterinary care (Coe et al., 2007). The results showed that monetary aspects often cause challenges within the veterinarian-client relationship. For instance, pet owners expressed suspicion in veterinarian recommendations at times and veterinarians shared that they at times feel undervalued. Coe et al. (2007) suggest improving communication between veterinarians and clients in order to decrease some of the challenges that arise within the veterinarian-client relationship over monetary issues. Due to client suspicion surrounding costs over veterinarian recommendations, it may be useful for veterinarians to promote dog walking for the health of their clients’ pets to show their clients that they have their pets’ best interest in mind as dog walking is a recommendation that carries minimal to no cost.

Oka and Shibata (2012a) also suggest that veterinarian encouragement to owners to walk their dogs may be the most effective intervention strategy for promoting motivational and behavioural change among dog owners. This suggestion is based on the fact that about 85% of Japanese dog owners reported visiting a veterinarian at least once a year, therefore providing an opportunity for veterinarians to educate the owners on the
importance of dog walking for the dog’s health and to support the owner’s sense of responsibility to walk the dog (Oka & Shibata, 2012a).

In a study by Chan et al. (2005), where both dog owners and their dogs wore pedometers, it was found that less active dog owners had less active pets. They also found that pedometers overestimated the actual number of steps by about 17% for large and medium-sized dogs and underestimated for small dogs by approximately 7%. The authors suggest that these results show that pedometers can be used with reasonable accuracy to measure physical activity levels of dogs. This can be used by veterinarians to help promote healthy lifestyles for dogs by implementing pedometer-based interventions targeting both the owner and the dog (Chan et al., 2005).

1.9 Interventions Currently in Place to Promote Dog-Walking

Very few interventions are currently in place to promote dog walking as a form of physical activity for dog owners. An example of a dog-walking intervention that has been done is “loaner dogs”, giving people a dog that is not their own to walk (Johnson & Meadows, 2010). In an intervention study that gave public housing residents a certified therapy dog to walk with a handler, it was found that the mean adherence rate of participants during 50 weeks was 72% and the average weight loss of participants was 14.4 pounds. The most common reason for adherence to the program among participants was that the dogs “need us to walk them”, further supporting that commitment or obligation to a dog may promote physical activity (Johnson & Meadows, 2010).

In a recent pilot study, Rhodes et al. (2012) recruited dog owners who do not walk their dogs regularly to participate in a randomized control trial with measurements taken at baseline, 6 weeks, and 12 weeks post-intervention. Both the control group and
intervention group wore pedometers for one week, and self-reported leisure time walking information was also collected. The intervention group received program materials containing messages targeting canine exercise, such as information about the benefits of exercise for dogs, safety tips and motivational quotes from dog owners (Rhodes et al., 2012). The results from this study showed that both groups had a significant increase in physical activity over 12 weeks, but the intervention group had significantly higher step counts compared to the control group. In addition, it was found that total walking, steps per day, and dog-walking measures significantly increased in the intervention group across each time period (baseline, 6 weeks, and 12 weeks), while total walking did not significantly increase in the control group. These results support that dog walking interventions could be a feasible way of increasing physical activity and supports that more dog-walking intervention studies are needed (Rhodes et al., 2012).

An intervention study, called the People and Pets Exercising Together (PPET) study, looked at the effectiveness of a combined people and pet weight-loss program (Kushner et al., 2006). They recruited participants for two study groups, one group was for overweight and obese participants who also had an obese dog that would also be participating in the intervention, and the second group only included overweight or obese individuals without dogs. Over one year, the human participants received nutrition and physical activity counseling and the dogs received a calorie-controlled prescription diet. The results from this intervention showed that completion rates at 1 year were 61% for the people and pets group and 58% for the people only group. Participants’ time spent in physical activity increased in both groups and the majority (two-thirds) of total physical activity in the people and pets group was spent with the dogs. Mean weight loss for the
people in the people and pets group and the people only group was 4.7% and 5.2%, respectively, while the average weight loss among the dogs was 15%. For human participants, it was hypothesized that the people and pets group would lose more weight than the people only group due to the social support they would be receiving from their pet dog. However, this was not the case as there were no significant differences in weight loss between the two groups at any point during the study. The authors suggest this could be because the people only group received social support through the counseling and support they were given throughout the study. They discuss that it is unknown whether dog owners in this study would be more successful maintaining their weight loss past one year due to the continual social support from their dogs.

The number of dog-walking intervention studies is very limited, requiring more theory- and evidence-based intervention research to be done in this emerging area.

1.10 The Use of Print Materials in Physical Activity and Health Promotion Interventions

When choosing an appropriate intervention delivery method, it is important to examine what has previously been found to be effective in promoting health and physical activity and in creating behavioural change. Heath et al. (2012) recommends informational approaches involving community-wide, mass-media campaigns and short physical activity messages targeting prominent community locations for effective physical activity interventions based on their review of interventions from around the world. Print interventions are sometimes viewed as less promising than interventions using newer technologies such as website-based interventions or using mobile devices to deliver programs. However, print interventions have multiple benefits that should not be
overlooked. For instance, print materials can allow for greater reach and acceptability of interventions in populations that may not always have access to the internet, such as lower socio-economic status groups, older adults, and those living in rural communities (Short et al., 2011). Some individuals prefer receiving print materials and some find print materials to be more novel in today’s society given much of what we see is online, therefore a printed material may be more memorable than something seen online (Short et al., 2011). There is also a lack of evidence suggesting that these newer approaches are more effective than traditional print interventions. Marcus et al. (2007) found in their study comparing internet- and print-based physical activity interventions that there were no significant differences in physical activity outcomes between a tailored internet program, a standard internet program, or a tailored print program. This suggests that both web-based interventions and print-based interventions may be equally effective in increasing physical activity levels. In a systematic review on the efficacy of print interventions to promote physical activity, it was found that there were positive intervention effects on physical activity levels in 7 out of 12 of the randomized trials examined (Short et al., 2011). Most of these interventions that were found to be effective were theory-based interventions.

1.11 The Intervention Mapping Approach

Intervention Mapping (IM) is a framework used in health promotion program planning to effectively make decisions in the process of program planning, implementation, and evaluation (Bartholomew et al., 2011). Intervention Mapping is strongly based in theory and evidence. Using theory to drive an intervention ensures that program planners are addressing the appropriate determinants to achieve change and
allows for protection against type III error. Type III error is when intervention
effectiveness cannot be found because the program was poorly designed or implemented.
Intervention Mapping uses a problem-driven perspective, where choices are made during
the developing process and multiple theories, empirical evidence, new research, and the
opinions and experiences of community members and program planners may be used to
shape the intervention.

According to Bartholomew et al. (2011), IM consists of six steps:

1. Conduct a needs assessment

2. Create matrices of change objectives

3. Select theory-informed intervention methods and practical applications

4. Organize methods and applications into an intervention program

5. Plan for adoption, implementation, and sustainability of the program

6. Generate an evaluation plan

Step 1: Conduct a Needs Assessment

Conducting a needs assessment involves acquiring an epidemiological,
behavioural, and social perspective of a community or population and making an effort to
understand the character of the community. At this stage, the intervention planner
assesses the health problem along with its causes and determinants and addresses that
there is a real need in the community for an intervention.

Step 2: Create Matrices of Change Objectives
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This is an important step in the IM process as it provides the framework for the intervention. At this stage, the planner must first use the information gathered during the needs assessment to state specific outcome behaviours that are to be accomplished as a result of the intervention. Then, the planner must decide on appropriate performance objectives for each of the behavioural outcomes. Performance objectives describe exactly what participants in the intervention need to do in order to make the change stated in the outcome behaviours. Next, the changeable determinants of the health behaviour must be selected that will be addressed through the intervention. Determinants are factors, such as self-efficacy or obligation, which have been found to be associated with the performance of the health behaviour. Results from the needs assessment provide valuable information on appropriate determinants but some refining is usually necessary in order to better address the problem.

Finally, the planner must create the matrix of change objectives by crossing performance objectives with determinants and writing change objectives. These matrices are formed by creating a table with performance objectives listed on the left side of the table and determinants across the top. The intersections of where the performance objectives and determinants meet are where the change objectives are written. Change objectives describe what needs to change related to the determinant for the individual to achieve the performance objective.

Example of a Matrix of Change Objectives:

<table>
<thead>
<tr>
<th>Performance Objectives</th>
<th>Determinant: Self-Efficacy</th>
<th>Determinant: Obligation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO. 1: Create a schedule</td>
<td>Express confidence in being</td>
<td>Express obligation to walk</td>
</tr>
</tbody>
</table>
**to walk the dog**  
- able to create a schedule that works for you  
- the dog on a regular schedule

**PO. 2: Assess and decide on an appropriate route to walk the dog**  
- Express confidence in being able to map out a safe route  
- Feel obligated to select a route that both you and your dog will enjoy

---

**Step 3: Select Theory-Informed Intervention Methods and Practical Applications**

Theoretical methods are general techniques proposed by various theories to influence change in determinants of behaviours. In contrast, practical applications act as the specific techniques used to organize, operationalize, and deliver the intervention methods (Bartholomew et al., 2011). Modeling is an example of a theoretical method that might be used in an intervention to increase an individual’s self-efficacy. A practical application that could be used to apply this method to the intervention could be testimonials from individuals similar to the intervention participants. Therefore, the tasks involved in Step 3 include reviewing program ideas, identifying and selecting theoretical methods, deciding on practical applications, and ensuring that the final applications chosen address the change objectives from the previous step.

**Step 4: Producing Program Components and Materials**

Step 4 involves creating the program scope, which is the breadth and amount of a program to be delivered, as well as the sequence, which refers to the order that a program is delivered in across time. Delivery channels, themes, and a list of needed program materials are also created during this stage. Delivery channels could include circulating
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print materials such as newspapers or magazines, or interpersonal channels such as through health care providers or teachers. A program theme should be one that will attract the target population to the program and help with the participants’ attention, awareness, and comprehension of the program (Bartholomew et al., 2011).

To guide the production of program materials and protocols, the planners must prepare design documents that meet the program objectives and parameters for the methods and practical applications. Next, the planner must review which program materials are available to them to find ones that fit with their objectives, methods and applications. Drafts of the program materials can then be developed, pretested and pilot tested followed by the final task of overseeing the production of the final materials and protocols.

Step 5: Planning Program Adoption, Implementation, and Sustainability

During this stage of the process, planners must identify potential adopters and implementers of the program and then create new matrices of change objectives specifically including adoption and implementation performance objectives. Along with the specific performance objectives, the planner must also decide on the program use outcomes, determinants, and change objectives for program adoption, implementation, and sustainability. Methods and practical applications for this step must also be selected as well as designing interventions for adoption and implementation of the program.

Step 6: Evaluation Planning
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This is the final step in the IM process. Planning an evaluation is important to determine efficacy and effectiveness of a program and it also allows for feedback in order to find ways to improve the program. In the evaluation-planning step, the planner writes effect evaluation questions that are based on the program outcome objectives to assess if these objectives have been met. Evaluation questions are also created to assess if there have been changes in the determinants of the behaviour. Next, process evaluation questions must be asked to examine if the methods, practical applications, program components, and implementation used were appropriate. Once the questions are created, indicators and measures must be developed and the evaluation design must be specified (e.g., experimental design with an intervention group and a control group).

Recent research has demonstrated that dog owners are a reasonable target population for physical activity interventions, however few interventions have been developed to address the problem. Therefore, the purpose of this study is to develop and pilot a print intervention resource targeting dog owners to walk their dogs at moderate intensity for at least 20 minutes on 3 days of the week or more in bouts of at least 10 minutes. This definition for regular dog walking has been previously used in a Canadian dog walking study by Brown and Rhodes (2006), excluding bouts of at least 10 minutes. The rationale for this criterion is that we do not expect that participants will acquire all of their physical activity through dog walking alone and therefore the definition is slightly lower than the Canadian Society for Exercise Physiology’s recommendation that was released in 2011 of at least 150 minutes of MVPA per week. An IM approach was used to conceptualize and develop the intervention resource. This project only involved steps
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1 to 4 of the IM process to focus on intervention development rather than program implementation, which can be addressed in future research that could build upon the current study by implementing and evaluating the intervention. Also, the current project accommodates the scope of and time constraints for a Masters thesis.
2.0 Research Objectives

The purpose of this project is to conceptualize and develop an intervention resource to promote dog walking among dog owners using an IM approach. The following are the objectives for the project which are based on the first four IM steps:

1. To apply the information gathered in the literature review, as part of the needs assessment, towards the development of matrices of change objectives that will guide the development of a resource to increase dog walking among dog owners.

2. To apply information gathered from interviews to develop matrices of change objectives.

3. To identify and develop intervention methods and practical applications, which are informed by theory, to include in the resource.

4. To design and produce a print resource that can subsequently be used to deliver the intervention.

5. To pilot the print resource with a small group of dog owners.
3.0 Methods

3.1 Participants

In order to take part in this study, participants must have identified themselves as the main caregiver of a dog and be 18 years of age or older. Both males and females were recruited to participate in this study. The sample for this study consisted of 26 participants. Twenty-four participants were dog owners who walk their dog regularly (at least 3 days per week for 20 minutes or more), and the other two participants were dog owners who do not walk their dogs at least 3 days per week for 20 minutes or more. Guest, Bunce, and Johnson (2006) found that data saturation occurred in their in-depth interviews with African women within the first 12 interviews, therefore, 26 participants helped to ensure that we reached a point in the interviews where no new information emerged from the data. Participants were from the Guelph community and other surrounding areas such as Cambridge, Kitchener, and Toronto. These locations were chosen because of their proximity to the University of Guelph and to obtain a more diverse sample.

3.2 Measures

3.2.1 Demographics and Background Information. Demographic and background information about the participants were obtained at the beginning of the individual interviews to better understand the characteristics of the study population. Information collected included participants’ age, gender, marital status and geographical location. The background questionnaire also included two questions that were asked of participants if they identified themselves as regular dog walkers: how many days in an average week the participants walked their dogs for at least 10 minutes at a time and
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specifically how much time they usually spent dog walking on one of those days (see Appendix B). A few questions were also asked in this questionnaire regarding background information on the participants’ dogs, such as the age of the dog and the breed. Participants were also asked if they were part of a formal dog-walking group because if many of the participants were from this sort of group, it could have had an impact on the results.

3.2.2 Lexington Attachment to Pets Scale (LAPS). The LAPS was used to measure participants’ level of attachment to their dog. The LAPS is a 23-item scale that has previously been found to be valid and reliable (Johnson, Garrity, & Stallones, 1992). Previous factor analysis identified three subscales. The first subscale represents “general attachment” and includes 11 items that inquire general questions about the relationship between the pet owner and his/her pet (Cronbach’s alpha = .90). The second subscale, “people substituting”, is comprised of 7 items that involve finding out how much of a central role the owner’s pet plays in his/her social life (Cronbach’s alpha = .85). The third subscale, “animal rights / animal welfare”, includes 5 items focusing on the level of respect that owners have for their pets and if they view them as members of their family (Cronbach’s alpha = .80) (Johnson, Garrity, & Stallones, 1992).

In administering the LAPS, participants indicate on a 4-point Likert scale whether they strongly agreed, somewhat agreed, somewhat disagreed, or strongly disagreed with each item (Anderson, 2007). The LAPS subscale scores are obtained by assigning values to each response option (strongly disagree = 0, somewhat disagree = 1, somewhat agree = 2, and 3= strongly agree), reverse scoring items that are worded in a negative direction, and calculating the item mean for each subscale (Johnson et al., 1992). In the current
study, the LAPS was adapted by changing the word “pet” to “dog” in all of the items (see Appendix C).

Johnson et al. (1992) found further support for the construct validity of the LAPS. For example, respondents who have fewer social relationships, respondents who have no children, females, and older respondents were more attached to their pets. Also, as evidence of convergent validity, respondents’ LAPS scores were strongly related to interviewer ratings of respondents’ pet attachment ($r = .64$) (Johnson et al., 1992).

In a study by Zilcha-Mano, Mikunlincer, and Shaver (2011), it was found that the LAPS was correlated with the Pet Attachment Questionnaire (PAQ) that measures the degree of pet owners’ anxious or avoidant attachment to their pets. The LAPS was inversely correlated with the PAQ avoidance score ($r = -.57$) but was not significantly related to the PAQ anxiety score. This provides support for the divergent validity of the LAPS because it suggests that attachment orientation, which the PAQ measures, is not the same as attachment strength, which is measured by the LAPS (Zilcha-Mano et al., 2011). This could be because the LAPS was found to be better at measuring strong attachment than weak attachment (Johnson et al, 1992).

3.2.3 Interview Guide. Semi-structured face-to-face and telephone interviews were used to collect data from participants using the interview guide below. One interview guide was used for both dog walkers and dog owners that did not walk their dogs. All participants in both groups were asked the same interview questions listed in Table 1. The dog owners that did not walk their dogs regularly were asked one additional question pertaining to the barriers they face when it comes to walking the dog (see bolded question in Table 1). Towards the end of the interview, all participants were asked about
any other physical activity that they take part in other than dog walking. Each interview lasted approximately 30 minutes. The following are research questions used to help guide the development of interview questions:

1. To investigate the contextual factors that may play a role in dog walking.
2. To investigate participants’ perceptions of factors that influence them to walk their dog or to not walk their dog.
3. To compare factors that influenced participants to walk their dog or to not walk their dog to those found in the literature.
4. To explore participants’ ideas on effective ways for a print resource to encourage dog owners to walk their dogs more frequently.

The following questions were asked of all participants. Table 1 shows the research topics with corresponding interview questions and probes.

Table 1
Research topics with corresponding interview questions and probes to help guide the interview

<table>
<thead>
<tr>
<th>Research Topic</th>
<th>Interview Question</th>
<th>Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contextual factors</td>
<td>Before we start the interview, would I be able to get the name of your dog?</td>
<td>Would you mind taking a few minutes to describe your relationship with your dog (say dog’s name)?</td>
</tr>
<tr>
<td></td>
<td>Now, could you tell me a bit about (dog’s name)?</td>
<td></td>
</tr>
<tr>
<td>Influencing factors</td>
<td>Can you please explain to me the reasons for walking your dog?</td>
<td>If the main correlates of dog walking that came up in the literature are not</td>
</tr>
</tbody>
</table>
| **What barriers do you experience when it comes to walking with your dog?** | mentioned, probe to discover if self-efficacy, motivation, obligation, attachment, and social encouragement from the dog are also influencing factors.

How do you overcome these barriers?

| **Ideas on effective intervention applications** | We will be making a print resource to encourage dog owners to walk their dogs more. What types of things do you think we should include in the resource to achieve this?

(Ask the following if participant is already a regular dog walker): What do you think you would find helpful/useful to get you to keep walking your dog on a regular basis?

(Ask the following if participant is a dog owner who does not walk the dog regularly): What do you think you would find helpful/useful to get you to walk your dog more often?

Is there any information that could be included in the resource that you would find helpful?

If/when broader strategies (such as role modeling) are mentioned, probe further for how |
**3.3 Procedure**

This is a qualitative descriptive study that used a cross-sectional research design. The study was reviewed and approved by the University of Guelph Research Ethics Board. Participants for this study were recruited using flyers (see Appendix F) and word of mouth. Snowball sampling was also used by asking participants to inform other dog owners who they know about the study. Flyers were posted at various locations throughout the community including community centers, dog parks, pet stores, veterinary clinics, and around the University of Guelph campus. Recruitment also took place at PawsWay in Toronto, Ontario, which is a place for owners to bring their pets to socialize and take part in pet-friendly events and activities. When potential participants expressed interest in taking part in the study, they were asked a screening question to determine if they are considered “dog walkers” or “dog owners who do not walk their dogs” (see Appendix A). Regular dog walking was defined as walking with the dog for at least 20 minutes (in bouts of at least 10 minutes) on 3 or more days per week. The criterion of 10-minute bouts is consistent with current physical activity guidelines (US Department of Health and Human Services, 2008; The Canadian Society for Exercise Physiology, 2013).
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Dog walking for at least 20 minutes on 3 or more days per week is the same definition that was used in a previous Canadian study of dog walking (Brown & Rhodes, 2006). This definition is lower than the current Canadian recommendations for physical activity because it is assumed that participants would be doing other forms of physical activity, in addition to dog walking, to achieve the recommended 150 minutes per week (Brown & Rhodes, 2006). How regular dog walking is defined has previously differed by country (Oka & Shibata, 2012a), therefore it is reasonable to use this definition in a Canadian context. During early recruitment, we conducted a small pilot of the interview questions that would be used in the main study among 5 additional participants. The same techniques and flyers were used in this pilot.

Semi-structured interviews with the 26 participants were done as an additional portion of the needs assessment. This allowed us to gather the experiences of dog owners living in Toronto and within the Guelph-Wellington County community and other surrounding areas to examine if the ideas that emerged are common or unique to those that arose from the literature review. This combination of empirical evidence from previous studies and the current study will aid in creating a more all-encompassing summary of how to increase dog walking among dog owners (Bartholomew et al., 2011). Interviews were scheduled to take place at the University of Guelph, over the telephone, or at PawsWay in Toronto.

As mentioned above, we piloted the interview questions among 5 participants to investigate how they reacted to the questions and to explore whether we were asking the right kind of questions to get at the type of information that we were looking for. Participants taking part in the pilot were asked the same interview questions as the main
study participants as well as to share their thoughts on the questions. Written consent was obtained from the pilot participants including consent to record interviews using an audio-recording device (See Appendix D). The procedure used to ensure confidentiality is described below. Once we felt confident that the interview questions were appropriate, we moved on to interviewing the 26 main study participants. No changes were made to the interview questions.

When recruiting at PawsWay, the interviews were done onsite at the time of recruitment. Some interviews were conducted over the phone if face-to-face interviews were not possible or feasible for the participants. At the interview sessions, participants were informed again about the purpose of the study and asked to read and sign a consent form (see Appendix D). The participants were assured that only the researcher, her advisor, and her advisory committee member would have access to the information obtained from the participant. Interviews were approximately 30-45 minutes long and audio-recorded. Consent to use an audio-recording device was obtained from participants before the interviews began. Once the interviews were completed, the researcher transcribed the interviews verbatim. Data were removed from the audio-recording devices within 24 hours of the interview and stored in a secure location (i.e., an encrypted laptop).

The researcher then continued with the IM process, by introducing the new information gathered from the literature review and the interviews into the matrix of change objectives. Every interview question that was asked of participants helped in developing the intervention resource by identifying what participants believe to be appropriate and effective methods to use in the intervention. The final stage of the study
was producing and piloting the print intervention resource among five dog owners not involved in the original one-on-one interviews.

Word-of-mouth was used to recruit dog owners for the pilot. Interviews were conducted over the phone and the researcher took notes during the interviews to record participants’ responses. Participants were asked to provide their consent to take part in the pilot study (See Appendix E). Pilot participants were only asked one question, “What are your thoughts about this print resource?” and follow-up probes were used to see how well the resource was accepted by these dog owners. Pilot study interviews relating to the print resource were approximately 15 minutes long.

3.3.1 Data Analysis. The author analyzed the individual interviews. Thematic analysis was used to analyze the data and NVivo software was used to organize the qualitative data collected from the interviews.

According to Braun and Clarke (2006), thematic analysis is a qualitative method for identifying, analyzing, and reporting themes that emerge from data. A “theme” is an idea or pattern collected from the data that tells us something important in regards to answering the research question (Braun & Clarke, 2006). Guest, MacQueen, and Namey (2012) describe a theme as a unit of meaning that is noticed in the data by someone reading the text. Therefore, in this study, obligation is an example of a theme that emerged when participants were asked about factors that influence them to walk their dog.

Liamputtong (2013) describes performing thematic analysis as the researcher trying to make sense of the data from the interviews and then trying to make sense of what the participants as a group are saying by trying to find repeated patterns of meaning.
within the data. A code is a textual description of the meaning of a theme or an element of a theme (Guest et al., 2012).

Thematic analysis entailing open coding (i.e., assigning preliminary themes and codes in the margins of transcripts), axial coding (i.e., examining how the preliminary themes are connected and then organizing them into larger clusters), and selective coding (i.e., highlighting good illustrations of themes) was used to analyze the transcripts (Neuman & Robson, 2015). Revising codes and themes while re-reading the transcripts is often necessary (Liampittong, 2013).

The researcher created a codebook in which themes were named, described, and assigned a code that was used throughout the analysis process. An example of a quote from the transcripts demonstrating the themes was also provided in the codebook.

During the process of identifying themes, it is important to keep in mind the research objectives of the study. This helps to ensure that the themes emerging are those that are relevant to the research questions and are therefore the themes that need to be elaborated on (Guest et al., 2012).
4.0 Manuscript to Submit for Publication

Developing a Resource to Promote Dog Walking Among Dog Owners

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Abstract

Objective: A print intervention was developed using an intervention mapping approach to promote regular dog walking among dog owners.

Methods: Twenty-six adult dog owners in Ontario were recruited in January 2014 to participate in a 30-minute semi-structured interview about dog walking. Results from these interviews were compared with the findings of previous dog walking studies to create a list of determinants of dog walking which were used to create a matrix of change objectives. Theory-based methods and practical applications were then chosen to use in the print resource to address these determinants. The resource was then developed and piloted among five adult dog owners.

Results: Eight major themes emerged from the individual interviews for reasons why the participating dog owners walk their dogs: obligation to the dog, motivation from the dog, self-efficacy, dog’s health, owner’s health, socialization, “an active dog is a better behaved dog”, and having a routine. These results are similar to those found in previously published dog walking studies. Weather, lack of security when walking at night, lack of time, and the dog’s behaviour while walking were the four themes that were identified as the primary barriers to dog walking.

Conclusion: The print resource that was created is based on theory and evidence and can be used to promote regular dog walking among dog owners. Future research should focus on the implementation and evaluation of this resource as well as the development of other intervention studies targeting physical activity among dog owners.
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**Introduction**

Walking is a form of moderate-intensity physical activity that can contribute to individuals achieving public health recommendations for moderate-to-vigorous physical activity (MVPA) (Kruger et al., 2008). It is also a simple, inexpensive activity to perform with very few barriers (Brown & Rhodes, 2006; Bryan & Katzmarzyk, 2009).

Approximately 35% of Canadian households own a dog (Perrin, 2009). This is relevant to physical activity research as it has been suggested in previous studies that dog owners spend more time walking and in moderate-intensity activity than do non-dog owners (Brown & Rhodes, 2006; Christian et al., 2013). Nonetheless, approximately one third of dog owners do not walk their dog regularly (Cutt et al., 2008a; Hoerster et al., 2011), suggesting an opportunity to increase the physical activity of this population through dog walking.

There is increasing support for dog walking as a practical form of physical activity. Individuals who walk their dog are more likely to meet the physical activity recommendations for MVPA than dog owners that do not walk their dog (non-dog walkers) and people who do not own dogs (non-dog owners). There are also fewer obese dog-walkers compared to non-dog walkers and non-dog owners (Coleman et al., 2008; Cutt et al., 2008a; Hoerster et al., 2011; Oka & Shibata et al., 2012b).

There are very few dog walking intervention studies targeting dog owners. The purpose of this study is to develop and pilot a print intervention resource targeting dog owners to walk their dog on a regular basis. An intervention mapping (IM) approach (Bartholomew et al., 2011) was used to conceptualize and develop the resource. Only steps 1 to 4 of the IM process (needs assessment, matrix of change objectives, selecting
theory-based methods and applications, and producing program components and materials) were performed to focus on intervention development rather than program implementation.

Methods

Participants

Twenty-six adult dog owners who self-identified as the primary caretaker of a pet dog were recruited for the main study (development phase). Table 1 shows participant characteristics as well as characteristics of their pet dogs. The average age of participants was 43.5 years (range 24 to 75) and most participants were females (84.6%) and already walked their dog for at least 20 minutes on three or more days per week (92.3%). Five adult dog owners participated in the pilot of the print resource. They were all female dog owners between the ages of 24 and 51.

Measures

Lexington attachment to pets scale (LAPS). The LAPS was used to measure participants’ level of attachment to their dog. The LAPS is a widely used 23-item Likert scale that has previously been found to be valid and reliable (Anderson, 2007; Johnson, Garrity, & Stallones, 1992). This scale consists of three subscales: general attachment, people substituting, and animal rights/welfare. In the current study (which has a small sample size), the coefficient alpha for general attachment, people substituting, and animal rights/welfare subscales were .86, .50 and .78, respectively, indicating that two of the subscales had adequate internal consistency reliability.

Interview Guide. An interview guide was developed to direct the individual interviews. These questions were based on concepts from behaviour change theories,
specifically social cognitive theory and theory of planned behaviour, as well as correlates of dog walking that have been found in previous studies. The interviews focused on what influences participants to walk their dog, what barriers they face when it comes to dog walking, and suggestions about how to promote dog walking in a print resource.

**Procedure**

A literature review was conducted prior to individual interviews with dog owners to identify determinants of dog walking.

The authors’ university provided ethics approval for the study. The 26 participants were recruited through posters in the Guelph community (e.g., community centers, dog groomers, and pet stores), snowball sampling, and word-of-mouth. Recruitment also took place onsite at PawsWay (a place for owners to bring their pet to socialize and take part in pet-friendly events and activities) in Toronto, Ontario. When potential participants expressed interest in taking part in the study, they were asked a screening question to determine if they are regular “dog walkers” or “dog owners who do not walk their dog”. Regular dog walking was defined as walking with the dog for at least 20 minutes (in bouts of at least 10 minutes) on 3 or more days per week. This is the same definition (with the exception of 10 minute bouts) that was used in a previous Canadian study of dog walking (Brown & Rhodes, 2006). The criterion of 10-minute bouts is consistent with current physical activity guidelines (US Department of Health and Human Services, 2008; The Canadian Society for Exercise Physiology, 2013).

A small pilot of the interview questions was conducted with five different participants during early recruitment to ensure appropriateness of the questions. No changes were made to the interview guide as a result of the pilot. All participants,
including the five from the pilot of the interview questions and the twenty-six main study participants, provided informed written consent, provided demographic and background information, and participated in a semi-structured interview (approximately 30 minutes) that was conducted face-to-face or over the phone. All interviews were audio taped and subsequently transcribed verbatim.

Quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS 20.0). Transcripts of the interviews were imported into NVivo 10. Thematic analysis entailing open coding (i.e., assigning preliminary themes and codes in the margins of transcripts), axial coding (i.e., examining how the preliminary themes are connected and then organizing them into larger clusters), and selective coding (i.e., highlighting good illustrations of themes) was used to analyze the transcripts (Neuman & Robson, 2015). Data saturation was reached in that no new information emerged during the last interviews.

A matrix of change objectives was created by referring to both the determinants of dog walking identified from a literature review and the interview data. Theory-based methods and practical applications were chosen to use in producing the resource to address these change objectives. In the final stage of the study, five additional individuals reviewed the resource and provided feedback over the phone (approximately 15 minutes).
Results

Determinants of Dog Walking Identified in Literature Review

Key determinants of dog walking that have been found in previous studies include obligation to the dog, motivation from the dog, self-efficacy, social support from the dog, attachment to the dog, and walkability of the neighbourhood (Brown & Rhodes, 2006; Coleman et al., 2008; Cutt et al., 2008a, 2008b; Hoerster et al., 2011; Oka & Shibata, 2012a, 2012b.)

Relationship With Pet Dog

Table 1 shows the mean score for the three LAPS subscales. Considering that the scores can range from 0 to 3, participants had a strong general attachment to their dog and viewed their dog as a family member.

According to the individual interviews, twelve of which were conducted face-to-face and fourteen over the telephone, all participants were attached to their dog. Many dog owners viewed their dog as their child or member of the family, although a few participants commented that their dog is nonetheless a dog. Most participants felt that they have a very strong companionship with their dog. More quotations describing participants’ relationship with their dog are provided in Table 2.

Reasons for Walking the Dog

Eight major themes for the reasons why people walk their dog emerged from the interviews: obligation to the dog, motivation from the dog, self-efficacy, dog’s health, owner’s health, socialization, an active dog is a better behaved dog, and having a routine. Illustrative quotations for these themes are in Table 3.
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**Obligation to the dog.** The majority of participants felt a sense of obligation as a dog owner to walk their dog regularly. Some participants stated that they usually feel guilty if they do not take their dog out for a walk. Several felt that the word “obligation” sounded too negative and shared that although they feel it is their responsibility to walk their dog, they do it because they want to do it, not because they have to. Others expressed the firm belief that if individuals are not willing to walk their dog then they should not own one.

**Motivation from the dog.** Many dog-walking participants mentioned that their dog provides them with motivation to get out and walk. They felt that they would rarely go for walks if they did not have their pet dog.

**Self-efficacy.** Many participants who walked their dog expressed that they feel confident in their ability to walk their dog regularly. This was sometimes shared in a general sense in that they believed that they are able to walk their dog regardless of barriers encountered. Some participants said that they feel confident that their dog will be obedient during walks, whereas others articulated that they feel confident with certain aspects of the walk, but not with other factors such as walking off leash.

**Dog’s health.** Almost all participants emphasized that the main reason they walk their dog is for the health of their dog, both physically and mentally. They see how much their dog enjoys being walked and are aware that dogs need physical activity as much as humans do. All participants wanted their dog to live a long, happy life and they saw dog walking as an important factor in keeping their dog healthy.

**Owner’s health.** Some participants said that one of the reasons why they walk their dog is for their own physical and mental health. Most felt that their primary reason
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for walking their dog was for the dog’s well-being and that their own health was a secondary factor. However, other dog owners in this study shared that improving their own health played a major role in their decision to get a dog. Participants often revealed that walking their dog not only allows them to get more exercise, but also provides a chance to get outside in nature to reflect, which helps to relieve stress.

**Socialization.** Various social factors were found to influence dog walking. Dog owners in this study stated that walking the dog is a great way to meet and connect with people who live in the community. They also highlighted the importance of socializing their dog with other people and dogs while walking to ensure that their pet knows how to behave around others and in new situations.

**An active dog is a better-behaved dog.** Many participants said that a dog that is walked regularly is likely to be better behaved. These dog owners said that it is very important for their dog to get out on walks to sniff and explore in order to release some pent-up energy from being indoors all day and therefore to be calmer at home. Some participants also stated that they use their walking time as an opportunity to practice different training techniques with their dog.

**Having a Routine.** Some participants expressed how dog walking is part of their daily routine which makes it easy for them to ensure that their dog gets walked regularly. They stated that they like the predictability of their routine and that once they fell into the habit of dog walking, it came very natural for them to fit it into their daily tasks.

**Barriers to Dog Walking**
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The most common barriers that participants faced when it comes to walking their dog include: *weather, lack of security when walking at night, lack of time*, and *dog’s behaviour when walking*. Some quotations representing these barriers are in Table 4.

**Weather.** Winter weather conditions such as ice, snow, cold temperatures, and salt on the sidewalk that gets into dog’s paws were the primary conditions that participating dog owners found the most unpleasant to walk in. Other weather barriers mentioned include rain, hot temperatures, and wind. Some dog owners overcome these barriers by dressing themselves and their dog appropriately for the weather, by going for shorter walks, and by skipping the walk on days when the weather seems unbearable.

**Lack of security when walking at night.** Participants living in more rural or secluded neighbourhoods expressed that they do not feel safe walking their dog at night due to limited street lighting, lack of sidewalks, and dangerous wildlife that may live in the area.

**Lack of time.** Many participants felt that they do not have enough time to walk their dog as often as they would like to. This is due to busy work schedules, having children and other family members to care for, and after-work activities.

**Dog’s behaviour when walking.** Some dog owners in this study did not enjoy taking their dog for a walk because of the dog’s behaviour while walking. Participants highlighted negative behaviours such as: the dog is not good at walking on a leash (i.e., pulling or barking), the dog is not good with other dogs encountered while walking, and the dog is fearful of different obstacles. These types of behaviour caused dog owners to feel stressed while dog walking.

Resource Suggestions
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The most common suggestions that participants gave for what to include in the resource were to highlight the health benefits for both the dogs and the owners, to emphasize how it is a great way to meet new people, and to stress how much the dog will enjoy the walks. Other suggestions were things like including the location of dog parks and trails, having testimonials from other dog owners as well as advice from experts, encouraging dog walking as a family activity, and incorporating tips for making dog walking part of their regular routine.

Applying Information to Develop the Resource

Table 5 shows the matrix of change objectives that guided the development of the resource. The shaded cells in Table 5 indicate the change objectives that were specifically addressed in the print resource. The matrix is based on the determinants of dog walking identified in both the literature and the interviews with dog owners. Self-efficacy, obligation, and motivation from the dog emerged from both the literature (Brown & Rhodes, 2006; Cutt et al. 2008a, 2008b; Hoerster et al., 2011) and the interviews. According to the interviews, two main themes for why owners in this study walk their dog are for the dog’s health and for the owner’s health. These themes are addressed through the awareness/knowledge determinant in the matrix because dog owners may be influenced to walk their dog for either their dog’s health or their own health if they are aware of the health benefits. “An active dog is a better behaved dog” is another theme from the interviews, which is addressed through both the awareness/knowledge and motivation determinants. Dog walking as part of a regular routine was another theme that emerged in the interviews. This involves getting into the habit of dog walking regularly, so this theme is represented by the habit determinant.
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Social support from the dog is a correlate of dog walking in previous studies (Cutt et al., 2007, 2008a; Hoerster et al., 2011). This was also discussed in the interviews of the current study, however socialization in general with other people appeared to play a larger role in dog walking than did social support from the dog. Socialization is not listed as a determinant in the matrix as it is not necessarily an easily modifiable determinant in the current context, however it is a major finding from the interviews with dog owners from this study so it is addressed through performance objective 6. Outcome expectations were not a determinant of dog walking identified from the literature or the interviews. However, according to Bandura (1977), self-efficacy influences outcome expectancies because people can believe that performing a behaviour will produce certain outcomes, but it will only impact their behaviour if they feel confident that they can do the necessary activities.

The matrix of change objectives also includes performance objectives and change objectives. Performance objectives describe exactly what participants in the intervention need to do in order to make the desired change (i.e. walk the dog regularly). The matrix is created by crossing performance objectives with determinants and writing change objectives. Change objectives describe what needs to change related to the determinant for the individual to achieve the performance objective. The intersections of where the performance objectives and the determinants meet are where the change objectives are written (Bartholomew, 2011).

Theoretical methods were chosen from a range of behaviour change theories as well as from the CALO-RE taxonomy of behaviour change techniques described by Michie et al. (2011) to develop the resource. In piloting the resource, the five participants
provided very positive feedback such as approval of the colours and pictures selected because the colours are pleasing to the eye and both owners and dogs look happy in the pictures. It was commonly stated that it is often imagery that draws people in and they felt as though this brochure’s images did a good job of that. Participants in this pilot also mentioned that they liked the quotes used because they evoked emotions and expressed the intent of the brochure in short sentences. In regards to the text, most participants shared that they liked having bulleted statements and that it was not too wordy, however it was suggested to use simpler language and to check the readability of the content in the brochure to ensure that the language is appropriate for a wide population. This feedback was utilized to revise the resource so that the content, which was originally at an 10th grade reading level, is now at an eighth grade reading level. (Piloted resource appears as Appendix A). The final print resource that was produced is a 3-panelled brochure. The brochure should be folded so that the front page is the title page with the title “DOG WALKING: Health Benefits for You and Your Dog” and the back page is the panel with the heading “Health Benefits for You and Your Dog”, which lists related web resources.

Discussion

This study used the first four steps of the IM process to develop an evidence-based print resource to promote dog walking among dog owners. The resource addresses prominent determinants of dog walking that have been identified and provides tips on how to overcome common barriers to dog walking. There are limited dog-walking intervention studies focused on physical activity among dog owners (Kushner et al.,
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2006; Rhodes et al., 2012). To our knowledge, this is the first to use an IM approach in this area.

During the interviews with dog owners, the major themes that emerged regarding why these dog owners walk their dog were obligation to the dog, motivation from the dog, self-efficacy, dog’s health, owner’s health, socialization, “an active dog is a better behaved dog”, and having a routine. These results add to the evidence that obligation (Brown & Rhodes, 2006; Hoerster et al., 2011; Oka & Shibata, 2012a) motivation (Cutt et al., 2008), self-efficacy (Cutt et al., 2008; Hoerster et al., 2011; Oka & Shibata, 2012a), and social support (Cutt et al., 2007, 2008; Hoerster et al., 2011) are main predictors of dog walking.

All participants in this study shared some level of attachment to their pet, either expressing their relationship with their dog as an owner-dog companionship or viewing their dog as a very valuable, integral member of the family. Also, the LAPS scores showed that participants in this study had a strong general attachment to their dog. This study mostly consisted of individuals who already walk their dog regularly. Previous research has found that dog walkers have higher levels of attachment to their dog than do non-dog walkers (Oka & Shibata, 2012b).

Results from the interviews with dog owners in this study were similar to those found in another Canadian qualitative study by Degeling and Rock (2013). In their study, participants discussed how caring for their pet dog acted as a motivator to become more physically active outdoors as they needed to meet the physical and social needs of their dog. This is comparable to the responses from many participants in the current study that expressed that the main reasons they walk their dog is for the good of their dog (both
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physically and mentally) and for getting their dog socialized with other dogs and people. The idea of including dog walking into dog owners’ everyday routine in order for it to become habit was also mentioned by dog owners in both of these studies.

Other studies have highlighted the importance of social support from the dog as a predictor of dog walking (Cutt et al., 2007, 2008; Hoerster et al., 2011; Kushner et al., 2006). Participants in the current study shared that they perceive their dog to provide some sense of social support while walking, however it was more often discussed that they find other social aspects of dog walking appealing, such as meeting new people and walking with friends and family members. These social interactions that occur while walking the dog commonly emerged as what participants feel to be a primary reason for why they continue to walk their dog regularly. This finding is supported by many studies that have found pet dogs to be facilitators for human social interactions, which could play a role in the association between pet ownership and psychological health (McNicholas & Collis, 2000; Wells, 2004).

The dog’s behaviour while walking was commonly discussed by participants in this study as either a barrier to dog walking if their dog is disobedient when on walks, or as a motivator if the dog is well-behaved. This has not usually been discussed in previous dog-walking studies and should be explored further.

The final print resource was formed from the results of both a literature review and the interviews with dog owners. Print interventions are sometimes viewed as less promising than interventions using newer technologies such as website-based interventions or using mobile devices to deliver programs. However, there is a lack of evidence suggesting that these newer approaches are more effective than traditional print
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interventions. Marcus et al. (2007) found in their study comparing internet- and print-based physical activity interventions that there were no significant differences in physical activity outcomes between a tailored internet program, a standard internet program, or a tailored print program. This suggests that both web-based interventions and print-based interventions may be equally effective in increasing physical activity levels. In a systematic review on the efficacy of print interventions to promote physical activity, it was found that there were positive intervention effects on physical activity levels in 7 out of 12 of the randomized trials examined (Short et al., 2011). Most of these interventions that were found to be effective were theory-based interventions. Therefore, we feel confident that this resource has the potential to elicit change in dog-walking behaviour.

Strengths and Limitations

A major strength of this study is that due to the use of IM, the resource is strongly based on theory and evidence. Limitations of this study include the small sample size, which primarily consisted of women who already walked their dog regularly. This is similar to other dog-walking intervention studies that had samples comprised of approximately 80% women (Kushner et al., 2006; Rhodes et al., 2012). Another limitation is that only steps one to four of the IM protocol were completed; however, the time focused on intervention development is critical. Developing a print resource intervention also limits the behavior change techniques that can be used because only techniques that can be implemented through writing, rather than in-person, can be used.

Future Research

Implementation and evaluation research of this resource is warranted in order to complete steps 5 and 6 of the IM process and to evaluate the effect of the intervention
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(possibly as part of a multi-component intervention) on dog owners. The plan for step 5 is to distribute the print resource to various veterinary offices, pet stores, and doctors’ offices. The resource could eventually be distributed online as well, via veterinary listserves, email, or weblinks on pet sites. Evaluation of the print intervention would involve evaluating whether or not the brochure influences dog owners to walk their dogs. Outcomes of interest might be health outcomes for both owners and dogs, determinants of dog walking such as awareness/knowledge, motivation, obligation, skills/self-efficacy, outcome expectations, and habit, as well as dog-walking behaviours.

Qualitative studies that include a larger sample of non-dog walkers are needed as well as more intervention studies targeting dog walking among dog owners, using other methods of delivery.
Acknowledgements

The authors acknowledge the contributions of Owen Roberts, Len Kahn, and Francesco Piccioni in the development and design of the final print resource. We would also like to thank PawsWay for their assistance with recruitment for this study.
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References


Hoerster, K.D., Mayer, J.A., Sallis, J.F., Pizzi, N., Talley, S., Pichon, L.C., & Butler,
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**Table 1**
Sample (n = 26) characteristics and LAPS subscale scores

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean (SD) or %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>43.5 (11.4)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>15.4</td>
</tr>
<tr>
<td>Female</td>
<td>84.6</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
</tr>
<tr>
<td>Never legally married</td>
<td>23.1</td>
</tr>
<tr>
<td>Legally married (and not separated)</td>
<td>65.4</td>
</tr>
<tr>
<td>Divorced</td>
<td>3.8</td>
</tr>
<tr>
<td>Widowed</td>
<td>7.7</td>
</tr>
<tr>
<td>Average # of days/week that dog gets walked</td>
<td>5.8 (1.9)</td>
</tr>
<tr>
<td>Average time spent dog walking on a typical day (minutes)</td>
<td>34.9 (17.6)</td>
</tr>
<tr>
<td>Size of Dog</td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>30.8</td>
</tr>
<tr>
<td>Medium</td>
<td>42.3</td>
</tr>
<tr>
<td>Large</td>
<td>26.9</td>
</tr>
<tr>
<td>Age of dog</td>
<td>5.7 (5.2)</td>
</tr>
<tr>
<td>Participants who own more than one dog</td>
<td>23.1</td>
</tr>
<tr>
<td>LAPS - General attachment subscale</td>
<td>2.6 (0.4)</td>
</tr>
<tr>
<td>LAPS - People substituting subscale</td>
<td>1.6 (0.5)</td>
</tr>
<tr>
<td>LAPS - Animal rights/welfare subscale</td>
<td>2.3 (0.6)</td>
</tr>
</tbody>
</table>

Note. Possible range for LAPS subscale scores is 0 (low attachment) to 3 (high attachment).
Table 2
Illustrative quotations describing participants’ relationship with their dog

<table>
<thead>
<tr>
<th>Theme</th>
<th>Illustrative quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog is like children or other family member</td>
<td>“They’re my children. I have 2 daughters (laughter), they’re my children. Life really revolves around them. Mornings, we have to see to them first before we see to ourselves. You have to rush home in the evenings to make sure that they get out. Our life really is our dogs. We sleep with them. They have their own chairs in the house.” (P12)</td>
</tr>
<tr>
<td></td>
<td>“I’m very much in tune with what they want all the time. They’re more than [dogs], like you know that question about family members. They’re kind of like my little kids because I don’t have kids.” (P14)</td>
</tr>
<tr>
<td></td>
<td>“I consider him like one of my children. He was the first in the family.” (P17)</td>
</tr>
<tr>
<td></td>
<td>“Other than my husband, they’re my best friends. My two doggies, I call them my children. I was sick with pneumonia a couple weeks ago and Ron had to work a lot of overtime. So I was home all by myself in bed, too sick to read, watch TV or do anything. I was just lying in bed all day, and the dogs were there with me and they’re such good company.” (P19)</td>
</tr>
<tr>
<td></td>
<td>“She is the most precious thing in my life other than my husband. I have this incredible, internal bond with her. She’s my baby, she’s my baby girl. I know it sounds crazy but she is.” (P4)</td>
</tr>
<tr>
<td></td>
<td>“There’s kind of confusion about whether or not they’re [the dogs] animals or kids. We don’t plan on having kids so all of our emotional baggage is on them (laughter).” (P5)</td>
</tr>
<tr>
<td></td>
<td>“He’s definitely a member of the family. We hate putting him in a kennel. We have once, when we went south to Cuba. Because he couldn’t come. We all share the commitment, we all love to spend time with him, and we take his needs into account when we’re deciding what we’re going to do.” (P11)</td>
</tr>
</tbody>
</table>
### Table 2 cont.
Illustrative quotations describing participants’ relationship with their dog

<table>
<thead>
<tr>
<th>Theme</th>
<th>Illustrative Quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dogs are dogs</td>
<td>“Of course, he’s a part of the family. I think dogs, in general to me, are a part of the family, but they are not a replacement for kids. I think dogs are dogs and people are people.” (P8)</td>
</tr>
<tr>
<td></td>
<td>“I’m very fond of her. However, in our house, a dog is a dog. And I don’t treat them like people, although I take excellent care of her and I enjoy her. I don’t let her sleep on my bed or sit on the furniture or eat off the table or any of those things.” (P26)</td>
</tr>
<tr>
<td></td>
<td>“We do consider a dog to be part of our family but I consider her to be our dog. We’re connected in the sense that she watches me for training and things like that. We also have a bond as dogs and people often do.” (P9)</td>
</tr>
<tr>
<td>Dog is close companion</td>
<td>“My own dog is like my best friend.” (P16)</td>
</tr>
<tr>
<td></td>
<td>“My relationship with Misty [the dog] is stronger than any of the other dogs I’ve ever had in my life, in that I am old, I’m a widow, I live alone and so she has become a very close companion.” (P20)</td>
</tr>
<tr>
<td></td>
<td>“She’s a really great companion. The other thing is that she’s really sensitive, like when you want quiet time or you just want to relax, she’ll just curl up right beside you on the couch and she’s just the most, she’s just the best companion, really wonderful.” (P25)</td>
</tr>
<tr>
<td></td>
<td>“I think he understands when something’s wrong with me.” (P3)</td>
</tr>
</tbody>
</table>
**Table 3**
Illustrative quotations for themes about why dog owners walk their dog

<table>
<thead>
<tr>
<th>Theme</th>
<th>Illustrative quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obligation to the dog</td>
<td>“If you’re going to have a dog, then I think walking comes as part of it. You have an obligation to take the dog out for a walk. I don’t believe that people that don’t walk the dog should have a dog.” (P12)</td>
</tr>
<tr>
<td></td>
<td>“I feel guilty when I don’t [walk my dog]. If I’m sick or if I have an appointment or meetings, I try to walk the dog in between, before, or after. Like if I’m going golfing, I get up extra early so that she can at least have her morning walk before I leave, and when I’m at an appointment or if I’m held up at a doctor’s appointment or something, I feel guilty because she’s at home and not getting her walk.” (P20)</td>
</tr>
<tr>
<td></td>
<td>“But we also knew they were a higher energy dog. They need exercise and so one of the reasons to walk is because he needs to walk. It’s that sort of accountability, you made that commitment, and you have to walk.” (P11)</td>
</tr>
<tr>
<td>Motivation from the dog</td>
<td>“I would probably go on almost no walks if it weren’t for the dog. I like that I’m going on them but to be honest, before I had a dog, I don’t think I went for many walks just for pleasure.” (P10)</td>
</tr>
<tr>
<td></td>
<td>“There are times that the weather is terrible and I’m tired and whatever other reasons, but [my dog] definitely motivates me to walk more.” (P1)</td>
</tr>
</tbody>
</table>
### Table 3 cont.
Illustrative quotations for themes about why dog owners walk their dog

<table>
<thead>
<tr>
<th>Theme</th>
<th>Illustrative quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>“I had a bit of a challenge when I got the second one [dog] because they were not going the same pace at first. I found that he was taking advantage of the situation by pulling while he was never pulling before so I had to adjust. But I find that it’s always, never the dog. It’s always the way you handle him. I find that I can walk pretty much any dog. Even people that I know, they say ‘Oh, my dog doesn’t walk on the leash. She doesn’t know how to heel.’ Well, all dogs know how to heel if you know how to handle it. Some of them, of course, may have higher energy and it may feel harder to get there but I don’t find it hard.” (P8)</td>
</tr>
<tr>
<td></td>
<td>“The only thing that I’m not confident with is being off leash right now.” (P25)</td>
</tr>
<tr>
<td></td>
<td>“I usually walk him and his sister, so I feel comfortable navigating traffic and getting him to follow commands at the cross-walks and stuff like that.” (P3)</td>
</tr>
<tr>
<td>Dog’s health</td>
<td>“It [dog walking] is so important. It’s not for the people who have the dog, it’s for the dog. It’s not so they [people] can get exercise. It’s that the dog needs the exercise.” (P12)</td>
</tr>
<tr>
<td></td>
<td>“I think it [dog walking] is good for them. It keeps them healthy. Misty’s weight hasn’t varied from when she became an adult dog until now and she’s 11. And it’s always within just a few ounces different. She benefits from the exercise. She enjoys it.” (P20)</td>
</tr>
<tr>
<td></td>
<td>“Just to keep him healthy. We love him and we want him to be around as long as he possibly can be.” (P2)</td>
</tr>
</tbody>
</table>
Table 3 cont.
Illustrative quotations for themes about why dog owners walk their dog

<table>
<thead>
<tr>
<th>Theme</th>
<th>Illustrative quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner’s health</td>
<td>“The best piece of exercise equipment I ever got was my dog but I think it’s also good for your mental health because you just get out on your own with the dog.” (P11)</td>
</tr>
<tr>
<td></td>
<td>“I think that originally when we got a dog, before we experienced really having a dog, it was to keep us healthy. We both work from home, both self-employed, so we thought it would be a good thing to get a dog to break up the day and break the tension and force us to get off our ass to go for a walk and that kind of thing. We could have probably trained Olivia. She wasn’t house broken when we got her. We could have probably introduced pee pads and could have kept that as an option but we decided it’s probably better for everybody to just go outside. Like I said, force ourselves to get up and do it. So it’s as much for us as it is for her.” (P4)</td>
</tr>
<tr>
<td></td>
<td>“I’m a lot into mindfulness, meditation and stuff like that. When you walk the dog, it brings you closer to nature and closer to the elements. So even when it’s raining, even if it’s snowing, you have to take the dog out. Sometimes we would just go out and it helps bring us closer to nature and stuff like that so it may be good, especially in the urban lifestyle like we have here.” (P8)</td>
</tr>
<tr>
<td>Socialization</td>
<td>“It’s good socialization for the dog obviously and good socialization for people. It’s a great way to know your neighbours and what’s going on in the community because you’re out there all the time.” (P6)</td>
</tr>
<tr>
<td></td>
<td>“I knew no neighbours in my neighbourhood. Now I know so many people. I know all of the people who own dogs in my neighbourhood and we chat fairly regularly. And I know other people who come up and say ‘oh, what kind of dog is that?’ and so I’ve gotten to meet so many people. It makes you feel more connected to your people in your neighbourhood.” (P25)</td>
</tr>
</tbody>
</table>
### Table 3 cont.

**Illustrative quotations for themes about why dog owners walk their dog**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Illustrative quotation</th>
</tr>
</thead>
</table>
| An active dog is a better behaved dog | “I notice an increase in anxiety or chewing behaviours if she’s not getting the exercise that I feel she needs.” (P26)  
“Definitely, he’s not as hyper. He calms down and he’s very relaxed in the evening. Not so much now that he’s older but when he was younger, … if he didn’t have his walk, he’d be all over the house, back and forth, back and forth.” (P15)  
“It’s also part of the bonding I do with Livy. We do some training times sometimes so I enjoy doing that. She enjoys it and she’s often looking for more than just a walk. She’s looking for a little bit more stimulation so we do some training. She enjoys that.” (P9) |
| Having a routine | “When I first got her, she was a puppy. She needed to go out frequently because she needed to go to the bathroom, so we just got into the habit of going out and just sort of fell into a routine. Always first thing in the morning going out for a walk 10-15 minutes, and then first thing when I get home, go out for a walk 10-15 minutes. Then later on in the evening, around 8:00 or 9:00, we go for a half hour or longer walk. And then last thing before she goes to bed, I take her out one more time so … it’s like a routine. A routine but we fell into it when I first got her and learned from the breeder about how important walking your dog is.” (P25)  
“I think it’s just a matter of getting them into a routine and doing it consistently and building that habit because some people come up with excuses not to do it. So it’s … building the habit of doing it and finding something like a trigger to get you to do it.” (P3) |
Table 4
Illustrative quotations representing barriers to dog walking

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Illustrative quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather</td>
<td>“The winter could be a barrier. The ice storm really limited my route so I really had to stay [at home] and I wouldn’t go anywhere near the park because I just couldn’t balance. So that really restricted me to the area around. We’re lucky he lets us put boots on him but if you don’t have a dog that does that and your limited to an area that has salt, that could be limiting to some people and dogs.” (P6)</td>
</tr>
<tr>
<td></td>
<td>“The winter time is more of a struggle because of the salt. We have boots but … sometimes when it’s really cold out, we’ll just let him out in the backyard because it’s easier, instead of taking him for walks. But the main barrier is the winter with the salt, so we put boots on him.” (P3)</td>
</tr>
<tr>
<td></td>
<td>“It would probably be the weather. When it’s raining, we don’t go out. And when it’s minus thirty. If I went out, it would be very short.” (P15)</td>
</tr>
<tr>
<td>Lack of security when walking at night</td>
<td>“The timing issue, so the darkness in the winter. There are no lights around here plus there are wolves. So we don’t go out in the dark around here.” (P19)</td>
</tr>
<tr>
<td></td>
<td>“There’s no paths so it’s just a loop through the neighbourhood and we have two street lights in the whole neighbourhood.” (P18)</td>
</tr>
<tr>
<td></td>
<td>“I have a roommate but I probably wouldn’t do this on my own. Sometimes we do take him very late at night. But usually I feel more comfortable having another person when going out at 11 o’clock or something.” (P10)</td>
</tr>
<tr>
<td>Lack of time</td>
<td>“Just lifestyle and what I mean by that is I have 2 children and I work shift work so those would be the barriers. It would be the time outside of that [to walk my dog]. My children are young and can’t go for an hour and a half walk and they’re too young to be home by themselves. My husband works shift work so very often only one of us is ever home so those are really the only times to walk her, so when the kids are at school or outside. Mostly when they’re at school is usually when I walk her but then sometimes those are the days it doesn’t happen. Well, we’ll go for a short one around the block.” (P9)</td>
</tr>
<tr>
<td></td>
<td>“It’s really just a lack of time and also the winter. I hate the cold weather so much so that’s the two main reasons. I would love to walk him every day and if it’s icy out, obviously I won’t and we just don’t have a lot of time.” (P18)</td>
</tr>
</tbody>
</table>
### Table 4 cont.
Illustrative quotations representing barriers to dog walking

<table>
<thead>
<tr>
<th>Theme</th>
<th>Illustrative Quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog’s behaviour when walking</td>
<td>“When you walk, he barks at certain types of dogs so it makes it stressful. If he was off leash, he wouldn’t stress out over it because if he’s off the leash, he won’t feel threatened.” (P17)</td>
</tr>
<tr>
<td></td>
<td>“In regards to my other dogs, when they’re on the leash it’s not very enjoyable because they’re barking and pulling on the leash and everything. So I almost hope I don’t see anyone when I’m going on the walk.” (P24)</td>
</tr>
<tr>
<td></td>
<td>“The leash behaviours have really been a struggle. She was probably a free roaming dog in the first year of her life and we’re not perfect. We had a very, very icy winter with terrible walking conditions. So probably one of my biggest sources of frustration with her is walking her on a leash, and off the leash because she doesn’t come back. So I am pursuing more obedience training because we need more.” (P26)</td>
</tr>
</tbody>
</table>

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### Table 5
Matrix of change objectives for dog owners

<table>
<thead>
<tr>
<th>Performance Objective</th>
<th>Determinants of Dog Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PO.1 Decide to walk your dog regularly</strong></td>
<td><strong>Performance Objective</strong></td>
</tr>
<tr>
<td></td>
<td>AK.1 Identify positive health benefits of dog walking for owners and the dog</td>
</tr>
</tbody>
</table>
Table 5 cont.
Matrix of change objectives for dog owners

<table>
<thead>
<tr>
<th>Performance Objective</th>
<th>Determinants of Dog Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PO.2 Assess your current and previous experiences with walking your dog (e.g., frequency of dog walking)</strong></td>
<td><strong>Awareness/Knowledge</strong></td>
</tr>
<tr>
<td>AK.2.a Identify physical activity recommendations for adults (people)</td>
<td>M.2.a Recognize how frequently you walk your dog</td>
</tr>
<tr>
<td>AK.2.b Identify walking recommendations for dogs</td>
<td>M.2.b Recognize any positive feelings that you have during or after walking your dog</td>
</tr>
<tr>
<td></td>
<td>M.2.c Recognize your dog’s positive behaviours during or after walks</td>
</tr>
</tbody>
</table>
Table 5 cont.
Matrix of change objectives for dog owners

<table>
<thead>
<tr>
<th>Performance Objective</th>
<th>Awareness/Knowledge</th>
<th>Motivation</th>
<th>Obligation</th>
<th>Skills/Self-efficacy</th>
<th>Outcome Expectations</th>
<th>Habit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO.3 Set a goal for how often you will walk your dog</td>
<td>AK.3 Understand what an attainable goal is and how to set one</td>
<td>M.3 Recognize the positive feelings associated with achieving a goal</td>
<td>SS.3.a Express confidence in setting an achievable goal</td>
<td>OE.3 Expect that setting this goal will help you walk your dog regularly</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SS.3.b Demonstrate ability to set an attainable goal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SS.3.c Express confidence in achieving the goal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5 cont.
Matrix of change objectives for dog owners

<table>
<thead>
<tr>
<th>Performance Objective</th>
<th>Determinants of Dog Walking</th>
<th>Habit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PO.4 Make a plan for how you will achieve the goal related to frequency of dog walking</strong></td>
<td><strong>Awareness/Knowledge</strong></td>
<td><strong>Motivation</strong></td>
</tr>
<tr>
<td></td>
<td>AK.4 List locations of dog parks, trails and walking routes in your area</td>
<td>M.4.a Recognize that going for regularly scheduled walks with your dog is good for you and your dog’s health</td>
</tr>
<tr>
<td>PO.4.a Create a dog-walking schedule / routine</td>
<td>AK.4.a Identify strategies for getting into a routine</td>
<td>M.4.b Motivated to choose equipment / materials that will make dog walking a positive experience for you and your dog</td>
</tr>
<tr>
<td>PO.4.b Ensure that you have appropriate dog walking equipment / materials (e.g., leash; water for you and your dog; clothing for you and your dog; sneakers for you)</td>
<td>K.4.b Identify which leashes, winter dog clothes, etc are most appropriate for your dog and where to obtain them</td>
<td></td>
</tr>
</tbody>
</table>

73
Table 5 cont.
Matrix of change objectives for dog owners

<table>
<thead>
<tr>
<th>Performance Objective</th>
<th>Determinants of Dog Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Awareness/ Knowledge</td>
</tr>
<tr>
<td>PO.5 Cope with barriers to dog walking (e.g., time, weather, dog pulls)</td>
<td>AK.5 Identify barriers and how to overcome them</td>
</tr>
<tr>
<td>PO.6 Socialize with other people and dogs while you are walking your dog</td>
<td>AK.6 Understand that walking your dog can lead to meeting new people in your neighbourhood</td>
</tr>
</tbody>
</table>
Table 5 cont.
Matrix of change objectives for dog owners

<table>
<thead>
<tr>
<th>Performance Objective</th>
<th>Determinants of Dog Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Awareness/ Knowledge</td>
</tr>
<tr>
<td>PO.7 Evaluate / monitor progress</td>
<td>AK.7 State how to measure changes in dog walking behaviour and health</td>
</tr>
</tbody>
</table>

Shaded cells indicate change objectives that were specifically addressed in the print resource.
Table 6
Theoretical methods and practical applications for change objectives selected to use in the development of the print resource

<table>
<thead>
<tr>
<th>Change objective</th>
<th>Methods (related theory)</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PO.1 Decide to walk your dog regularly</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AK.1 Identify positive health benefits of dog walking for owners and the dog</td>
<td>Consciousness raising (health belief model, TTM)</td>
<td>List health benefits for owners and dogs</td>
</tr>
<tr>
<td></td>
<td>Gain-framed messages</td>
<td></td>
</tr>
<tr>
<td>M.1.a Motivated to walk your dog regularly so that you and your dog will enjoy this physical activity</td>
<td>Modeling</td>
<td>Testimonials</td>
</tr>
<tr>
<td>M.1.b Motivated to walk your dog regularly to attain (dog owner) physical and mental health benefits</td>
<td>Consciousness raising</td>
<td>List health benefits for owners</td>
</tr>
<tr>
<td>O.1 Feel obligated to walk your dog regularly for the physical and mental well-being of your dog</td>
<td>Consciousness raising</td>
<td>List physical and mental health benefits for dogs</td>
</tr>
<tr>
<td></td>
<td>Modeling</td>
<td>Testimonials</td>
</tr>
<tr>
<td>OE.1.a Expect that walking your dog regularly will result in health benefits to you and your dog</td>
<td>Modeling</td>
<td>Testimonials</td>
</tr>
<tr>
<td>OE.1.b Expect that walking your dog regularly will enhance your relationship with your dog</td>
<td>Consciousness Raising</td>
<td>Discuss how walking your dog is a great way enhance your connection with your dog</td>
</tr>
</tbody>
</table>

**PO.2 Assess your current and previous experiences with walking your dog (e.g., frequency of dog walking)**
Table 6 cont.
Theoretical methods and practical applications for change objectives selected to use in the development of the print resource

<table>
<thead>
<tr>
<th>Change objective</th>
<th>Methods (related theory)</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK.2.a Identify physical activity recommendations for adults (people)</td>
<td>Consciousness raising</td>
<td>List recommendations for walking and dog walking</td>
</tr>
<tr>
<td>AK.2.b Identify walking recommendations for dogs</td>
<td>Consciousness raising</td>
<td></td>
</tr>
<tr>
<td><strong>PO.3 Set a goal for how often you will walk your dog</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS.3.b Demonstrate ability to set an attainable goal</td>
<td>Goal setting (theories of self-regulation, Michie et al., 2011)</td>
<td>Suggest dog owners set a goal for how frequently and for how long they want to walk their dog</td>
</tr>
<tr>
<td><strong>PO.4 Make a plan for how you will achieve the goal related to frequency of dog walking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AK.4 List locations of dog parks, trails and walking routes in your area</td>
<td>Consciousness raising</td>
<td>Describe how owners can get information about locations of dog parks, trails and walking routes in their area</td>
</tr>
<tr>
<td>SS.4(ii) Develop a dog walking plan</td>
<td>Action planning (Michie et al., 2011)</td>
<td>Explain how to plan effectively by deciding when and where they will walk the dog</td>
</tr>
<tr>
<td>H.4(i) Identify prompts and cues to promote dog walking (e.g., time of day)</td>
<td>Cue altering (theories of goal directed behavior; theories of Automatic, impulsive and habitual behaviour)</td>
<td>Suggest examples of new cues to prompt dog walking (e.g., time of day)</td>
</tr>
<tr>
<td>Change objective</td>
<td>Methods (related theory)</td>
<td>Application</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>H.4(ii) Create an environment that supports dog walking (e.g., putting the leash by the front door)</td>
<td>Environmental restructuring (Michie et al., 2011)</td>
<td>Suggest ways of organizing the home so that walking the dog is easier (e.g., putting the leash by the front door)</td>
</tr>
</tbody>
</table>

**PO.4.a Create a dog-walking schedule / routine**

<table>
<thead>
<tr>
<th>AK.4.a Identify strategies for getting into a routine</th>
<th>Consciousness raising</th>
<th>Provide tips for getting into a routine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Modeling (SCT, theories of learning)</td>
<td>Testimonials</td>
</tr>
</tbody>
</table>

| SS.4.a Express confidence in being able to adhere to schedule, even when encountering barriers | Planning Coping responses (attribution theory and relapse prevention theory; theories of goal directed behaviour) | List tips for overcoming main barriers |

**PO.4.b Ensure that you have appropriate dog walking equipment / materials (e.g., leash; water for you and your dog; clothing for you and your dog; sneakers for you)**

| AK.4.b Identify which leashes, winter dog clothes, etc are most appropriate for your dog and where to obtain them | Consciousness raising | Explain how owners can obtain this equipment / materials |

**PO.5 Cope with barriers to dog walking (e.g., time, weather, dog pulls)**
Table 6 cont.  
Theoretical methods and practical applications for change objectives selected to use in the development of the print resource

<table>
<thead>
<tr>
<th>Change objective</th>
<th>Methods (related theory)</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK.5 Identify barriers and how to overcome them</td>
<td>Planning coping responses</td>
<td>List main barriers and tips for overcoming them</td>
</tr>
<tr>
<td></td>
<td>Barrier identification / problem solving (Michie et al., 2011)</td>
<td></td>
</tr>
<tr>
<td>M.5 Motivated to learn obedience training skills and to consistently practice good dog-walking skills so that dog walking is safe and enjoyable</td>
<td>Consciousness raising</td>
<td>Advice from experts</td>
</tr>
<tr>
<td>PO.6 Socialize with other people and dogs while you are walking your dog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AK.6 Understand that walking your dog can lead to meeting new people in your neighbourhood</td>
<td>Consciousness raising</td>
<td>Explain how walking the dog can lead to meeting new people</td>
</tr>
<tr>
<td>O.6 Feel obligated to create a social environment for your dog during walks to ensure that your dog is properly socialized with other people and dogs</td>
<td>Consciousness raising</td>
<td>Describe importance of socializing your dog</td>
</tr>
<tr>
<td></td>
<td>Modeling</td>
<td>Testimonials</td>
</tr>
<tr>
<td>PO.7 Evaluate / monitor progress</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROMOTE DOG-WALKING
### Table 6 cont.
Theoretical methods and practical applications for change objectives selected to use in the development of the print resource

<table>
<thead>
<tr>
<th>Change objective</th>
<th>Methods (related theory)</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.7 Motivated to identify any positive changes in your and your dog’s walking behaviour (e.g., frequency and duration) and health</td>
<td>Modeling</td>
<td>Testimonials</td>
</tr>
<tr>
<td></td>
<td>Gain-framed messages (protection motivation theory)</td>
<td>Provide messages emphasizing the advantages of dog walking</td>
</tr>
</tbody>
</table>

**Table Legend:**

AK = Awareness and Knowledge  
M = Motivation  
O = Obligation  
SS = Skills and Self-efficacy  
OE = Outcome Expectations  
H = Habit
Appendix A: Piloted Brochure

Tips to Overcome Barriers

Dog owners frequently face barriers when it comes to dog walking, such as lack of time, the dog’s disobedient behavior while walking, lack of security when walking at night, and bad weather conditions. Here are a few tips for overcoming some of these challenges so that dog walking can become a part of your regular routine.

- Decide ahead of time when, where, and for how long you are going to walk your dog.
- Prepare yourself and your dog for the weather. Boots and coats for dogs are easily found at many pet supply stores.
- Put your running shoes and the leash by the front door. This will make it easy to remember to take your dog for a walk.
- When the only option is to walk at night, walk with a friend or family member.
- Search for obedience training in your area for help with disruptive walking behaviors.
- Make dog walking a family activity. Your whole family will benefit from the physical activity and it will provide quality time for the family to spend together.

Health Benefits for You and Your Dog

There are many resources available online that can give you more information about how to make it easier to include dog walking into your regular routine. Here are a few useful websites to get you started:

- On the CVMA website, Canadian veterinarians provide information on a wide range of topics related to your dog’s well-being:
  - AnimalHealthCare.ca

- Websites like WalkDoggin.com provide lists of dog-friendly trails in Canada and give details such as if the park is fenced or has drinking water.

The information in this brochure is based on a study from the University of Guelph. For more information, contact John Dryer at dogwalkingguelph@canada.com or Julie Campbell at campbells@uoguelph.ca.

“Dogs are...”

“I ever got was my dog”
Health Benefits

Dog walking isn’t only for the dogs...

Walking your dog is an excellent form of physical activity that can help Canadian adults reach the current physical activity recommendation of 150 mins/week of moderate intensity activity.

Achieving this recommendation will lead to many health benefits, such as a decreased risk of developing chronic diseases like heart disease, type 2 diabetes, and certain cancers.

A time for reflection

Many dog owners believe that dog walking has a positive effect on their mental health. They feel that it provides them with time to reflect and de-stress after a long day as well as an opportunity to connect with their dog and with nature.

We are responsible for the health of our dogs

The Canadian Veterinary Medical Association (CVMA) suggests that dogs should exercise 2-3 times a day for a total of at least one hour (this can include walking and other activities such as playing fetch).

Walking your dog regularly provides the dog with a wide range of benefits, including:

- Weight control, which Canadian veterinarians have identified as the #1 thing you can do to help your dog live longer because a dog that is a healthy weight is less likely to develop other health problems.
- Reduce destructive behaviours (e.g.: chewing; over excitement).
- Mental stimulation.
- Socialization with other dogs and people.

“Before I got my dog, I didn’t know any of my neighbours. Now I know everyone who has a dog and we talk regularly when we’re out walking our dogs.”

Get Social

Many dog owners who walk their dog regularly enjoy the social aspects that accompany dog walking.

It is a great way to meet new people and other dogs who live in your community. Walking your dog with a friend, family member, or neighbour can help you to stay motivated to walk your dog regularly.

You can also search online for local dog walking groups in your area.

“My dog is 11 years old and we walk everyday. She has been a healthy weight her entire life and she absolutely loves when we go on our walks.”
PROMOTE DOG-WALKING

5.0 References


Bentley, R., Jolley, D., & Kavanagh, A. M. (2010). Local environments as determinants of walking in Melbourne, Australia. *Social Science and Medicine, 70*(11), 1806-1815. doi: http://dx.doi.org/10.1016/j.socscimed.2010.01.041


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6.0 Appendices

Appendix A: Screening Email and Telephone Script

Hello, my name is Julia Campbell. I am contacting you because you showed interest in my study on Developing a Program to Promote Dog Walking Among Dog Owners. The following questions are going to determine whether you should participate in this study or not and whether or not you classify as a regular dog walker according to this study.

1. Do you identify as the primary caretaker of a pet dog?
   • Yes—Please continue with checklist
   • No—Sorry you are not a candidate for this study

2. What is your gender?
   • Female
   • Male
   • Other

3. Do you walk your dog for at least 20 minutes on 3 or more days per week in episodes of at least 10 minutes?
   • Yes
   • No

At this point in the screening the researcher will review her quota of participants to see if she has already reached 10 male and 10 female participants for each the dog walkers group and the dog owners who do not walk their dogs group. If there is still room for the participant in the corresponding group then continue with the questionnaire. If already have enough participants than the researcher will apologize and inform the respondent that they are not currently a candidate for this study as we have already acquired the maximum number of participants. If this is the case, the researcher will ask if it is ok to contact the respondent in the case that a participant withdraws from the study.

4. Are you willing to participate in a 30-45 minute interview?
   • Yes—Please continue with the checklist
   • No—Sorry you are not a candidate for this study

I am going to email you a letter of informed consent on this study. It will describe the study in detail so that you can make an informed choice as to whether to participate or not. Then, if you want to participate, you can contact me again to set up a date and a time for the meeting. Would I be able to have an email address I can send this information to?

______________________________

Thank you so much for your interest in this study.

I look forward to hearing from you.
Take care and goodbye.
Appendix B: Demographic and Background Questionnaire

*Questions are based on the 2011 National Household Survey Questions (Statistics Canada, 2012)

1. What is your age? _________ Years

2. What is your sex?
   - Male
   - Female
   - Other

3. Marital Status
   Mark one circle only.
   - Never legally married
   - Legally married (and not separated)
   - Separated, but still legally married
   - Divorced
   - Widowed

4. Where do you currently live?
   ______________________________

The following two questions will only be asked of participants who indicated that they walk their dog regularly for at least 20 minutes on 3 days of the week or more in episodes of at least 10 minutes. These two questions have been adapted from the International Physical Activity Questionnaire Short-Form (IPAQ) (IPAQ, 2002).

5. In an average week, how many days do you walk your dog for at least 10 minutes at a time?
   _____ Days
6. On average, how much time do you usually spend walking your dog on one of those
days?

_____ Minutes

The following questions will be asked to find out more contextual information about
participants’ dogs.

7. What kind of dog do you have?

_______________________________

8. How would you describe the size of your dog?
   a) Small
   b) Medium
   c) Large

9. Does your dog have any illnesses or physical issues that may prevent your dog
   from going on walks?
   a) Yes
   b) No

10. How old is your dog?

____________________

11. Do you have more than one dog?
   a) Yes
   b) No

12. Are you currently a member of a formal dog-walking group?
   a) Yes
   b) No
   c) No, but have been in the past
Appendix C: Lexington Attachment to Pets Scale (LAPS) (Anderson, 2007)
Please tell us if you agree or disagree with these brief statements about your dog. For each statement, check whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree. You may refuse to answer.

<table>
<thead>
<tr>
<th>Items</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Somewhat Disagree</th>
<th>Strongly Disagree</th>
<th>Don’t Know/Refuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My dog means more to me than any of my friends.</td>
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<tr>
<td>2. Quite often I confide in my dog.</td>
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<td>3. I believe that dogs should have the same rights and privileges as family members.</td>
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<td>4. I believe my dog is my best friend.</td>
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<td>5. Quite often, my feelings toward people are affected by the way I react to my dog.</td>
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<tr>
<td>6. I love my dog because he/she is more loyal to me than most of the people in my life.</td>
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<tr>
<td>7. I enjoy showing other people pictures of my dog.</td>
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<tr>
<td>8. I think my dog is just a dog.</td>
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<tr>
<td>9. I love my dog because it</td>
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<td>never judges me.</td>
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<tr>
<td>10. My dog knows when I’m feeling bad.</td>
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<tr>
<td>11. I often talk to other people about my dog.</td>
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<tr>
<td>12. My dog understands me.</td>
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<tr>
<td>13. I believe that loving my dog helps me stay healthy.</td>
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<tr>
<td>14. Dogs deserve as much respect as humans do.</td>
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<tr>
<td>15. My dog and I have a very close relationship.</td>
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<td>16. I would do almost anything to take care of my dog.</td>
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<td>17. I play with my dog quite often.</td>
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<td>18. I consider my dog to be a great companion.</td>
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<td>19. My dog makes me feel happy.</td>
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<tr>
<td>20. I feel that my dog is part of my family.</td>
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<tr>
<td>21. I am not very attached to my dog.</td>
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<tr>
<td>22. Owning a dog adds to my happiness.</td>
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<tr>
<td>23. I consider my dog to be a friend.</td>
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</tbody>
</table>
PROMOTE DOG-WALKING

“General attachment” subscale items are items 17, 22, 15, 19, 18, 21, 10, 11, 23, 13, and 12. “People substituting” subscale items are items 6, 1, 9, 5, 4, 2, and 7. “Animal rights / animal welfare” subscale items are items 14, 3, 20, 8, and 16.

Items that are reversed scored are items 8 and 21.
CONSENT TO PARTICIPATE IN RESEARCH

“Developing a Program to Promote Dog-Walking Among Dog Owners”

You are asked to participate in a research study conducted by Julia Campbell and Dr. John Dwyer from the Family Relations and Applied Nutrition Department at the University of Guelph. The results of this study will be used for Julia Campbell’s Master’s of Applied Human Nutrition thesis.

If you have any questions or concerns about the research, please feel free to contact:
Julia Campbell (MSc Candidate)  Dr. John Dwyer (PhD)
Phone: 226-979-0622  Phone: 519-824-4120, ext. 52210
Email: campbelj@uoguelph.ca  Email: dwyer@uoguelph.ca

PURPOSE OF THE STUDY

The purpose of this study is to examine dog owners’ reasons for walking or not walking their dogs on a regular basis and to use this information to develop a print resource intervention that will be used to increase dog walking among dog owners.

PROCEDURES

If you volunteer to participate in this study, we will ask you to do the following things:

Sign this consent form to indicate that you give your consent to participate in this study. Then, you will be asked to complete a short demographic questionnaire that will ask you your age, sex, ethnicity, education level, and where you live. This questionnaire will take 5 minutes to complete.

Next, you will be asked to take part in a one-on-one interview with the researcher. You will first be asked a screening question to determine if you are a regular dog walker or not. The interview will be audio-recorded using two audio-recording devices and later transcribed by the researcher and volunteer research assistants. The interviews will last approximately 30-45 minutes. You will only be asked to participate in an interview on one occasion. Interviews will be conducted at the University of Guelph or PawsWay in Toronto.

POTENTIAL RISKS AND DISCOMFORTS
There are no foreseeable risks or discomforts associated with participating in this study. Foreseeable inconveniences may be the time commitment to complete the interview for 30-45 minutes.

**POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY**

Participation in this study could benefit participants as it may make them more aware of how often they walk their dog and increase their physical activity levels by walking the dog more frequently.

There is potential for this study to benefit society as the resulting resource could increase physical activity levels of dog owners and their dogs, therefore contributing to better health of members in society.

**PAYMENT FOR PARTICIPATION**

Participants will not receive payment for participation in this study.

**CONFIDENTIALITY**

*Every effort will be made to ensure confidentiality of any identifying information that is obtained in connection with this study.*

ID numbers or pseudonyms will be used in the interview transcripts to ensure that no identifying information will be available. If participants share any identifying information (such as contact information, names of family members and friends, etc.) during the interviews, the transcripts will be altered in these instances to maintain confidentiality.

Volunteer undergraduate students will be helping with the transcription of the interviews. The researcher, Julia Campbell, will provide the volunteers with numbered audio files of the recorded interviews. Only Julia Campbell and Dr. John Dwyer will have access to the ID numbers that correspond with the participants' names. All volunteers will sign a confidentiality agreement stating that they will not discuss the study, the names mentioned in the interviews, or the names of participants if they recognize any participants' voices as anyone they know.

The researcher will keep any written records and demographic questionnaires under lock and key in the Family Relations and Applied Nutrition Department at the University of Guelph during the period of study. They will be locked in a cabinet in Dr. John Dwyer's office or in his filling cabinet in the Applied Human Nutrition graduate students' office. Only the researcher (Julia Campbell) and her advisor (Dr. John Dwyer) will have access to these cabinets.

The researcher's laptop will be encrypted for the purpose of this study. To
maximize confidentiality, the volunteer researchers will also be completing their transcribing on an encrypted laptop or computer. Encryption means that the words in the file are rearranged, which makes the document unreadable without proper resources. At the end of every interview, the audio-recordings of the interviews will be placed in an encrypted file on Julia’s laptop and deleted from the voice recorder device. Interview transcripts will also be saved in an encrypted file. Following the period of study, the researcher’s advisor, Dr. John Dwyer, will keep the data under lock and key at the University of Guelph for 5 years after the publication of the results. At the end of the 5 years, hard copies of transcripts will be shredded.

**PARTICIPATION AND WITHDRAWAL**

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw without consequences of any kind. You may exercise the option of removing your data from the study. You may also refuse to answer any questions you do not want to answer and still remain in the study. The researcher may withdraw you from this research if circumstances arise that warrant doing so. If you complete the interview, you have one week to withdraw from the study by requesting that your data be permanently destroyed.

**RIGHTS OF RESEARCH PARTICIPANTS**

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. This study has been reviewed and received ethics clearance through the University of Guelph Research Ethics Board. If you have questions regarding your rights as a research participant, contact:

Sandy Auld, Director, Research Ethics  
Telephone: (519) 824-4120, ext. 56606  
E-mail: sauld@uoguelph.ca  
University of Guelph  
437 University Centre  
Guelph, ON N1G 2W1  
Fax: (519) 821-5236
SIGNATURE OF RESEARCH PARTICIPANT

I have read the information provided for the study “Developing a Program to Promote Dog Walking Among Dog Owners” as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

____________________________________
Name of Participant (please print)

_________________________________                             ______
Signature of Participant                             Date

SIGNATURE OF WITNESS

______________________________________
Name of Witness (please print)

_________________________________                             ______
Signature of Witness                             Date
 Appendix E: Consent Form for Pilot Study

CONSENT TO PARTICIPATE IN RESEARCH

“Pilot Study: Dog Owners Thoughts and Reactions to New Dog Walking Print Intervention”

You are asked to participate in a research study conducted by Julia Campbell and Dr. John Dwyer from the Family Relations and Applied Nutrition Department at the University of Guelph. The results of this study will be used for Julia Campbell’s Master’s of Applied Human Nutrition thesis.

If you have any questions or concerns about the research, please feel free to contact:
Julia Campbell (MSc Candidate)  Dr. John Dwyer (PhD)
Phone: 226-979-0622  Phone: 519-824-4120, ext. 52210
Email: campbelj@uoguelph.ca  Email: dwyer@uoguelph.ca

PURPOSE OF THE STUDY

The purpose of this study is to examine how well a newly developed print resource aimed at increasing dog walking among dog owners is accepted by dog owners.

PROCEDURES

If you volunteer to participate in this study, we will ask you to do the following things:

Sign this consent form to indicate that you give your consent to participate in this study. Then, you will be asked to complete a short demographic questionnaire that will ask you your age, sex, ethnicity, education level, and where you live. This questionnaire will take 5 minutes to complete.

Next, you will be asked to take part in a one-on-one interview with the researcher. The interview will be taking notes during the interview to analyze later. The interview will last approximately 15 minutes. You will only be asked to participate in an interview on one occasion. Interviews will be conducted at the University of Guelph or over the telephone.

POTENTIAL RISKS AND DISCOMFORTS
PROMOTE DOG-WALKING

There are no foreseeable risks or discomforts associated with participating in this study. Foreseeable inconveniences may be the time commitment to complete the interview for approximately 15 minutes.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

Participation in this study could benefit participants as it may make them more aware of how often they walk their dog and increase their physical activity levels by walking the dog more frequently.

There is potential for this study to benefit society as the resulting resource could increase physical activity levels of dog owners and their dogs, therefore contributing to better health of members in society.

PAYMENT FOR PARTICIPATION

Participants will not receive payment for participation in this study.

CONFIDENTIALITY

Every effort will be made to ensure confidentiality of any identifying information that is obtained in connection with this study.

ID numbers or pseudonyms will be used to ensure that no identifying information will be available. If participants share any identifying information (such as contact information, names of family members and friends, etc.) during the interviews, that information will be altered and will not be reported and will be permanently destroyed once the interviews have been analyzed. Only the researcher, Julia Campbell, and Dr. John Dwyer will have access to these interviews.

Only Julia Campbell and Dr. John Dwyer will have access to the ID numbers that correspond with the participants’ names.

The researcher will keep any written records under lock and key in the Family Relations and Applied Nutrition Department at the University of Guelph during the period of study. They will be locked in a cabinet in Dr. John Dwyer’s office or in his filing cabinet in the Applied Human Nutrition graduate students’ office. Only the researcher (Julia Campbell) and her advisor (Dr. John Dwyer) will have access to these cabinets.

The researcher’s laptop will be encrypted for the purpose of this study. Encryption means that the words in the file are rearranged, which makes the document unreadable without proper resources. Following the period of study, the researcher’s advisor, Dr. John Dwyer, will keep the data under lock and key at the University of Guelph for 5 years after the publication of the results. At the
end of the 5 years, hard copies of transcripts will be shredded.

**PARTICIPATION AND WITHDRAWAL**

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw without consequences of any kind. You may exercise the option of removing your data from the study. You may also refuse to answer any questions you do not want to answer and still remain in the study. The researcher may withdraw you from this research if circumstances arise that warrant doing so. If you complete the interview, you have one week to withdraw from the study by requesting that your data be permanently destroyed.

**RIGHTS OF RESEARCH PARTICIPANTS**

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. This study has been reviewed and received ethics clearance through the University of Guelph Research Ethics Board. If you have questions regarding your rights as a research participant, contact:

Sandy Auld, Director, Research Ethics
Telephone: (519) 824-4120, ext. 56606
E-mail: sauld@uoguelph.ca
University of Guelph
437 University Centre
Guelph, ON N1G 2W1
Fax: (519) 821-5236
SIGNATURE OF RESEARCH PARTICIPANT

I have read the information provided for the study “Pilot Study: Dog Owners Thoughts and Reactions to New Dog Walking Print Intervention” as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____________________________________
Name of Participant (please print)

_____________________________________
Signature of Participant                     Date

SIGNATURE OF WITNESS

_____________________________________
Name of Witness (please print)

_____________________________________
Signature of Witness                     Date
Appendix F: Recruitment Flyer

**Attention Dog Owners!**

Are you aged 18 or older and consider yourself to be the primary caretaker of your pet dog? We are looking for adult dog owners to take part in a study that will involve completing a 30-45 minute interview about dog walking.

If interested, please contact Julia Campbell for more information

226-979-0622
campbelj@uoguelph.ca

Research Advisor: Dr. John Dwyer
Appendix G: Pilot Study Recruitment Flyer

Dog Owners Needed for Pilot Study!

Are you aged 18 or older and consider yourself to be the primary caretaker of your pet dog? We are looking for adult dog owners to take part in a short pilot study that will involve sharing your thoughts about a new print resource that is aimed at increasing dog walking among dog owners.

If interested, please contact Julia Campbell for more information
226-979-0622
campbelj@uoguelph.ca
Research Advisor: Dr. John Dwyer