Walk a Hound, Lose a Pound, and Stay Fit for Older Adults: A Secondary Data

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by

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled:

WALK A HOUND, LOSE A POUND, AND STAY FIT FOR OLDER ADULTS: A SECONDARY ANALYSIS

Presented by Lynette P. Harvey, a candidate for the degree of Doctor of Philosophy, and hereby certify that, in their opinion, it is worthy of acceptance.

Dr. Kari Lane
Dr. Rebecca A. Johnson
Dr. Bonnie J. Wakefield
Dr. Christine Proulx

DEDICATION

This dissertation is dedicated to my family, my husband David Harvey, and our two boys, Preston and Jackson. This entire doctoral journey has been challenging for all of us, and I could not continue forward with any progress of this degree without your love and support. David, your never-ending encouragement is my strength when I feel like I can't go on any further. You are there with me in every step of this journey. I feel that this is not only my success but the success of our family. Preston and Jackson, your love and never-ending warm hugs are everything to me. God has truly blessed us all, and I am so thankful to have you all in my life as my family.

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Lynette P. Harvey, MS, RN

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Abstract

Physical inactivity in the older adult population contributes to a decreased quality of life and complications from many co-morbidities. The need is to encourage older adults to engage in more physical activity. Dog walking is an activity that is easy to do, inexpensive, and can be done anywhere. This was a secondary analysis of a 12-week quasi-experimental study of older adults residing in three separate assisted living facilities. There were three groups: one that walked with shelter dogs (DW), one that walked with a human companion (HW), and a control group (C). The first aim was to explore dog walking and the older adult through a quantitative lens. The second aim examined dog walking and the older adult through a qualitative approach. Statistical difference was found in overall total program walking distance in feet in DW (M=112,429.12, SD=89,796.47) compared to HW (M=50,863.35, SD=41,859.38) $f_{(1,33)=}7.75$, p=0.01, with an effect size of $Eta^2=0.19$. Additionally, statistical significance in overall total walking time in minutes was found in DW (M=1,480.69, SD=583.94) compared to HW (M=742.87, SD=452.21) $f_{(1,33)=}17.17$, p=0.00, with an effect size of $Eta^2=0.34$. Aim Two outcomes were that the experiences with the walking companion were overall positive, and the participants expressed joy in interaction with both the dog and human companion. The only negative feedback with walking partners were that the HW group expressed dissatisfaction when their walking partner did not want to walk. This could be because humans can be unreliable, whereas dogs might not. In response to the program, both groups expressed that the program itself added to the overall motivation to continue walking. This study has addressed the many benefits of older adults engaging in a more

active lifestyle. Ideally, dog walking in older adults may motivate older adults to engage in a more active lifestyle.

CHAPTER ONE

GENERAL INTRODUCTION

Physical inactivity is a chronic problem in our society today, especially in the older adult population. A sedentary lifestyle can lead to many chronic and acute physical ailments such as heart disease, stroke, diabetes, and several forms of cancers (Centers for Disease Control and Prevention, 2021). Approximately 31 million people over 50 are inactive, with only one quarter to one-third of adults 65 and older meeting the current physical activity recommendations (Centers for Disease Control and Prevention, 2018). In addition to the many physical ailments prevalent with inactivity, mental health can also be affected by a lack of activity (Centers for Diseases Control and Prevention, 2021).

Background

Due to the detriments of inactivity in older adults, there is a need to encourage and increase exercise within this population (U.S. Department of Health and Human Services Physical Activity Guidelines Advisory Committee, 2018). Walking is a trendy exercise choice among older adults. Walking is easy to do, and it can be performed almost anywhere (Curl et al., 2017). Dog walking provides an added incentive for the older adults' activity because of their perception of the animals' need for exercise (Curl et al., 2017). This perception, in turn, may make the older adult more apt to sustain the activity of walking with their dog (Curl et al., 2017). Some investigators found that walking the dog strengthens the bond between the human and dog and further enhances motivation to walk (Brown & Rhodes, 2006; Campbell et al., 2016; Campbell et al., 2017; Curl et al., 2017; Degeling et al., 2015; Degeling & Rock, 2012; Herbert

& Greene, 2001; Hoerster et al., 2011; Janevic et al., 2019; Johnson & Meadows, 2010; Knight & Edwards, 2008; Smith et al., 2017; Westgarth et al., 2017).

The recommended minimum activity for older adults is 150 minutes of vigorous exercise per week to support the individual's health (The U.S. Department of Health and Human Services, 2018). Unfortunately, Harris et al. (2009) found that only 2.5 % of the older adults surveyed met this goal. Many older adults state that their chronic health problems, being older, having a lower self-efficacy are some reasons why they do not engage in physical activities (Harris et al., 2009). Dog walking can be a helpful tool to assist the older adult in reaching this guideline. Jeffries et al. (2014) examined 25 towns in the United Kingdom and found that those who accumulate the 150-minute goal were younger age (around 65), had fewer health issues, had fewer self-reported falls, a higher self-efficacy, and less depression. Thorpe et al. (2006) explain that dog walkers were more likely than non-dog walkers to obtain this goal over three years. From the literature examined above, the older adult still falls short in meeting the 150-minute guidelines. However, these studies demonstrate that those older adults that participate in dog walking are meeting this goal better than those who do not dog walk (Harris et al., 2009; Jeffries et al., 2014; Thorpe et al., 2006).

Many of the physiological benefits of dog walking include improvements in physical health parameters such as lowered BMI, decreased problems with chronic health conditions, lowered blood pressure, and better blood glucose control when comparing dog walking groups to non-dog walking groups (Curl et al., 2017; Lentino et al., 2012; Motooka et al., 2006). Fewer studies have examined the psychological effects of dog walking, and the outcomes have mixed results. Toohey et al. (2013) show that dog walking may decrease mental health issues such as depression, loneliness, and social isolation (Toohey et al., 2013). In contrast, Dunn et al. (2018)

found no statistical self-reported depression and hopelessness scores between dog walking and non-dog walking groups.

As mentioned previously, dog walking has assisted in promoting physical activity among older adults. Much of the literature explored cites dog obligation or the dog bond, that their dog relies on their owner for walks as the reason for physical activity and dog walking among dog owners (Brown et al., 2013; J. Campbell et al., 2017; K. Campbell et al., 2016; Curl et al., 2017; Degeling & Rock, 2012; Hoerster et al., 2011; Janevic et al., 2019; Knight & Edwards, 2008; Smith et al., 2017; Westgarth et al., 2017). Interestingly, two other studies involving walking with loaner dogs also found that the participants felt the same dog obligation, that the dogs relied on the humans for physical activity, thus reinforcing the impetus of dogs as motivators for physical activity and walking (Herbert & Greene, 2001; Johnson & Meadows, 2010).

Several studies cite the benefits that dog walking brings to humans. One of these benefits from walking their dog is that the dogs act as a type of "social lubricant." This phenomenon occurs when people are more apt to speak to each other due to the dog being a catalyst in interactions between humans, which serves as a positive impact on the sense of belongingness (Antonacopoulos & Pychyl, 2014; Calise et al., 2018; J. Campbell et al., 2017; K. Campbell et al., 2016; Schneider et al., 2015; Toohey et al., 2013). Additionally, some studies found that not only is dog walking beneficial in promoting interactions with other humans, but the act of being with the dog also acts as social engagement with the owner (Janevic et al., 2019; Knight & Edwards, 2008; Peacock et al., 2020; Smith et al., 2017).

Conclusions

The purpose of this dissertation project is to assess dog walking with older adults in the examination of outcomes of dog walking, the literature that examines this activity, and the theoretical constructs involved in exploring dog walking and older adults. This project discovers the many advantages that occur from the older adult engaging in dog walking activities. Findings from this study will be used to implement further studies on the effect of dog walking and older adult.

There are a total of six chapters that comprise this dissertation project. Chapter two is a systematic literature review of the significant findings of dog walking and the older adult. Seventeen articles were included in this review, demonstrating a complex subject encompassing many different constructs and topics. Chapter three in this dissertation compares two theoretical constructs used in adults and dog walking. This chapter compares Albert Bandura's Social Cognitive Theory (SCT) and Icek Ajen's Theory of Planned Behavior (TPB) as theoretical constructs related to dog-walking and physical activity. The systematic literature review and theoretical construct chapters were used as the foundation for developing the secondary data analysis used in this dissertation project. Chapter four is the research proposal that describes this project for the secondary data analysis of the original study, a longitudinal, three-group, non-randomized trial conducted by Johnson (2008). Chapter five of this dissertation study discusses the outcomes of the procedures and findings proposed in this secondary data analysis. Lastly, Chapter six discusses the overall project, its significance, and how these findings add to the nursing profession's science.

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CHAPTER TWO

DOG WALKING AND THE OLDER ADULT: A SYSTEMATIC LITERATURE REVIEW

Harvey, L. P. & Lane, K. R. Dog walking and the older adult: a systematic literature review. *Advances in Nursing Science*. Manuscript is currently in review.

Abstract

Inactivity in older adults is associated with lower quality of life and more complications from chronic diseases. There is a need to find mechanisms that encourage exercise within this population. Dog walking is an excellent activity to encourage older adults to become more active. The purpose of this systematic review was to determine the significant findings of dog walking and older adults. Seventeen articles were included in this review, demonstrating a complex subject encompassing many different constructs and topics. Dog walking and the older adult are encouraging in providing, the older adult with an adjunct to promote more physical activity.

Keywords: older adults, dog walking, exercise, Systematic literature review

Physical inactivity among older adults is associated with lower quality of life, complications from chronic diseases, and higher mortality rates[1]. Approximately 31 million people over 50 are inactive, with only 1/4 to 1/3 third of adults 65 and older that meet the current physical activity recommendations[2]. Physical activity in older adults can help treat or minimize the effects of several chronic diseases, thereby improving the quality of life in this age group[3]. Physical activity may also help combat mental health issues that may riddle the elderly such as depression, loneliness, and social isolation[4]. The CDC[2] stated that over 20% of adults aged 55 and older have a mental health disorder that is not considered a normal part of aging. Preliminary data suggests that seniors who own and walk dogs may be more likely to engage in continuous physical activity[5]. Therefore, dog walking activities could allow the older adult to reap the benefits that physical activity may offer, such as better physical and mental health[3]. Due to the detriments associated with inactivity in older adults, there is a need to encourage and increase exercise within this population[6]. Walking is a popular exercise choice among older adults. Walking is easy to do, and it can be done almost anywhere[1]. Dog walking provides an added incentive for the older adults' activity because of their perception of exercise needed by the dog[1]. In turn, this perception may make the older adult more apt to sustain the activity of walking with the dog[1]. Some investigators found that the act of walking the dog strengthens the bond between the human and dog and further enhances motivation to walk[1,7,8]

The US Department of Health and Human Services[6] recommends that older adults obtain a minimum of 150 minutes of vigorous activity per week to support their health. Dog walking assists in allowing seniors to meet this goal. Unfortunately, Harris et al.[9] found that only 2.5 % (6/238) of the older adults surveyed met this goal. They found that the main reported reasons for inactivity were old age, poor health, having low self-efficacy, and low perceived exercise

control. However, this group discovered that people who walked a dog walked longer than those who walked alone. In a study conducted by Thorpe et al.,[10] dog walkers were more likely than non-dog walkers to obtain this goal over three years. From the literature examined above, the older adult still falls short in meeting the 150-minute guidelines. However, these studies demonstrate that older adults that participate in dog walking are meeting this goal better than those that do not dog walk[10].

Significance to Nursing Science

The nurse may use dog walking among older adults to encourage this population to be more physically active. This demographic will gain from the physical benefits that this activity affords, such as fewer falls[3]. Additionally, the bond from being with a dog can help the older adult reduce loneliness, isolation, and mental health despair[11]. Since nurses are generally the healthcare providers at the forefront of patient care, they can be the primary motivator for the older adult to engage in an activity. Using dog walking as an adjunct for increasing activity in older adults is an innovative and inexpensive method that nurses should embrace to encourage older adults to function at their highest level possible. Therefore, this systematic literature review sought to answer these four objectives:

1. What are the major concepts found in the outcomes of dog walking in older adults?
2. What is the impact of these outcomes?
3. What research methodologies were utilized?
4. What were the strengths and limitations of each study?

METHOD

Search Strategy

The study utilized the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA)[12]. In February 2020, 14 databases: Medline, Cumulative Index of Nursing and Allied Health Literature (CINAHL), Scopus, PubMed, Psych Info, Cochrane, Sport Discus with Full Text, PEDro-Physical Therapy Evidence Database, Science Direct Freedom Collection, Project MUSE, Consumer Health Complete, Sports Medicine and Education Index, ProQuest-Technology Collection, and Google Scholar, in addition to an ancestral search, were used to identify relative articles. The study was limited to articles in English and those published from 2000-2020. Keywords used in the investigation include dog, dog walking, canine, pet walking; companion animal; walking, physical activity, exercise; older adults; senior citizens, and elderly.

Inclusion and Exclusion Criteria

The search included peer-reviewed articles based on the following criteria:

1. Inclusion of studies that sampled only adults aged 50 and above
2. Used dogs in a combination of human physical activity measurement
3. Measured levels of one or more: sedentary physical activity (mostly sitting, obtain few steps/day), incidental physical activity (steps acquired secondary to performing another action—i.e., cleaning the house), active physical activity (mostly structured exercise)

Articles were excluded from this review if: the population studied an age group other than adults 50 and older; the study did not include dogs; the study did not include measurement of physical activity; the study measured only canine properties of dog walking, or the study was a literature review.

Study Selection

A total of 463 articles were found using the electronic databases mentioned above. Additionally, 2,867 more articles were found using an ancestral search. After compilation of the total 3,330 articles, 714 were removed because they were duplicates. A total of 2,616 were reviewed for suitability via reading abstracts, with 2,529 excluded from this review because they did not include dog walking, did not include older adults, were not peer-reviewed, or were not written in English. The remaining 87 articles were analyzed for eligibility via reading the complete text, with 70 articles excluded because they did not include dog walking or did not include older adults. The remaining 17 articles were included for this review (see Figure 1).

Data Extraction

The 17 articles in this study extracted the following information from this review. These items were: the year the article was published; the purpose of the study; methodologies; the sample size; gender; age ranges included in the study; educational background(if included); marital status(if included); the measurements taken in each study; the results of the measurements taken; and the strengths and limitations of each study. Table 1 delineates this information.

RESULTS

Description of Studies

There were 7 countries included in these studies. Seven of these studies originated in the United States, 1 from Canada, 4 from the United Kingdom, 2 from Australia, 1 from Japan, 1 from Taiwan, and 1 from Brazil. There were 4 main types of methodologies used in this review. These methodologies included: cross-sectional surveys (10), use of direct measurement of physical activity (5), focus groups (1), and mixed methods (1).

A total of 183,579 subjects were sampled in the 17 studies, with many of the subjects being female, 171,380, and 12,199 being male. The range of ages included in these studies ranged from 50 to 101. Of the studies that reported education and marital status, most were well educated (post-high school or degreed) and married or living with a partner.

Major Study Concepts

Because this review included such varied study methodologies, there was a large variety in the concepts obtained from these studies. An analysis of these studies showed seven predominant concepts of the outcomes that originated from these studies. The results were: physical activity measurements in dog walking and walking behaviors of older adults[4,7,8,10,13–19]. The second concept was the health outcomes of humans in dog walking[1,20,21]. The third concept was neighborhood trends and measurements of dog walking environment[22–24]. The fourth concept examined theoretical constructs used in dog walking[1]. The fifth concept examined the effect of the human-dog bond and dog obligation on dog walking[1,7,8]. The last concept entailed the impact of dog walking on social interactions[4,8,17]. These concepts will be discussed in detail below.

OUTCOMES OF MAJOR CONCEPTS

Physical activity measurements and behaviors in dog walking and older adults

A large portion of the studies included in this review examined how physical activity is affected by dog walking behaviors in older adults.

Study Methodology. Eleven studies examined physical activity behaviors in dog walking with older adults that showed trends in dog walking contributing to some level of increased physical activity[4,7,8,10,13–19]

Among these 11 articles, 4 measured physical activity through direct measurement of distance walked, accelerometers, or pedometers[7,13,14,17]. Six studies measured physical activity indirectly through self-reported surveys from the participants[4,10,15,16,18,19]. Lastly, one study used interviewing through focus groups to determine physical activity[8]

In addition to variation in physical activity measurements, these studies varied in sampling group comparisons. Eight of these studies compared dog owners to non-dog owners[4,10,13–16,18,19]. Two studies used participants who were currently dog owners[8,17], and one study used participants who were not dog owners but walked with a therapy dog[7].

Study Outcomes. There were three subconstructs in physical activity measurements in dog walking and older adults.

The minimum 150+ minutes/week guidelines.

Three studies examined the difference in various groups in meeting the recommended 150+ minutes of moderate to vigorous physical activity[4,15,19]. Two studies determined dog owners who dog walk are more likely to meet these guidelines than non-dog owners or dog owners who do not walk their dog[15,19]. Additionally, one study examined dog owners who walked their dogs and showed a higher odds ratio of meeting this minimum guideline than non-dog owners [4].

Comparison of dog walking among sampling and methodology differences.

Six of the 11 studies compared the activity levels among dog walking groups[7,13,14,16–18] In three of these studies, accelerometers were used to measure walking distance and found that dog walkers walked more than non-dog walkers[7,13,14]. One article that measured physical activity used participants' self-recalled surveys and found that dog walkers walked more than non-dog walkers[18]. Peacock et al.[17], also used accelerometers to measure walking distance but only

measured this on dog owners/walkers group. Lastly, Liao et al.[16], discovered that older adults living in metropolitan areas of Taiwan who owned and walked dogs achieved better health outcomes than those that own a dog and don't walk.

Incidental Physical Activity

The last two studies that examined physical activity behaviors in dog walking in older adults found that dog ownership encourages non-incidental or leisure walking activity[8,19]. Janevic and colleagues[8]; used focus groups of dog walkers to determine this increase in physical activity. Thorpe et al.[19], found similar findings in conducting surveys in their studies.

Measurement of health outcomes of dog walking

It is widely known that there are many physical and mental health benefits that physical activity affords[3,4]. This section seeks to investigate how dog walking affects these health outcomes.

Study Methodology. Three studies specifically examined either physiological or psychological health measurements in dog walking and older adults[1,20,21]. All of these studies compared dog walking groups to non-dog walking groups[1,20,21]. Curl et al.[1] and Motooka et al.[21] measured physiological parameters, where Dunn et al.[20] measured psychological parameters. Dunn et al.[20] used a survey designed studies where Curl and colleagues[1]; used secondary data analysis, and Motooka et al.[21] used a crossover research design.

Study Outcomes. Two of the three examined studies showed physiological benefits from frequent dog walking[1,21]. Curl et al.[1] demonstrated that dog walking could lower BMI, improve chronic health conditions, and lower limitations in daily living activities. Motooka and colleagues[21] determined that dog walking can decrease parasympathetic nervous system activity, which helps lower stress. This study concluded that it was the act of being around the dog, not

the exercise itself, that helped increase parasympathetic activity.[21] In contrast, Dunn et al.[20] found no statistical significance in self-reported depression and hopelessness scores between dog walking and non-dog walking groups.

Neighborhood trends and measurements of the dog-walking environment

It is essential to note the characteristics of the surroundings and environments in which participants walk their dogs.

Study Methodology. Two studies examined in this concept used surveys to obtain their data to compare the environment or neighborhoods where people walk their dogs[22,24]. These studies examined comparisons between dog owners and dog walking groups and non-dog walking group[22,24]. One of these studies examined the characteristics of the neighborhoods where the participants live[22], where Dalton and colleagues[24] looked at trends of greenspace that supports dog walking.

Study Outcomes. Among the studies that examined the attributes of the neighborhoods in which the dog walker lived, Corseuil et al.[22] found that people were more likely to walk their dog if they had access to aesthetically pleasing communities and had high walkability. Dalton and colleagues[24]; explained that larger, more aesthetically pleasing spaces promoted more dog walking activities than smaller ones with fewer amenities related to dog walking.

Primary Theoretical Constructs Found in Dog Walking

Several other dog walking studies that include younger participants used common mid-range theoretical concepts in exploring the constructs of dog walking. These theories allow for a better understanding of the intricacies of dog walking.

Study Methodology. Because of the stringent age inclusion criteria in this study, only one article was found that centered on a theoretical construct around dog walking. Curl et al.[1] used Bronfenbrenner's Social-Ecological Model (SEM).

Study Outcome. According to the Social-Ecological Model theory, three levels of external systems influence a person's behavior[25]. SEM states that there are many levels of influence that determine whether someone chooses to engage in particular behavoir[1]. These levels are personal factors, social support, and environments that determine whether people choose to engage in dog walking[1].

Effect of human-animal bond and obligation on dog walking

As mentioned previously, the bond that the human feels with the dog can fuel the motivation to engage in dog walking[1,7,8]

Study Methodology. One study examined in this concept used focus groups to determine the role of pets in encouraging activity[8]. Herbert and Greene[7] used a mixed methodology design, and one study utilized a cross-secondary survey using a secondary data analysis[1]. Curl et al.[1] compared dog owner groups to non-dog owners[1] while Herbert and Greene used loaner dogs in their studies[7], while Janevic and colleagues [8] used pet owners strictly as their sampling technique.

Study Outcomes. Dog obligation, or the feeling that the owner or human has to walk the dog because of the animal's health, acts as a motivator to engage in dog walking[8]. In Curl et al.[1], and Herbert & Greene[7], the owner's bond with the dog motivates dog walking and encourages continued participation in this activity.

Effect of dog walking on social interactions

Dog walking can often act as an incentive for people to engage in conversation with the human walker[26]

Study Methodology. In the concept of how dog walking affects social interactions, Janavic et al. [8] used focus groups, whereas Peacock and colleagues used a mixed methodology design to explore these concepts[17]. Toohey et al. [4] used surveys to collect their data and used dog and non-dog owners in their sample. The other two studies used pet owners only in their sampling[8,17].

Study Outcomes. Arkow[26](p.44) coined the phrase "social lubricant" to describe the effect a pet can have on the community. For example, someone walking their dog is seen as friendlier and more approachable to initiate a conversation than someone without a dog[26]. From the studies examined above, many of the outcomes revealed that dog walking creates a sense of community and connection to other dog walkers[4,17]. In addition to creating a sense of community and social connectedness, the mere act of possessing a dog, caring for it, and walking, creates a social companionship for the human[8].

DISCUSSION AND SIGNIFICANCE OF CONCEPTS

Because this review included such a large variety of study methodologies, they produced a broad diversification of concepts that emerged from this analysis. This paper is by no means an exhaustive list of possible ideas that may arise from studies that include dog walking, but it is interesting to note the six concepts that emerged during this review.

Physical activity measurements in dog walking

It is not surprising that many of these studies examined included some measurements of physical activity. Most of the studies reviewed demonstrated some increase in physical activity

levels either by purposeful movement or incidental movement when the participant engages in some form of dog walking activity. About half of these studies (46%) used self-reported surveys to measure activity[4,10,15,16,18]. The remaining studies utilized direct measurement of physical activity by directly measuring distance traveled or accelerometer/pedometer usage[7,13,14,17,19]. The majority of these studies used canines owned by the walker when examining dog walking activities. The 150 minutes /week minimum guideline set forth by the US Department of Health and Human Services[6] is an essential guide to determining whether the recommended amount of physical activity is being obtained. Of the three studies that measured this guideline, all showed trends towards meeting the recommendation when using dog-walking as a method to achieve this[4,15,19]. As a result, this gives significance to using dog-walking to meet the targeted 150 minutes/week goal.

When comparing walking outcomes among dog owners who walk, dog owners who do not walk, and non-dog owners, most of the studies examined found that when comparing dog walkers to non-dog walkers, dog walkers tend to walk more than groups not associated with dog walking[7,13,14,18]. Non-incidental activity is an exciting outcome of several of these studies[8,10,19]. This non-incidental activity is best described as physical activity that is not purposeful but is obtained from performing another task. For example, someone brushing a dog may have more incidental activity than someone reading a book. Therefore, dog walking can be a significant contributor to physical activity. Even possession or being around a dog often could increase physical activity, either through purposeful or non-incidental activity.

Health Outcomes

The review's analysis that measured dog walking's physiological outcomes reported some added physical benefits from engaging in dog walking behavior such as lowered BMI, decreased

chronic diseases, and reduced physician visits[1,21]. From this review, only one study measured psychological measurements from dog walking, and that study did not show significance in depression scores in dog walking[20]. There is a need for more research on psychological outcomes and dog walking because of the limited information.

Neighborhood trends

Of the studies in this review that examined the dog-walking environment, most of these studies indicated aesthetically pleasing, safe, and accessible environments (parks, neighborhoods, greenspaces) that are needed to entice participants to initiate and continue to dog walk[22–24]. This evidence shows the need for planning areas and communities that support dog walking so that this behavior is more appealing to the older adult.

Theoretical constructs

Theoretical constructs are often helpful in explaining why and how a particular experience can occur. As discussed previously, one primary theoretical construct emerged from this review. Curl et al.[1] explain that SEM demonstrates multi-level or tiered outside systems to guide whether to engage in dog walking. For example, personal factors such as energy levels, social support like encouragement from family members to dog walk, and environmental factors such as the weather can all be pertinent to the older adult's decision to engage in dog walking. The use of this construct can better explain the phenomenon of why people engage in dog walking.

Human-Animal Bond and Dog Obligation

A critical study in this review explores the human-animal interaction bond or obligation to the dog, show that the higher the obligational bond, the higher the incident of physical activity[8]. The human often feels that the dog relies on the human for needed activity. Therefore,

this can cause the older adult to repeat this process of walking. Interestingly, this bond or obligation was also found in a study when the dog did not belong to the walker and was a "loaner dog" or therapy dog[7]. From these studies examined, one can find that human-to-dog connection can promote dog walking and thus more physical activity.

Dog walking and Social Factors

Depression and social isolation are becoming more prevalent in older adults, yet this is not considered a normal part of aging[2]. From the studies in this review that examine social outcomes, most state positive connections and feelings of belongingness and community connection with dog walking[4,17]. These positive feelings could indicate that dog walkers are more likely to engage in conversations with people while walking their dogs, improving mental health and decreasing social isolation. Some participants found that being around the dog can help them feel less lonely because it adds companionship[8].

STRENGTHS AND LIMITATIONS

One of the significant strengths of this review is the richness of the broad spectrum of outcomes examined in these studies. For example, the studies range from exploring physical benefits from dog walking to how greenspace affects walking outcomes. Having a large spectrum of study types allows the reader to gain a broader prospect of all that dog walking entails. Several studies included in this analysis had a large sample size that contributed to more statistical power in the findings. Another strength of this review was that it examined studies worldwide, which gives the reader a broader perspective of how dog walking is perceived in different geographic locations.

The limitation of this review was that most of the examined studies were very similar in participant demographics. Most of the participants engaged in these studies were Caucasian and

of similar education and socio-economic status, which does not allow how dog walking affects a broader population. Additionally, a few of the studies included in this analysis had a small sample size, limiting the generalizability. Lastly, some of the studies included in this analysis were based on participants' self-reported physical activity, lending itself to potential bias recall of actual activity obtained. Studies not written in English were excluded.

CONCLUSION

After completing this literature review, one can determine that dog walking is a complex subject encompassing many areas. This review attempted to explore the research that has been conducted in older adults and the many outcomes that have been discovered from this research. Dog walking and the older adult positively encourage the older adult to engage in exercise and activities that promote a healthier lifestyle by continuing habitual active habits. This study hopes to demonstrate that aging does not necessarily have to be negative and something to be feared by doing so.

This review also provided information on future areas that should be explored further in dog walking. Only one study examined how dog walking affects mental health[28], which provides more impetus for further research in this area due to the prevalence of mental health issues in older adults. Additionally, many of the studies examined in this review used non-objective measurements in measuring physical activity, primarily in self-reported activity, which may add a concern of bias in the valid measurement of movement. Therefore, this also warrants further investigation of direct measurement of the actual activity to correlate the amount of dog walking, affecting the older adult's physical activity. This review was unique because it explores many types of study design methodologies and covers many topics in the older adult population.

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Figures/Tables

Figure 1- Study Selection

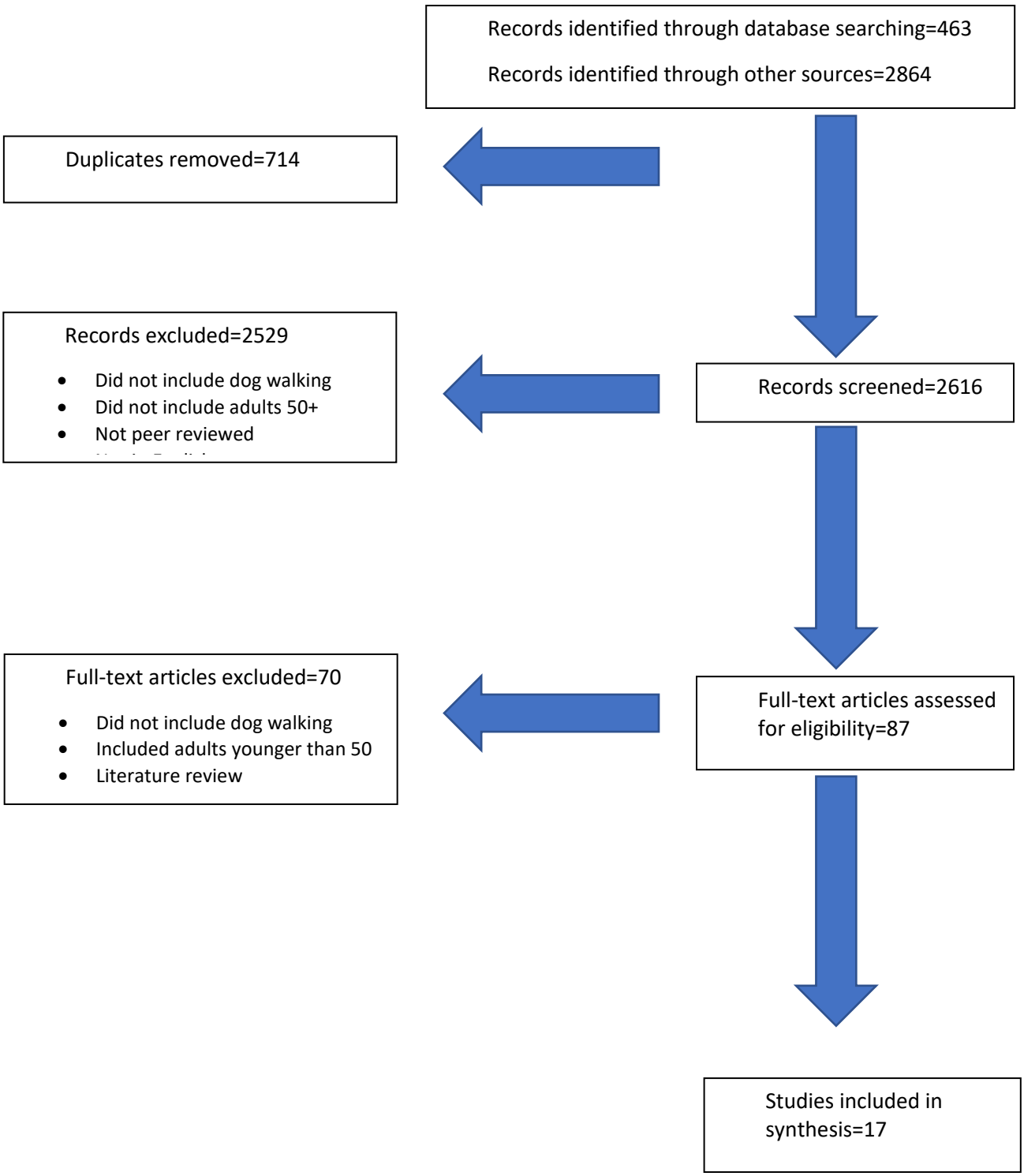

Table 1- Data Extraction Matrix

Author/year	Purpose/Demographics	Methodology	Measures	Results	Strengths/Limitations
Corseuil et al[22]	Association between perceived environmental attributes & PA in OA using cross-sectional survey N=1652; F=1058, M=598; Ages=60-80+; MS=not reported; ES=23% 12+ years	1911 eligible; 1652 (86.4% response rate) of Brazilian OA DW 6.9% DO/NDW 35.5% NDO 57.6%	1) Intenational PA Questionnaire 2) Community Environment Walkability Scale	1) 36.8% inactive; 35.2% didn't meet 150+ min. goal 2) Reasons for inactivity: no parks, trash, low street lighting, not walking. w/dog; don't have a dog	1) OA report not having a dog or not walking the dog as rationale for inactivity 2) casual inference
Curl et al[1]	Association DO, pet bonding, walking behavior, health outcomes OA; Secondary data analysis of N=771; F=395, M=376; Ages=mean of 67; MS=54%; ES=some college	2012 Health & Retirement Study Eligibility of 771; DO=271; NDO=500	1)Physical health 2)Pet bonding/DW.	1)DW=↓BMI,↓ADL limits, chronic conditions, ↓ MD visits 2) For each 1 point ↑ pet bonding; odds of DW ↑ by 200%	1) Inclusion of comparison groups of dog ownership /walking status, helps in concluding. health benefits 2) Secondary analysis doesn't allow for questioning
Dall et al[23]	Longitudinal study examining activity on DO versus NDO in OA; N=86; F=54, M=32; Ages=65-81; MS=not reported; ES=not directly reported	Longitudinal survey over 7 people	1) steps/day 2) walking (min./Day) 3) walking (min/day) @ moderate cadence 4) sedentary time(hrs./day) 5) # sedentary events/day 6) time standing	1) Sig. DO> NDO,p<0.001 2) Sig. DO>NDO, p<0.001 3) Sig. DO>NDO, p<0.001 4) No sig. DO & NDO 5) Sig. DO<NDO, p<0.001 6) No sig. DO & NDO	1) Objective measurement of activity 2) Moderate attrition rate (19 participants withdrew)

Author/year	Purpose/Demographics	Methodology	Measures	Results	Strengths/Limitations
Dalton et al[24]	Longitudinal cohort study examine how greenspace affects physical activity in OA; N=15636, F=10997, M=4639;Ages=53-71; MS=80% married; ES=not directly measured	Longitudinal survey 25639 criteria met people: 61% response rate	1) Greenspace &activity (METS) 2) Covariates	1)Part. with the biggest greenspace slows decline in PA (117-107.2 METS) 2) DW accounts for 22.6% mediation in PA diff.; Part. being in social groups also add to ↑PA	1) Objective measurement of activity 2) Self-reporting bias; didn't measure. quality of greenspace
Dunn et al[28]	Observational Study on DW & relationship in CR Ex., Depression, Hopeless in heart pt.; N=122, F=42, M=80; Ages=56-74; MS=91%; ES=not obtained	188 eligible (64.9% response rate). Mailed survey given 4x throughout year	1)Dog ownership 2)Depression 3)Feeling hopeless 4)Exercise amount	1)34.4% dog owners 2) No statistical sig. in depression (DO/NDO) 3) No statistical sig in hopeless (DO/NDO) 4) OR of home ex. 8.1 [1.7, 8.5] vs 1 higher in DO to NDO	1) Showed way to encourage PA in high-risk population 2) Homogenous sample limits generalizability
Feng et al[14]	Cross-sectional observational study on DO and PA in OA; N=547, F=295, M=252, (71-87); MS=married (49%); ES=Mostly primary & high school	Int.=DO(50) Exp.=NDO (497) wear accelerometer 7 days during awake hours	1) PA 2) Geographic data	1)DO were 12% more active than NDO (CI:2810to 40939, $p<0.05$) 2) DO live in more rural areas	1) Showed a diverse socio-economic; obj. measure PA 2) Only gave info on whether people owned dog & not other factors like attachment
Garcia et al[15]	Cross-sectional study on post-menopausal Women in DO & PA; N=152629; F=152629 M=0; Age=50-79; MS=70% live with somebody; ES=39.7% some college	Self-reported questionnaire; 156808 eligible (97% response rate)	1) demographics 2) PA levels	1) DW associated with women living alone. 2) DO have a higher likelihood meeting 150+ min. goal (OR, 1.14 (CI, 1.10-1.17). DO less likely to meet PA levels than NDO	1) Considered diverse sample 2) Self-reported activity-bias; didn't explore dog breed/status, physical environments

Author/year	Purpose/Demographics	Methodology	Measures	Results	Strengths/Limitations
Herbert & Greene[7]	Mixed method study effects of preference on distance walked in OA; N=10; F=10, M=0; Ages 70-89; MS=did not provide; ES=did not provide	Solicited participants; chose favorite activity: WO/A; WO/DW; WI/A; WI/DW; f/u with interviews on choice & exp.	1)Distance walked w/ preferred activity 2)Distance walked in DW 3) Statements on preference	1) Walked longer with preferred activity [WO/DW] (p=0.016) 2) distance greater in DW (p=0.050) 3) 8/10 participants preferred DW-favorable to dogs	1) Dogs as motivators to walk; preference is huge motivator in PA 2) Smaller sample size
Janevic et al[8]	Qualitative critical theory based study examining role of pets in supporting self-management of pain in OA; N=25;F=17; M=8; aged 70-75;MS=44% married; ES=96% some college	4 focus group of (4-9) based on Biopsychological model of chronic pain & Social factors shaping chronic pain experience	Themes emerged on PA	1) DW encourages PA 2) Pet ownership encourages non-intention activity 3) DW is social lubricant to people and own pet	1) Pet care may be incorporated into pain management and coping via DW. 2) Some expressed negative association with DW; fear of falling; mostly pets were positive
Liao et al[16]	Cross-sectional phone-based survey on DO, DW &OA on leisure-time walking; N=1074; F=534; M=540(65-80+); MS=76.8% married; ES=28.5% tertiary degree	3546 older adults contacted (30.3% response rate)	1) Amount DO. & DW 2) Who dog walks and why	1) Of sample, 12% DO; 31% DW 2) OA living in non-metro more likely to be DW than those living in metro areas	1) First study examining DO & DW in Taiwanese 2) Subject bias in survey recall; only sampled people w/ phone
Motooka et al[21]	Experiment to determine autonomic nervous system activity in DW & during daily routine; N=13; F=10; M=3; Ages=62-83; MS=not obtained; ES= not obtained	Used same group as control; 30 min with dog; 30 min without dog measured HR variability (↑HR variability=↑PN)	1) HR Variability DW & HR Variability NDW 2) HR changes dog visit at home	1) HR variability ↑ when DW than when NDW 2) HR variability ↑ when same dog visits at home	1) Objective measurement of HR variability with DW & OA 2) Small convenience sampling

Author/year	Purpose/Demographics	Methodology	Measures	Results	Strengths/Limitations
Peacock et al[17]	Mixed Method design on relationship on pet ownership on incidental & purposeful PA in OA; N=15; F=8; M=7; Ages=(68-80); MS=53.3% lives partner; ES=not obtained	OA 65+ wore accelerometer for 7 days & recorded diaries of PA & encounters w/pet; followed by open-ended interviewing	1) Avg. daily step count & avg. sedentary time/day (hours) 2) Themes emerged from interviews	1) Avg. 14204 (SD=5061) & sedentary time: 8.76 (1.18) hrs. of awake time 2) Pets big part owner life & purposeful & incidental PA; pets encourage social engagement via :pets, other people	1) High compliance rate of OA wearing accelerometer so ↑ reliability of data 2) Didn't compare pet owner's activity to non-pet owners, not generalizable to total OA population
Shibata et al[18]	Cross-sectional study of Japanese OA and PA levels between DO & NDO; N=1926: F=944; M=982; Ages= (65-75); MS=89.3% lives with somebody; ES=64.8% ≤ 12 yrs. education	2700 residents in Japanese mail survey with 72.8% response rate	1) PA & MVPA 2) DO & NDO	DW more MVPA (minutes/week)(698.6±40.6) & PA (698.6±40.6) than NDW and NDO, $p<0.05$	1) Large, cross-sectional design that reported on large community dwelling OA 2) Most of participants sampled are of same socio-economic status, hard to make generalizations
Thorpe et al[19]	Cross-sectional study on DW and walking behavior in DO & NDO & gait speed over 3 yrs. N=2,533; W=1057, M=1476; Ages =71-82; MS=30.5% live alone; ES=83.6% high school graduate	Out of 3075 eligible, 82% response rate over 3 years to determine walking behaviors w/follow-up on walking gait measurement	1) walking behavior 2) measured regular & fast walking speeds at baseline and at end of 3 year period	1) Of DO, 36% DW ≥3X/week 2) DW more likely to reach 150+ goal 3) DW had faster regular and fast walking speed than NDO or DO who don't walk frequently 4) 3 years later, DW was 2X as likely to achieve 150+ goals, independent	1) Provided insight into relationship with DO& walking behavior in communal OA 2) Didn't acquire info about dog acquisition/loss over 3 years

Author/year	Purpose/Demographics	Methodology	Measures	Results	Strengths/Limitations
Thorpe et al[19]	Cross-sectional study on pet ownership with PA. N=2533; Ages=(70-80) F=1024; M=915; MS= 77.8% non-married; ES=9.8% high school;	3075 eligible respondents; 83% response rate	Difference in walking behavior in: DO, NDPO, NPO	1) DO>NPO in non-exercise walking 2) No difference in DO &NPO in walking for exercise 3) No difference in NDPO & NPO in incidental walking 4) NDPO<NPO in walking for exercise 5) DO walk more/longer than NPO or NDPO	1) Show potential benefit of DO; ↑ PA, especially non-intentional PA 2) Voluntary sampling of study shows non-randomization of sampling
Toohey et al[4]	To determine if DO and neighborhood are associated with intentional walking & walking in neighborhood recreationally. N=884; F=531, M=353; Ages (50-65+); MS=mostly single; ES=mostly college	Initial survey of 4422, with a 20% follow-up response rate. FDW (≥4 X/wk.)133; IDW (≤3X/wk.)96; NDO 655	1) Sense of community 2) amount of walking	FDW more likely than NDO to have a ↑sense of community & achieve 150+ min./week goal— DW can lead to higher sense of community d/t interaction with others	1)Focuses on OA with neighborhood and "Aging in Place" 2) Potential for subject recall and biases in self-reported surveys
Wu et al[13]	Observational study to determine role of DO & OA and walking in inclimate weather. N=3123; F=1775; M=1348; Ages (65-80+); MS= not reported; ES= 45.6% some college	Sampling from EPIC study asking to wear accelerometer 7-days; as chosen randomly throughout period of Sept 2006 and Dec 2011	1) DO: How often DW? 2) PA levels during awake hours of DO & NDO; Weather conditions and correlations with PA	1) 18% own dog; 2/3 of DO walk dog 1x/day 2) Regular DW more active (20%↑) and less sedentary (30 min.↓)on inclement weather days than NDO was on good weather days	1) Large sampling conducted over 1 year allowing better heterogeneity variables 2) Cannot rule out reverse causality- were active people more likely own dogs

Note**: A**=Adult**, ADL**=Activities of daily living, **BMI**=Body Mass Index, **CR**=Cardiac Rehabilitation, **DO**=Dog owners, **DW**=dog walking, **ES**=Education Status, **Ex.=**Exercise, **F**=Females, **FDW**=Frequent dog walking, **F/U**=Follow up, **IDW**=Infrequent dog walking, **M**=Males, **METS**=Metabolic equivalent, **MS**=Marital Status, **MVPA**=Moderate to vigorous physical activity, **N**=Sample, **NDO**=Non dog owner,

NDOI=Non dog owner Intervention Group, **NDPO**=Non dog pet owner, **NDW**=Non dog walker, **OA**=Older adults, **OR**=Odds Ratio, **PA**=Physical Activity, **PNS**=Parasympathetic Nervous System, **Pt**.=patient, **SD**=Standard Deviation, **WI**=Walked Inside, **WO**=Walked outside,

CHAPTER THREE

A COMPARISON OF SOCIAL COGNITIVE THEORY AND THEORY OF PLANNED BEHAVIOR WITH ADULTS AND DOG WALKING

Harvey, L. P. & Lane, K. R. A comparison of social cognitive theory and theory of planned behavior with adults and dog walking.

Abstract

The purpose of this paper is to explore the middle range theories of Albert Bandura's Social Cognitive Theory (SCT) and Icek Ajzen's Theory of Planned Behavior (TPB) as theoretical constructs as they relate to dog-walking and physical activity. The theory evaluation method was derived from Melanie McEwen's Synthesized Method for Theory Evaluation. This evaluation was conducted using several of the well-known middle-range evaluations and practice nursing theory evaluations. This study used a three-part system of theory description, theory analysis, and theory evaluation. SCT and TPB have many of the same concepts in predicting dog walking behaviors. TPB examines the individual attitudes to dog walking, and SCT details the personal factors and self-efficacy as a driving construct to dog walking. Both theories involve value beliefs of the subjective norms in TPB and the outcome expectancies in the behavioral factor construct of SCT and dog walking. Lastly, both SCT and TPB involve the importance of the environment in dog walking from social interaction with others in the neighborhood and the enjoyability to the community in the walk. TPB, SCT, and dog walking is also a significant contributor to Human-Animal Interaction science. SCT and TPB may be used to develop programs in dog walking and adults to encourage individuals to be more active. The healthcare practitioner may then use this knowledge to be more proactive in health advocacies for their clients. Instead of being reactive in treating disease, the healthcare practitioner and client can use TPB, and SCT constructs to prevent illness and lead healthier lives.

Keywords: Social Cognitive Theory (SCT), Theory of Planned Behavior (TPB), dog walking

The purpose of this paper is to explore the middle range theories of Albert Bandura's (1997)Social Cognitive Theory and Icek Ajzen's (1985) Theory of Planned Behavior as theoretical constructs as it relates to dog-walking and physical activity.

Background

The prevalence of inactivity varies among regions and ethnicities in the United States. Still, in some areas, as much as almost 48% of adult Americans are classified as inactive (Centers for Disease Control and Prevention [CDC],2020). A lack of regular activity may increase the rates of many physical and mental diseases such as heart disease, diabetes, and depression in most adults (CDC, 2020). The US Department of Health and Human Services (2018) recommends that adults receive a minimum of 150 minutes of moderate to vigorous activity per week to support an individual's health. Walking is one activity that many people engage in. Walking is an easy activity to do, and it can be done almost anywhere (Curl et al., 2017). Dog walking may help adults become more active because recent studies have shown that dog walkers are more positively associated with meeting these physical activity guidelines stated above (Hoerster et al., 2011; Lentino et al., 2012; Reeves et al., 2011). Due to dog-walkers' success meeting these guidelines, it is vital to understand the factors that contribute to these individuals' success so that programs to develop and implement dog walking can be explored (Richards et al., 2013a,2013b,2015,2016,2017). Two of the most prevalent theories used in dog walking are Bandura's Social Cognitive Theory SCT (1997) and Ajzen's Theory of Planned Behavior TBP (1985).

This paper will seek to critique these middle-range SCT and TPB theories related to dog walking and the adult. Middle range theory is less comprehensive than grand theories but complex enough to be applicable in various scenarios (Blegen & Tripp-Reimer, 1997).

Method of Theory Evaluation

This paper uses a synthesized method for evaluating the SCT and TPB in dog walking. The synthesized approach combines several of the well-known middle-range evaluations and practice nursing theory proposed by McEwen (2019). Table 2 demonstrates this method using a three-part system of theory description, theory analysis, and theory evaluation (McEwen, 2019). McEwen (2019) evaluates theory description based on its purpose, classification, scope, origins, significant concepts, major assumptions, and theory uses. Theory analysis is described by how the theory is defined—theoretically and operationally, if the theory flows logically, if concepts and statements are used consistently, and if the outcomes are clearly stated (McEwen, 2019). Lastly, theory evaluation examines how the theory aligns with nursing standards, whether the theory has been tested, if the theory has been used by nurses, the theory's social and cultural relevance, and how it contributes to nursing (McEwen, 2019).

Social Cognitive Theory

Theory Description

Albert Bandura's (1997) SCT is a middle-range theory used in combination with dog-walking to predict what promotes dog-walking behaviors that encourage dog walking in adults (Richards et al., 2013a, 2013b, 2015, 2016, 2017). SCT was initially derived as a theory for use in psychology (Bandura, 1997). Bandura derived SCT from an earlier theory he developed, social learning theory, which was used to describe motivators of human behavior (Bandura, 1997). SCT was later used to explain the determinants of physical activity (PA) behavior through

efficacy, beliefs, outcomes, goals, and sociostructurally beliefs (Rhodes & Pfaeffli, 2010). Through the use of SCT as a determinant of PA, SCT was then used to describe the determinants that drive dog walking behavior (Campbell et al., 2017; Richards et al., 2013a,2013b,2015,2016,2017).

The central concepts of SCT and dog walking can be explained through reciprocal determinism, which Bandura describes as the interactions between the three primary constructs of cognitive (personal factors), environment, and behavioral factors (Bandura, 1997; Richards et al., 2016). Personal or cognitive factors are thoughts that a person has about that behavior. Self-efficacy is a crucial sub-construct under personal factors and refers to an individual's confidence that they must perform a behavior (Bandura, 1997). Environmental factors can include social support that a person receives in dog walking (Richard et al., 2013a,2013b, 2015,2016,2017). The last theoretical proposition is behavioral factors, which are skills, or health outcomes that the individual gains from performing the desired behavior (Richards et al., 2016).

Some of SCT's basic assumptions are: people learn by observing others; learning is internal and may or may not lead to behavior change; people and environment influence each other; behavior is directed to goals; behavior becomes increasingly self-regulated (McCormack & Martinko, 2013). The context of SCT and dog walking is primarily for health promotion.

Theory Analysis

Definitions of Theoretical Concepts.

Personal factors are unique to everyone and will always vary from person to person. Personal factors are attitudes and perceptions that everyone possesses (Bandura, 1997). An example of this would be a sub-construct of personal factors, which is self-efficacy, or the belief that an individual has that he or she can perform a particular task or behavior, no matter what

barriers he or she has to overcome to achieve said behavior (Richards et al., 2016). Self-efficacy would be the adult's belief that they can walk for a certain distance or time, despite any barriers they must overcome, such as inclement weather, bodily aches and pains, mental anguish, and any issues with the dog.

The second key construct in Bandura's SCT is behavioral factors, which can be explained by how they conduct themselves or actions they may make (Bandura, 1997). Two sub-constructs of behavioral factors are expectancies and health outcomes. Expectancies are the value that the adult places on their benefits from dog walking (Richards et al., 2013a).

The last essential concept in Bandura's SCT is environmental factors or factors outside of the individual that help shape one's decision-making (1997). Environmental factors can vary geographically for everyone, based on the situation and location. A sub-construct of environmental factors is social support, which can be described as others that surround an individual and interact with them in their daily interventions (Richards et al., 2016). Examples of social support can be communities, family members, friends, co-workers, and acquaintances. In dog walking, the dogs can function as social support and the area or community that the individual walks the dog in (Richards et al., 2013a, 2013b,2015,2016,2017). Additionally, the environment in which the dog walking is performed contributes to this construct. If the area where the adult walks their dog is accessible and aesthetically pleasing, then more walking can occur (Richards et al., 2013a, 2013b, 2015, 2016, 2017).

Definitions of Operational Concepts. The personal concept of self-efficacy is defined as measuring a person's confidence to walk their dog in any given circumstance (Campbell et al., 2017; Richards et al., 2013a,2013b,2015,2016,2017). The behavioral factor construct is defined by Richards et al. (2013a,2013b,2015,2016,2017) as a measurement of outcome expectancy on

the value the individual places on certain positive benefits each person receives from dog walking. Campbell et al. (2017) describe the behavioral construct as the acceptability individuals place on their dog walking. Lastly, the environment can be defined operationally as the social support one receives from engaging in dog walking (Campbell et al., 2017; Richards et al., 2013a,2013b,2015,2016,2017).

In dog-walking and SCT, all linkages of the primary constructs of personal, behavioral, and environmental factors are explicit and logically organized. Richards et al. (2013a) use SCT reciprocal determinism concepts of personal, behavioral, and environmental factors to organize constructs that influence dog walking. Self-efficacy for dog walking is a significant component of the personal factors that individuals make; they take the time to dog walk, resisting the urge to relapse, thus creating a self-efficacy pattern (Richards et al., 2013a). Richards et al. (2013a) explain how the human benefits (health, weight loss, better mood) and dog benefits (happy dog, better behavior) influence the benefit that the individual feels from dog walking, which ultimately affects behavior. The bond that the human has with their dog walking companion and support from family in friends in walking contributes to overall social support and the last construct of environmental factors (Richards et al., 2013a). Lastly, the walking infrastructure (paths, safety) and accessibility to routes contribute to the walking environment and the second component of environmental factors (Richards et al., 2013a). The assumptions, concepts, and statements outlined in the theory description are used consistently in SCT and dog walking.

Theory Evaluation

Although SCT was originated as a theory-based for use in psychology, it has been adopted by nursing and used in other literature supporting physical activity behavior changes (Beauchamp et al., 2019). With SCT and dog walking, this theory is congruent with current

nursing standards. For example, using the SCT model and dog walking as an adjunct for increasing adults' activity is well paired with contemporary nursing interventions, such as promoting physical activity.

There is a wealth of literature supporting the use of SCT in explaining physical activity behavior. However, there is far less literature that explicitly illustrates the use of SCT in predicting dog walking behaviors in adults. Richards et al. (2013b) use SCT to develop an instrument to empirically test SCT components in predicting dog walking called Development and Psychometric Testing of the Dogs and WalkinG Survey (DAWGS). This instrument measures the three primary constructs of SCT in personal (self-efficacy), behavior(outcome expectancies), and environmental (social support & walking environment) constructs (Richards et al., 2013b,2016). The DAWGS instrument shows sound reliability (p=0.39-.079; k=0.41-0.89) and acceptable model fit for dog walking correlations (Richards et al., 2013b).

Further studies by Richards et al. (2015,2016,2017) demonstrate SCT's use through the positive relationship between self-efficacy and social environment in supporting dog walking behaviors. Campbell et al. (2017) use SCT and dog walking to develop a print resource to encourage dog walking in dog owners. These studies demonstrate the use of SCT and dog walking by nursing researchers.

SCT is relevant to individuals, families, and groups, regardless of age or socioeconomic status. However, there is some concern that most of the literature on the use of SCT and dog walking has a very similar population. This population is a homogenous group of Caucasian, female, and relatively well-educated individuals, limiting its sensitivity to cross-cultural relevance (Campbell et al., 2017; Richards et al., 2013a, 2013b, 2015,2016,2017).

The use of SCT and dog walking can be a significant contributor to nursing science. The nurse may use dog walking among older adults to encourage physical activity. Since the nurse is generally the healthcare provider at the forefront of patient care, they can be the primary motivator to engage someone in action. Using dog walking as an adjunct for increasing activity in older adults is an innovative and inexpensive method that nurses should embrace to encourage their clients to function at their highest possible levels.

Theory of Planned Behavior

Theory Description

Icek Ajzen's (1985) Theory of Planned Behavior (TPB) is another middle-range theory that can predict what promotes dog-walking behaviors to encourage dog walking in adults (Brown & Rhodes, 2006; Cutt et al., 2008; Gretebeck et al., 2013; McCormack et al., 2013). Like SCT, TPB was initially derived as a theory for use in psychology that links one's beliefs and behaviors (Ajzen, 1985). TPB's origins stemmed from the view of reasoned action, which assists in perceived behavioral control (Ajzen, 1985). Ajzen's theory has been used to predict exercise behavior that an individual's attitudes, perceived control, and subjective norms, interact to predict intention to exercise (Hausenblas & Carron, 1997). This use of TPB was later used to describe the force that drives individuals to dog walk (Brown & Rhodes, 2006; Cutt et al., 2008; Gretebeck et al., 2013; McCormack et al., 2013).

The major components in TPB and dog walking are: that the individual's attitudes drive whether to engage in dog walking, their subjective normative beliefs from others, and their perception of the control they have over the decision to dog walk all interplay to form the motivation to perform dog walking (Brown & Rhodes, 2006; Cutt et al., 2008; Gretebeck et al., 2013; McCormack et al., 2013). Cutt et al. (2008) explain that in dog walking, TPB states that engaging in dog walking is affected by individual behavioral beliefs that drive the attitudes to

dog walking; the societal normative beliefs that form their subjective norms on the individual; and the barriers and motivators include the individual's perceived behavioral control, which all impact the driving forces to engage in dog walking.

TPB and dog walking are significant assumptions because the more an individual has a positive-personal attitude, subjective norms, and perceived control over the intent to dog walk, the more the person will ultimately form more dog walking behaviors (Cutt et al., 2008). Like SCT, TPB and dog walking are used for the promotion of good health.

Theory Analysis

Definitions of Theoretical Concepts. Attitudes to dog walking are defined as whether the participant feels that engaging in dog walking is beneficial (McCormack et al., 2013). Subjective norm is defined as the person's perception of the pressure they feel from their family, friends, and others to dog walk (McCormack et al., 2013). The last concept of behavior control is defined as that person's belief that they can dog walked based on their prior experiences with such an activity (Cutt et al., 2008; McCormack et al., 2013).

Definitions of Operational Concepts. Operational concepts are how one measures the theoretical concepts (Ajzen & Driver, 1991). An example of how to measure attitude is the value someone places on performing a particular behavior. For example, one person might feel that engaging in dog walking is extremely helpful and pleasant. In contrast, another might think that walking their dog is not beneficial and an arduous chore to endure (Gretebeck et al., 2013). Subjective normative beliefs can be measured by the amount of pressure that someone feels from those they care about to engage in dog walking (McCormack et al., 2013). For example, those that feel a more significant influence from others to dog walk might perform that activity more than those that don't perceive pressure to dog walk, or if there is a subjective pressure, perhaps

others don't place value in engaging in that activity (Cutt et al., 2008; McCormack et al., 2013). An example of perceived behavior control measurement and dog walking is described by one who feels that they have more control and less difficulty dog walking. Therefore, this person will walk their dog more than someone who feels more events and issues are out of their control, making it more challenging to walk and harder to engage in an activity (Gretebeck et al., 2013).

In review, all linkages in the constructs of attitude, subjective normative values, and perceived behavioral control factors are explicit and logically organized. TPB constructs that motivate one to engage in dog walking are described by the walker's attitude (Cutt et al., 2008). The attitudes that affect dog walking via their behavioral beliefs through the: individual(relaxing, walking for health, enjoyable); dog (dog's health, the dog may bite); and neighborhood (social interaction with others); Cutt et al. (2008) then explain how the person's subjective norms affect dog walking through their motivation to comply with what others think about dog walking. Lastly, perceived behavioral control involves dog walking through barriers and motivators through the following constructs: individual (long work hours, family commitments); dog-related (dog health, dog enjoyment); environmental (social interaction, pleasant walking area) (Cutt et al., 2008). The assumptions, concepts, and statements outlined in the theory description are used consistently in the TPB and dog walking.

Theory Evaluation

TPB is another "borrowed" theory that nursing has used to describe many nursing interventions and therapeutics. With TPB and dog walking, this theory can be used to explain motivating factors that contribute to engaging in an activity and can be used as a template for the development of dog walking programs to encourage people to become more active through

walking a dog (Brown & Rhodes, 2006; Cutt et al., 2008; Gretebeck et al., 2013; McCormack et al., 2013).

Many nursing researchers have tested TPB and dog walking through empirical studies. Brown & Rhodes (2006) used the constructs of attitude, subjective norms, and perceived behavioral control in surveying dog walking behaviors and explained that 46% of the variance in an individual's intention to walk could be explained through the constructs TPB. Cutt et al. (2008) developed an instrument based on TPB to measure dog owners' attributes of dog walking behaviors. This instrument was called the Dogs and Physical Activity (DAPA) tool and showed a high level of test-retest scores of >0.70 (Cutt et al., 2008). Gretebeck et al. (2013) used a Theory of Planned Behavior Questionnaire to determine factors that influence older adults to walk their dogs. This study demonstrated that the primary theoretical constructs are valid in explaining older adults' motivators to dog walk (Gretebeck et al., 2013). Lastly, McCormack et al. (2013) used TPB as a mediator to explain the motivators for walking. Still, this study does not explicitly use dog walking as a motivator for activity, yet dog walking is a major social component of the motivating factors to engage in walking.

TPB is very similar to SCT in its relevance to social and cultural groups. Additionally, as stated above, there is a similar concern about the possibility of dog walking bias because of the overrepresentation of a similar demographics group (Cutt et al., 2008). It is supposed that this is a function of dog walking studies rather than the theoretical construct.

TPB and dog walking are also significant contributors to nursing and Human-Animal-Interaction science. As mentioned previously with SCT, TPB may develop programs in dog walking and adults to encourage individuals to be more active. The nurse may then use this knowledge to be more proactive in health advocacies for their clients. Instead of being reactive in

treating disease, the nurse and the client can use TPB constructs to prevent illness and lead healthier lives.

Conclusion

As illustrated above, SCT and TPB have many of the same constructional themes in predicting dog walking behaviors. TPB examines the individual attitudes to dog walking (Cutt et al., 2008), and SCT details the personal factors and self-efficacy as a driving construct to dog walking (Richards et al., 2013). Both theories involve value beliefs of the subjective norms in TPB (Cutt et al., 2008) and the outcome expectancies in the behavioral factor construct of SCT and dog walking (Richards et al., 2013). Lastly, both SCT and TPB involve the importance of the environment in dog walking from social interaction with others in the neighborhood and the enjoyability to the community in the walk (Cutt et al., 2008; Richard et al., 2013). The only construct missed in TPB and dog walking is the importance of dog obligation, or the need for dog walking because the dog relies on it, as a motivator for walking (Brown & Rhodes, 2006; Gretebeck et al., 2013).

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Tables

Table 2

McEwen's Synthesized Method For Theory Evaluation

Theory Description	Theory Analysis	Theory Evaluation
Theory purpose	Are concepts theoretically & operationally defined?	Is theory congruent with nursing standards?
Theory level	Are linkages explicit	Is theory congruent with nursing interventions?
Origins of theory	Is the theory logically organized?	Has theory been tested?
Major concepts	Is there a diagram? Does it clarify theory?	Have nursing researchers used theory?
Major theoretical propositions	Are concepts/statements consistent?	Is theory relevant socially?
Major assumptions	Are the outcomes stated/predicted?	Is theory relevant cross-culturally?
Theory context		Does theory contribute to the nursing discipline?
		Nursing implications related to theory implementation?

Note: Adapted from "Theory Analysis and Evaluation," by M. McEwen, 2019, In M. McEwen & E.M. Wills, Theoretical Basis for Nursing (5th ed., p. 107) Copyright 2014 by Wolters Kluwer Health Reprinted with permission.

CHAPTER FOUR

DISSERTATION PROPOSAL/METHODS

Walk a Hound, Lose a Pound, and Stay Fit for Older Adults: A Secondary Data Analysis

As discussed earlier (Chapter 2), physical inactivity among older adults is associated with a decreased quality of life, complications from chronic diseases, and higher mortality rates (Curl et al.,2017). The statistics show that approximately 31 million people over 50 are inactive, with only one quarter to one-third of adults 65 and older meeting the current physical activity recommendations (Centers for Disease Control and Prevention[CDC], 2017). Physical activity in older adults can help treat and minimize the effects of several chronic diseases, thereby improving the quality of life in this age group (National Institute on Aging [NIA], 2018). Physical activity may also help combat many mental health issues that riddle the elderly such as depression, loneliness, and social isolation (Toohey et al., 2013). The CDC (2017) stated that over 20% of adults aged 55 and older have a mental health disorder that is not considered a normal part of aging. Preliminary data suggest that seniors who own and walk dogs may be more likely to engage in continuous physical activity (Richards et al., 2016). Therefore, dog walking activities could allow older adults to reap the benefits that physical activity may offer, such as better physical and mental health (NIA, 2018).

Significance to Nursing Science

As mentioned earlier in Chapter 2, dog walking among older adults may be used by the nurse to encourage physical activity. This demographic will profit from the physical benefits that dog walking affords, such as fewer falls and a better quality of life (NIA, 2018). Additionally, the bond from being with a dog can help seniors reduce loneliness, isolation, and mental health despair (Campbell et al., 2017). Since the nurse is generally the healthcare provider who is at the

forefront of patient care, they can be the primary motivator to the older adult to engage in an activity. Using dog walking as an adjunct for increasing activity in older adults is an innovative and inexpensive method that nurses should embrace to encourage older adults to function at their highest level possible.

Therefore, the research aims of this proposed study are to examine the effects of dog walking on older adults, specifically, walking behaviors, intent to walk, mood states, and the dog bond, and to explore the older adult's experiences with dog walking and the program. This proposed study will be done via a secondary data analysis from data gathered from the Walk A Hound, Lose a Pound, and Stay Fit for Older Adults study (Johnson, 2008).

The Walk, a Hound, Lose a Pound, and Stay Fit for Older Adults original study gathered data from three groups of a 12-week (5 days/week) repeated measure designed study. From the data collected in the original study, this proposed secondary analysis will first examine the older adult's: walking behaviors in total distance and time walked in the program, intent to exercise, mood, and bond that the older adult has with their dog. Additionally, this proposed secondary study will use the qualitative data gathered in the original research on participants and their perceptions of the walking program and experience with the dog/human.

Background

As stated previously in this dissertation's Chapter 2, there is a need to encourage and increase exercise among older adults due to the problems with inactivity (U.S. Department of Health and Human Services Physical Activity Guidelines Advisory Committee, 2018). Walking is a trendy exercise choice among older adults. Walking is easy to do, and it can be performed almost anywhere (Curl et al., 2017). An additional incentive of the need of perception of the dog's need for exercise provides an added incentive for the older adults to engage in dog walking

(Curl et al., 2017). This perception, in turn, may make the older adult more apt to sustain the activity of walking with their dog (Curl et al., 2017). The phenomenon of a bond between the human and the dog forms when older adults engage in dog walking, and therefore, enhances motivation to walk (Brown & Rhodes, 2006; Campbell et al., 2016; Campbell et al., 2017; Curl et al., 2017; Degeling et al., 2015; Degeling & Rock, 2012; Herbert & Greene, 2001; Hoerster et al., 2011; Janevic et al., 2019; Johnson & Meadows, 2010; Knight & Edwards, 2008; Smith et al., 2017; Westgarth et al., 2017).

As stated in Chapter 2, the U.S. Department of Health and Human Services (2018) recommends that older adults obtain a minimum of 150 minutes of vigorous activity per week to support the individual's health. Dog walking assists in allowing seniors to meet this goal. There are very few (2.5%) of older adults surveyed who can complete this goal (Harris et al., 2009). However, this group discovered that people who walked dogs walked longer than those who walked alone. Jeffries et al. (2014) examined 25 towns in the United Kingdom and found that those who accumulate the 150-minute goal were younger age (around 65), had fewer health issues, had fewer self-reported falls, a higher self-efficacy, and less depression. In a study conducted by Thorpe et al. (2006), dog walkers were more likely than non-dog walkers to obtain this goal over three years. Much focus needs to be done to encourage the older adult to meet the 150-minute guidelines. However, these studies demonstrate that those older adults that participate in dog walking are meeting this goal better than those who do not dog walk (Harris et al., 2009; Jeffries et al., 2014; Thorpe et al., 2006).

Many studies demonstrate the physiological benefits of dog walking, such as lower BMI, decreased problems with chronic health conditions, lowered blood pressure, and better blood glucose control when comparing dog walking groups to non-dog walking groups (Curl et al.,

2017; Lentino et al., 2012; Motooka et al., 2006). Fewer studies have examined the psychological effects of dog walking, and the outcomes have mixed results. Some studies show that physical activity may help combat mental health issues such as depression, loneliness, and social isolation (Toohey et al., 2013). In contrast, Dunn et al. (2018) found no statistical self-reported depression and hopelessness scores between dog walking and non-dog walking groups.

As mentioned previously (Chapter 2), dog walking has helped promote physical activity among older adults. Much of the literature explored cites dog obligation or the dog bond, that their dog relies on their owner for walks as the reason for physical activity and dog walking among dog owners (Brown et al., 2013; J. Campbell et al., 2017; K. Campbell et al., 2016; Curl et al., 2017; Degeling & Rock, 2012; Hoerster et al., 2011; Janevic et al., 2019; Knight & Edwards, 2008; Smith et al., 2017; Westgarth et al., 2017). Interestingly, two other studies involving walking with loaner dogs also found that the participants felt the same dog obligation, that the dogs relied on the humans for physical activity, thus reinforcing the impetus of dogs as motivators for physical activity and walking (Herbert & Greene, 2001; Johnson & Meadows, 2010).

Several studies cite the benefits that dog walking brings to humans. One of these benefits from walking their dog is that the dogs act as a type of "social lubricant." This phenomenon occurs when people are more apt to speak to each other due to the dog being a catalyst in interactions between humans, which serves as a positive impact on the sense of belongingness (Antonacopoulos & Pychyl, 2014; Calise et al., 2018; J. Campbell et al., 2017; K. Campbell et al., 2016; Schneider et al., 2015; Toohey et al., 2013). Additionally, some studies found that not only is dog walking beneficial in promoting interactions with other humans, but the act of being

with the dog also acts as social engagement with the owner (Janevic et al., 2019; Knight & Edwards, 2008; Peacock et al., 2020; Smith et al., 2017).

Based on an examination of the literature above, there is much data to support the benefits that older adults may obtain from dog walking. Through the lens of a mix of a qualitative and quantitative perspective approach, the scientific community can better understand the components of dog walking and the older adult.

Theoretical Framework

Bandura's Social Cognitive Theory (SCT) can illustrate dog walking's effects as an incentive for older adults to exercise. SCT uses a concept called Reciprocal Determinism to explain how a person's behavior is determined (Bandura, 1997; Figure 1).

Bandura's concept of reciprocal determinism states that personal, behavioral, and environmental factors interact with one another to produce choices that the older adults make that ultimately affect their health (Richards, 2016). Under the primary constructs of SCT, self-efficacy is a crucial subconstruct under personal factors. Bandura (1997) defined self-efficacy as confidence in their ability to exert control over their behavior. An example of self-efficacy in this proposed study is self-efficacy for walking, where the individual makes choices about their lives, such as intentions to walk their dog. Looking at intent to walk or the stages of contemplation to perform physical activity, the higher the stage of change for exercise, the more actual physical activity, the older adult engages in (Riebe et al., 2005). In this proposed study, if the older adult has a higher intention to walk, they walk more, reinforcing their confidence or self-efficacy to make their own decisions to walk.

The second construct in the SCT of behavioral factors produces the next sub-construct of health outcomes. The older adult has a choice to engage in healthy or unhealthy behaviors. In the

proposed study with dog walking and older adults, seniors who possess a more positive outcome and mood engage in frequent dog walking sessions (Richards et al., 2013). More dog walking can lead to multiple positive health outcomes, such as positive mental health or positive moods (Richards, 2016). In this proposed study, if the older adult is in a more positive mindset, it may impact their decision to dog walk—repetition of dog walking benefits older adults by enhancing their outlook, which may improve mental health. (Toups et al., 2017).

The last central construct in SCT is environmental factors that utilize social support as a sub-construct. Historically, older adults who live alone or in an assisted living facility can have a predisposition towards lack of social support, either because they do not live with anyone or do not leave their home/room to engage in social activities (McCormack et al., 2016). Dog walking is helpful to offset this in many respects. The dog itself assists the older adult as a companion. The act of taking the dog outside, generally in their neighborhoods or parks, allows the senior to interact with other people, who might approach and speak to someone with a dog (Wood et al., 2013). This interaction may help offset isolation and depression or lack of interaction or communication with others (Cameron et al.,2014). This isolation can create loneliness, which is the older adult's perception of social isolation. Additionally, the bond that the older adult forms with their dog assist with companionship, being socially engaged, and a feeling of belonging and being loved (Cutt et al., 2008).

Purpose and Research Questions

The purpose of this proposed study is to use a secondary analysis to examine the effects of dog walking on older adults and their experiences in the program among older adults in three different communal living facilities in the Midwest. The three groups are divided into dog walkers (DW), human walkers without dogs (HW), and control(C). All three groups will be

measured based on intent to exercise and mood states. Additionally, the HW and DW groups will be measured in total program walking distance (feet), total program walking time (minutes), dog bond, and qualitative perceptions of the program using secondary data analysis. (Johnson et al., 2008). There are two aims of this proposed study. The first aim is to examine the effects of dog walking on older adults; five questions relate to this aim:

1. To what extent does intent to walk differ from baseline to completion of the 12-week program among the three groups (DW, HW, C) using The Physical Activity and Stage of Change (PASOC) instrument?
2. To what extent do mood states differ from baseline to completion of the 12-week program among the three groups (DW, HW, C) using the Profile of Mood State (POMS) instrument?
3. To what extent does total program walking distance (in feet) differ among the two groups (DW and HW) after completion of the 12-week program?
4. To what extent does the total program walking time (in minutes) differ among the two groups (DW, HW) after completion of the 12-week program?
5. To what extent does the bonding relationship between participants bonding with the dog companion and participants bonding with the human companion differ among the two groups (DW, HW) after completion of the 12-week program, when using the Center for Study of Animal Wellness Pet Bonding Scale (CSAWPBS)?

The second aim is to explore the older adult's experience with dog walking. There are two questions associated with this aim:

1. What were the experiences with the dog (human) companion in the program, with the dog walking and human walking groups (DW, HW) as expressed by each participant via open questioning?

2. What were the overall program experiences in the dog walking and human walking groups (DW, HW) as expressed by each participant via open questioning?

Original Study Design

Johnson (2008) conducted the original study, a longitudinal, three-group, non-randomized trial. It took place over 12 weeks, with the participants meeting daily for five days/week.

Sample

The original study purpose was to test the efficacy of a five day/week (12 weeks total) dog walking program for community-dwelling older adults residing in three different retirement facilities using a three-group, non-randomized, repeated measures design (Johnson et al., 2008). The three mid-west facilities were similar in demographics, size, design/services offered to residents, and the residents' physical ability level. Posters were placed in each facility, inviting residents to attend an information meeting at their facility, which would explain study plans and procedures to potential participants. The original plan was to randomly assign each facility to the shelter dog walking group (DW), human walking companion group (HW), or the control group (C). Randomization did not occur because the participants decided that they were only willing to participate if they could be in the opposite condition of HW and DW; hence, the C group was the only randomized group (Johnson et al., 2008). The conditions were separated by facility to prevent cross-contamination (Johnson et al., 2008). The residents in these facilities lived in their apartments, had provided housekeeping services, and were able to eat together in a community dining room.

The study's inclusion criteria were adults 65 and older, able to read and write English, and whose primary health care provider (HCP) gave assent for participation in the study. Written consent was obtained by those who met the criteria above and wished to participate. This study was approved by the University of Missouri Health Sciences Institutional Review Board

(HSIRB). The original research was funded by Waltham Pet Nutrition and The American Association of Human-Animal Bond Veterinarians (now Waltham Petcare Science Institute).

Shelter Dogs

The shelter dogs used in the DW cohort were obtained from The Central Missouri Humane Society. This privately funded shelter focuses on the safety and wellbeing of companion animals. Each shelter dog used in this study was screened using the American Society for the Prevention of Cruelty to Animals (ASPCA) Meet Your Match Safety Assessment for Evaluating Rehoming (SAFER) (Weiss, 2007). This assessment was used to assess each dog's behavior to predict the dog's aggression level (Weiss, 2007). The dogs are scored from 1-5, with higher numbers indicating more aggression, on several subset behaviors such as arousability and leash conduct (Bennett et al., 2012). Dogs that scored a five on any of these subset behaviors were not used as walking companions (Johnson, 2008). This assessment instrument was utilized on each shelter dog each day before the shelter dog walking with their human participant. All dogs used in this preliminary study were "loaner" dogs and did not belong or reside with their human walking partners. The majority of dogs used in this original study were small to medium size, and each participant was matched with dogs suitable for them. For example, those participants using an assistive device were matched with smaller dogs who did not provide as much tension on the leash and would be easier for the older adult to walk with (Johnson et al., 2008).

Human Participants

The participants were 67-92 years old, primarily female (40), mostly Caucasian (49), and mainly widowed (32) (Johnson, 2008). The majority of the participants were well educated. 40 of the 54 participants either had attended college or had college degrees (Johnson, 2008).

Additionally, most participants had an average of two children each and did not currently own a pet (47) (Johnson, 2008).

Instruments

The timing of the collection of the data in these instruments is outlined in Table 3.

Demographic questionnaire

The demographic questionnaire was given to all three groups that contained information on age, race, marital status, educational level, number of children, pet ownership, and specific questions regarding pets. This questionnaire was collected at baseline (before week one) in all three groups and takes approximately three to ten minutes to complete.

Health History

This was an investigator developed a self-rated questionnaire to rate their physical and mental health as they perceive it (Johnson et al., 2008). Additionally, participants were asked to list any health problems they have, the duration of the issue, and whether they are taking medication for this issue. Questionnaires were collected at baseline in all three groups. Completion of these questionnaires took approximately three to ten minutes to complete.

Physical Activity and Stage of Change

The Physical Activity and Stage of Change (PASOC) instrument (Table 4) measures physical activity readiness using eight statements that range from Stage 1 "I do not do regular vigorous or moderate exercise now, and I do not intend to start in the next six months" to Stage 8 "I have been doing vigorous exercise three or more days per week for the last six months or more" (Prochaska et al., 2002). Construct validity of the stages of change has been established comparing exercise behavior and BMI in adults (Cardinal, 1997). The reliability of the stage of change demonstrated a Cronbach's alpha score of 0.94 for consistency with the actual physical

activity and physical function scores (Mostafavi & Pirzadeh, 2015). The PASOC survey was taken at the baseline of the original study (week 1), mid-way (week 6), and the end (week 12) for all three groups and took approximately one to three minutes to complete.

Profile of Mood States

The Profile of Mood States (POMS) is a 65 item instrument (Table 5) listing feelings that people might have (i.e., weary, lively), asking respondents to score to what extent each word describes their feelings over the previous week (0=not at all, 4=extremely) (Shacham, 1983). These 65 items correspond with seven mood states: tension-anxiety, depression-dejection; anger-hostility; vigor-activity; fatigue-inertia; confusion-bewilderment, and a summation of the entire 65 mood states (Shacham, 1983). The POMS-short form's reliability scores showed good internal consistency with a Cronbach alpha score of 0.78- 0.91 on the six subscales and good correlation validity between POMS and other mood scoring instruments (Baker et al., 2002). The POMS survey instrument was taken at the baseline of the original study (week 1) and the end (week 12) for all three groups and took the participants five to 15 minutes to complete.

Seven-Day Physical Activity Recall (PAR)

This instrument collects the accumulated amount of physical activity (P.A.) that participants engage in over seven days (Johnson et al., 2008). This instrument asks the participant to recall their P.A. level over the past week and rate intensity level of activity from "moderate, hard, or very hard" (Sallis et al., 1985). Reliability coefficients range from 0.66-0.99 for a two-week test-retest (Sallis et al., 1985). The PAR data were gathered baseline (week 1), mid (week 6), and at the end (week 12) for all three groups and took the participants five to 15 minutes to complete.

Six-Minute Walk Test

The six-minute walk is a test that measures the total distance walked in six minutes. In this original study, the participants walked in their facility hallways with a staff member measuring their yardage using a yardage recording device that they pushed along with the participant (Johnson et al., 2008). During this test, participants were allowed to rest, slow down, or continue to walk as long as they could in six minutes (Johnson et al., 2008). This test was conducted at baseline (week 1), mid-way (week 6), and post-study (week 12) in all three groups.

The Center for the Study of Animal Wellness Pet Bonding Scale (CSAWPBS)

The CSAWPBS is a 28-item questionnaire asking questions such as "the dog companion likes me" and "the dog companion knows when I feel happy" (Table 6). The respondent rates the statement on 5-point Likert scale of 1=more often false to 5=more often true (Johnson & Meadows, 2003). Possible scores range from 28-140, with higher scores indicating more perceived bonding. This instrument has three subscales to measure bonding factors: unconditional acceptance from the dog (human) companion, feeling of reciprocity from the visit, and attachment to the animal (human) (Fulton, 2005). The subscales: unconditional acceptance is comprised of four items (1,6,21,24); reciprocity is made of ten items (2,4,5,11,14,15,16,25,26,27); and attachment to companion is comprised of 13 items (3,7,8,9,10,12,13,17,18,19,20,22,23,28). This instrument was used for both the HW group and DW groups. For the HW group, the term "dog companion" was replaced with "human companion" to determine the attachment between the participant and their human companion. This instrument is internally consistent with a Cronbach alpha score of 0.892 among older adults in a dog walking study with trained visiting dogs (Fulton, 20057). The CSAWPBS questionnaire

was given to the HW and DW groups after completing the program (week 12) and took the participants five to 15 minutes to complete.

Exit Questionnaire

The qualitative portion of this primary study used open-ended questions that the HW and DW participants answered. There were seven questions that the participants were asked, like "what is the best part of the program" and "please tell me about your experiences with the dog walking and the exercise program (Johnson, 2008)." These seven questions are in Table 7. The participants were given this question in paper format at the end of the study (week 12) and asked to record their answers to the seven questions. This instrument's purpose was for the participants to describe their perceived benefits and challenges of the program, their perceptions of the dog and human companion in the program, and the motivators to join and continue participation within the program (Johnson et al., 2008).

Original Study Procedures

After the initial paperwork of informed consent and primary care provider assent, the participants were taken to be fitted for proper walking shoes (Johnson et al., 2008). Data were collected at baseline(week 1), daily, weekly, mid-study(week 6), and after the study(week 12) (Table 3).

The DW group participants were taken via facility van to the animal shelter to walk for the five days/week, 12-week study (Johnson et al., 2008). All participants were oriented to the program, proper dog handling, and helped select a pre-screened (via SAFER) shelter dog that corresponded with their walking capabilities. Much care was taken to use the 6-minute walk test from each participant to match them with the corresponding correct dog in size, breed, and temperament (via SAFER). The walking course was a paved road at the shelter that was pre-

measured. The participants were led through a series of warm-up exercises led by a study investigator (Johnson et al., 2008). Participants were allowed to walk for one hour and were provided with bottled water. The distance and time of the walk were recorded by study staff.

The HW group participants met in their facility lobby and walked with a human companion of their own choice (Johnson et al., 2008). They also walked on a pre-measured, paved course near their facility for up to one hour, with study staff recording walking distance and total walking time. Bottled water was provided to participants in this group. Participants in the C group maintained their regular activity but participated in data collections outlined in Table 3.

There are four significant data collection points taken during this original study, detailed in Table 3. This table details which group (HW, DW, C) participated in each measurement and at what time during the study (baseline, daily, weekly, mid-point, and exit).

Discussion On Initial Study

Even though stringent measures were in place to ensure participant safety while walking, there were three fall incidents. One participant in the dog-walking group, who used a walker, fell when the dog leash became entangled in her walker (Johnson et al., 2008). On two other occasions, one participant in the HW group fell after re-entering his facility from the walk. Fortunately, neither participant was injured and continued in the program.

Peripheral outcomes from the DW group study were that the participants were found to socialize with each other in the facility and were very encouraging of each other in their walking and fitness progress (Johnson et al., 2008). Additionally, this group altered their walking times during hotter weather by leaving their facility earlier and asking their chef to provide muffins and juice for them to eat on the way to the dog shelter (Johnson et al., 2008).

Conversely, the human-companion group was discouraged from walking from other residents not participating in the program. For example, some were told, "you are too old to be out there walking," and "you people (study staff) have no business trying to get old people to walk" (Johnson et al., 2008, p. 18). Participants in the human-walking group were heard to discourage each other from walking. Some examples are, "it's hot today, let's not walk very far," or "I'm busy this morning, let's not walk so far" (Johnson et al., 2008, p.19).

These factors from the original study demonstrate the complexity that is prevalent in such a study. There are many factors to consider and many issues that may arise, like hot days, that can alter the study outcomes.

Secondary Analysis

This proposed study will focus on a mixture of measurements taken either: before initiating the 12-week program, after completing the 12-week program, or a measurement of accumulated data acquired throughout the 12-weeks (Table 8). Figure 2 details the design of this proposed study. The first question in Aim 1 compares the participants in all three groups (DW, HW, C) both at the beginning and end of the primary study on intent to exercise. All three groups took the Physical Activity and Stage of Change (PASOC) questionnaire, which measures the participant's readiness for physical activity. The second question in Aim 1 will use the Profile of Mood State-short form (POMS) questionnaire to determine any relationships with positive or negative effects among the three groups. Question three of Aim 1 will examine the difference in the cumulative walking distance in feet. While Question four examines the cumulative walking time in minutes among the DW and HW groups after the 12-week program. Question five of Aim1 examines the bonding between the shelter dog and the DW group and the bonding between the human companion in the HW group using the Center for the Study of Animal Wellness Pet

Bonding Scale (CSAWPBS). Question one of Aim 2 examines the DW and HW groups' self-expressed experiences that the DW group had with their dog companion and the HW group self-expressed experiences that the HW group had with their human companion. The last question of Aim 2 uses open-ended questions given to the DW and HW group inquiring about their self-expressed experiences of participation in the program.

This is a secondary analysis of a longitudinal three-group non-randomized trial with a qualitative component to illustrate the quantitative data. The quantitative data and qualitative data will be analyzed as described below. The output from the quantitative and qualitative analysis will be examined to determine if the qualitative data reinforce or detract from the findings of the quantitative analysis and rationale for this.

Aim 1

Aim 1, Question 1. To what extent does intent to walk differ from baseline to completion of the 12-week program among the three groups (DW, HW, C) using The Physical Activity and Stage of Change (PASOC) instrument? This question has one independent categorical variable with three levels (DW, HW, C). This question examines between and within-group comparisons. Before analyzing this data set, the data need to be screened for missing data, outliers, normality, linearity, homogeneity of regression, multicollinearity, and homoscedasticity (Field, 2018). If variances in these tests are found, then data transformation should be considered to allow for better statistical analysis rigor (Field, 2018). The sample is non-randomized, and after checking assumptions, the pre-post PASOC scores will be analyzed using repeated-measures ANOVA. If the assumptions are not met, then Friedman's ANOVA would be applicable.

Aim 1, Question 2. To what extent do mood states differ from baseline to completion of the 12-week program among the three groups (DW, HW, C) using the Profile of Mood Score

(POMS) instrument? This question has one independent categorical variable with three levels (DW, HW, C). This question examines between and within-group comparisons. Before analyzing this data set, it needs to be screened for missing data, outliers, normality, linearity, homogeneity of regression, multicollinearity, and homoscedasticity(Field, 2018). If variances in these tests are found, then data transformation should be considered to allow for better statistical analysis rigor (Field, 2018). POMS has seven mood sub-profiles (tension, depression, anger, vigor, fatigue, confusion, total) (McNair et al., 1971). After checking for normality, MANOVA will be used to analyze the data.

Aim 1, Question 3. To what extent does total program walking distance (in feet) differ among the two groups (DW and HW) after completion of the 12-week program? This question has one independent categorical variable with two levels (DW, HW) and one continuous dependent variable. This question examines between-group comparisons to the extent to which there is a distance in total walking distance between DW and HW groups. After using the screenings outlined above, with applicable data transformation, the data will be analyzed using a 1-way ANOVA analysis. If assumptions are not met, then Kruskal-Wallis analysis would be appropriate. There is only one independent variable with two categories (DW, HW) and one continuous dependent variable.

Aim 1, Question 4. To what extent does the total program walking time (in minutes) differ among the two groups (DW, HW) after completion of the 12-week program? This question has one independent categorical variable with two levels (DW, HW) and one continuous dependent variable. This question examines between-group comparisons to the extent to which there is a distance in total walking time between DW and HW groups. After using the screenings outlined above, with applicable data transformation, the data will be analyzed using a

1-way ANOVA analysis. If assumptions are not met, then Kruskal-Wallis analysis would be appropriate. There is only one independent variable with two categories (DW, HW), with one continuous dependent variable.

Aim 1, Question 5. To what extent does the bonding relationship between participants bonding with the dog companion and participants bonding with the human companion differ among the two groups (DW, HW) after completing the 12-week program, when using the Center for Study of Animal Wellness Pet Bonding Scale (CSAWPBS)? This question has one independent categorical variable with two levels (DW, HW). This question examines between and within-group comparisons. Before analyzing this data set, it needs to be screened for missing data, outliers, normality, linearity, homogeneity of regression, multicollinearity, and homoscedasticity(Field, 2018). If variances in these tests are found, then data transformation should be considered to allow for better statistical analysis rigor (Field, 2018). CSAWPBS is a 28-item instrument with three different sub-scores of bonding (unconditional acceptance, reciprocity, attachment) and the total score (Fulton, 2005). The scoring for question 17 will be reverse-scored because it is worded as a negative question and is different from the other 27. After checking for normality, MANOVA will be used to analyze the data.

Aim 2

Aim2, Question 1. What were the experiences with the dog (human) companion in the program, with the dog walking and human walking groups (DW, HW) as expressed by each participant via open questioning? The outcome from these questions will be transcribed for each item into one document. The first cycle of manual coding will be thematic coding about the human/dog companion's experiences. Pattern coding will occur in the second cycle method to

determine any patterns or themes that the participants express regarding their walking companion experiences (Saldana, 2016).

Aim 2, Question 2. What were the overall program experiences in the dog walking and human walking groups (DW, HW), as expressed by each participant via open questioning? Like the qualitative question in Question1, the outcome from these questions will be transcribed for each item into one document. The first cycle of manual coding will be thematic coding about the overall experiences in the program. Pattern coding will occur in the second cycle method to determine any patterns or themes that the participants express regarding the best/worst parts of the Program (Saldana, 2016).

Validity Issues

Because this is a secondary data analysis study, internal validity threats cannot be controlled because the data have already been gathered. However, in the original study, specific parameters were undertaken to ensure better validity. The three assisted living facilities were selected because of their similarities in resident demographics and services offered by the facilities (Johnson et al., 2008). They did have the intent to randomly assign each facility as either HW, DW, C. However, during the participant orientation meetings, the participants expressed willingness to participate if they could only participate in the opposite group (HW or DW). Therefore, the C group was the only one randomly assigned (Johnson et al., 2008). In the perseverance of validity, each facility served in one group to avoid cross-group contamination (Johnson et al., 2008).

Potential Ethical Issues

The original study's raw data have been de-identified to protect the participants' interests and privacy. The original study was approved via a full board review by the University's Health

Sciences Institutional Review Board. Each participant was screened correctly for inclusion criteria, signed informed consent, and health care provider assent was obtained (Johnson et al., 2008). As described earlier in this proposal's methods portion, the shelter dogs were also screened for suitability in the program. Each animal was then paired with an older adult with comparable personalities and energy levels (Johnson et al., 2008). All the data were secured, and participants were assigned a number to protect participants' anonymity and confidentiality. Upon communication with U.M.'s Health Science Internal Review Board (HSIRB), since these data are considered de-identified, this proposed study will need a Human Subject Research Determination Form.

Conclusion

The original study has addressed the issues that are associated with inactivity and the adult over 65. Dog walking and the older adult points positively towards encouraging, the older adult to engage in exercise and activities that promote a healthier lifestyle. This proposed study hopes to demonstrate and reinforce previous research that points to the benefits that dog walking offers to older adults. By encouraging these walking behaviors, aging does not necessarily have to be negative and something to be feared.

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Tables/Figures

Table 3

Measurements Taken in the Primary Study

Measurement	Time of Data			
	Baseline	Daily/weekly	Mid-Point	Exit
Demographic Questionnaire	H,D,C			
Self-Rated Health Questionnaire	H,D,C			
Physical Activity & Stage of Change (PASOC)	H,D,C		H,D,C	H,D,C
Social Provisions Scale	H,D,C			H,D,C
Pet Attitude Inventory	H,D,C			
Daily Data Collection Tool (dog & human)		H, D		
Body weight/height	H,D,C	H,D	H,D,C	H,D,C
6-Minute Walk	H,D,C		H,D,C	H,D,C
7-day PAR	H,D,C		H,D,C	H,D,C
CSAWPBS/HBS				H,D
Exit Satisfaction Questionnaire				H,D

Note: H=Human Walking group, D=Dog Walking group, C=Control group Baseline=before initiating 12-week program; Mid-Point=Midpoint of study around week 6; Post=after completion 12-week program; Daily/Weekly=Daily/weekly data collection

Using the original study's research design, "Walk A Hound and Lose a Pound and Stay Fit for Older Adults" by R. Johnson (2008).

Table 4

Physical Activity and Stage of Change (PASOC)

Participants were asked the circle the number of the ONE sentence that is most like them

	Statement
1	I don't do regular vigorous or moderate exercise now, and I don't intend to start in the next 6 months
2	I don't do regular vigorous or moderate exercise now, but I have been thinking of starting in the next 6 months.
3	I'm trying to start doing vigorous or moderate exercise, but I don't do it regularly.
4	I'm doing vigorous exercise less than 3 times per week or moderate exercise less than 5 times per week
5	I've been doing 30 minutes a day of moderate exercise 5 or more days per week for the last 1-5 months.
6	I've been doing 30 minutes a day of moderate exercise 5 or more days per week for the last 6 months or more.
7	I've been doing vigorous exercises 3 or more days per week for the last 1-5 months.
8	I've been doing vigorous exercise 3 or more days per week for the last 6 months or more.

Note-Using the research design from the original study, "Walk A Hound and Lose a Pound and Stay Fit for Older Adults " by R. Johnson (2008).

Table 5

Profile of Mood States (POMS)

Participants were asked to rate the feeling from 0-4 to best describe how they have been feeling during the past week, including today.

(0=Not at all; 1=A little; 2=Moderately; 3=Quite a bit; 4=Extremely)

	Mood		Mood		Mood		Mood
1	Friendly	**18**	Blue	**35**	Lonely	**52**	Deceived
2	Tense	**19**	Energetic	**36**	Miserable	**53**	Furious
3	Angry	**20**	Panicky	**37**	Muddled	**54**	Efficient
4	Worn out	**21**	Hopeless	**38**	Cheerful	**55**	Trusting
5	Unhappy	**22**	Relaxed	**39**	Bitter	**56**	Full of pep
6	Clear-headed	**23**	Unworthy	**40**	Exhausted	**57**	Bad-tempered
7	Lively	**24**	Spiteful	**41**	Anxious	**58**	Worthless
8	Confused	**25**	Sympathetic	**42**	Ready to fight	**59**	Forgetful
9	Sorry for things done	**26**	Uneasy	**43**	Good-natured	**60**	Carefree
10	Shaky	**27**	Restless	**44**	Gloomy	**61**	Terrified
11	Listless	**28**	Unable to concentrate	**45**	Desperate	**62**	Guilty
12	Peeved	**29**	Fatigued	**46**	Sluggish	**63**	Vigorous
13	Considerate	**30**	Helpful	**47**	Rebellious	**64**	Uncertain about things
14	Sad	**31**	Annoyed	**48**	Helpless	**65**	Bushed
15	Active	**32**	Discouraged	**49**	Weary		
16	On edge	**33**	Resentful	**50**	Bewildered		
17	Grouchy	**34**	Nervous	**51**	Alert		

Note-Using the research design from the original study, "Walk A Hound and Lose a Pound and Stay Fit for Older Adults," by R. Johnson (2008).

Table 6

Center for the Study of Animal Wellness Pet Bonding Scale (CSAWPBS) For the Dog/Human Companion

Participants were asked to make an "X" in the column that best shows your views about each statement

	Statement	More Often False **1**	**2**	**3**	**4**	More Often True 5
1	The dog companion likes me.					
2	I talk to the dog companion.					
3	I confide in the dog companion.					
4	The dog companion understands what I say.					
5	The dog companion knows when I feel bad.					
6	The dog companion is always glad to see me.					
7	The dog companion prefers me to others.					
8	The dog companion has become my friend.					
9	I look forward to getting up in the morning on days when I will see the dog companion.					
10	I tell others about the dog companion.					
11	The dog companion knows when I feel happy					
12	I would like to have the dog companion come to my home.					
13	I will remember the dog companion after my program.					
14	The dog companion makes walking easier.					
15	The dog companion tries to comfort me.					
16	The dog companion makes me feel better.					
17	The dog companion is boring.					
18	I feel attached to the dog companion.					
19	The dog companion gives me energy.					
20	I miss the dog companion between visits.					
21	The dog companion doesn't judge me.					
22	I look forward to the dog companion.					
23	The dog companion makes me feel happy.					
24	The dog companion accepts me just the way I am.					
25	I make the dog companion feel better.					
26	I make the dog companion feel happy.					
27	The dog companion takes my mind off my troubles.					
28	The dog companion helps me feel secure.					

Note-Using the research design from the original study, "Walk A Hound and Lose a Pound and Stay Fit for Older Adults," by R. Johnson (2008).

Table 7

Open-ended questioning Regarding Companion/Program

Participants were asked to answer the questions in their own words.

Question	Question Content
1	Please tell me about your experiences with the dog walking & exercise program
2	What is the best part of the program?
3	What is the worst part of the program?
4	In what way has the program affected you?
5	Would you recommend a program like this to someone else?
6	Why or why not?
7	Could you say a little more about the program?

Note- Qualitative interview questions used in the qualitative portion of the study.

Table 8

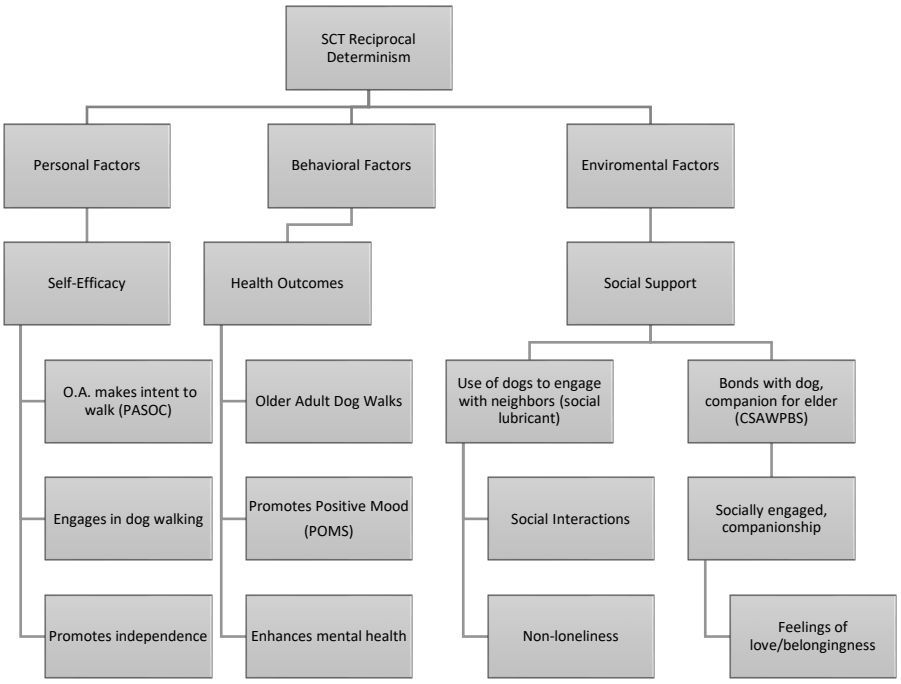
Summary of Completed Assessments Used in Secondary Analysis Study

Assessment	Dog Walking Group (D.W.)			Human Walking Group (H.W.)			Control Group (C)		
	Pre	***Post***	***Acc.***	***Pre***	***Post***	***Acc.***	***Pre***	***Post***	***Acc.***
Total Walking Distance (feet)			X			X			
Total Walking Time (minutes)			X			X			
PASOC (intent to exercise)	X	X		X	X		X	X	
POMS (mood state)	X	X		X	X		X	X	
CSAWPBS (dog bonding)		X			X				
Interview Questions		X			X				

Note: Pre=At beginning of study; Post=At completion of study; Acc.=Accumulation of measurement during entire length of study

Figures

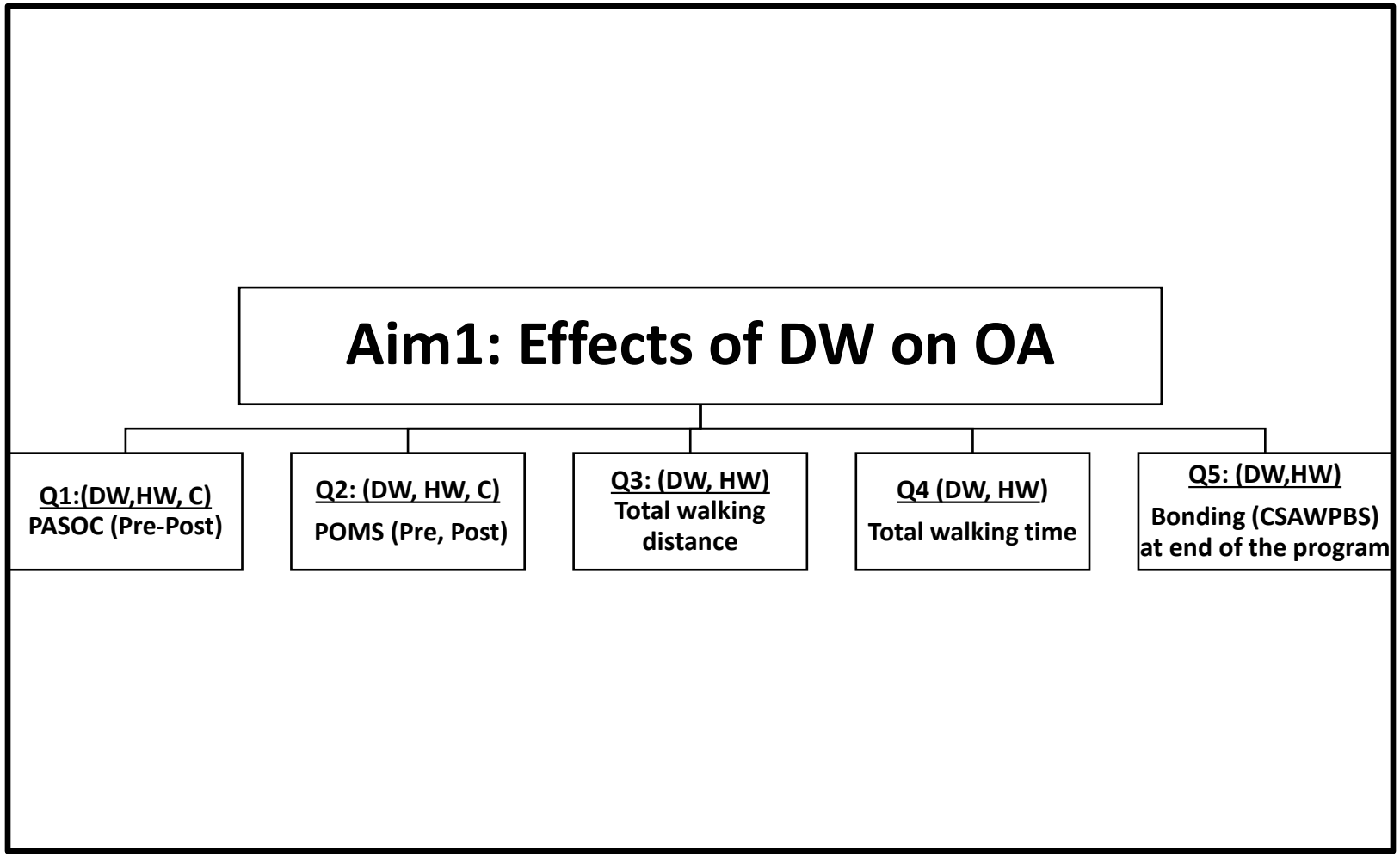
Figure 2 Dog walking as an incentive for older adults to exercise and SCT with Reciprocal Determinism



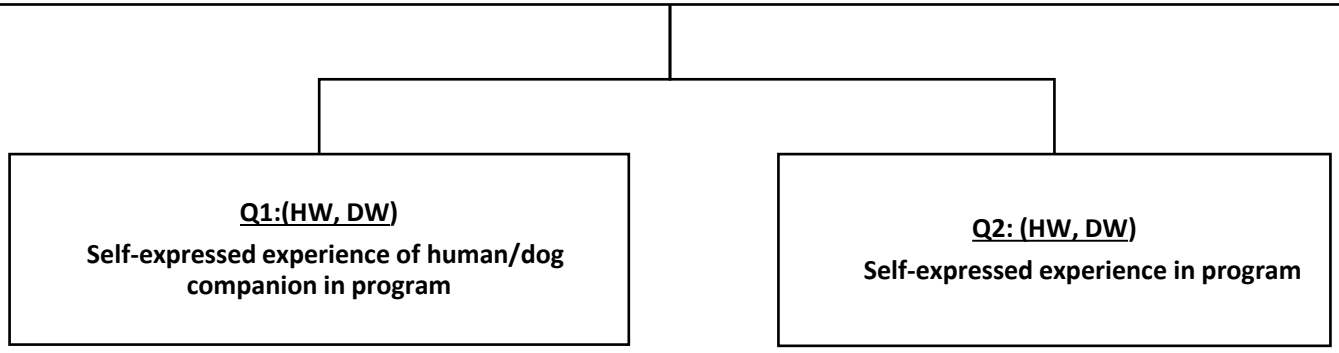
Note- Using Bandura's Social Cognitive Theory to introduce personal, behavioral, and environmental factors to promote self-efficacy, positive health outcomes, and social support Adapted from "Self-Efficacy: The Exercise of Self-Control," by A. Bandura, 1997, W. H. Freeman. (permission in process)

Figure 3

Design plan



Aim 2: OA DW Experience



CHAPTER FIVE

WALK A HOUND, LOSE A POUND, AND STAY FIT FOR OLDER ADULTS-A SECONDARY DATA ANALYSIS

As the primary author, my colleagues and I plan to submit for publication to Applied Nursing Research

Abstract

Background: Physical inactivity in the older adult population contributes to a decreased quality of life and complications from many co-morbidities. The need is to encourage older adults to engage in more physical activity. Dog walking is an activity that is easy to do, inexpensive, and can be done anywhere.

Methods: This was a secondary analysis of a 12-week quasi-experimental study of older adults residing in three separate assisted living facilities. There were three groups: one that walked with shelter dogs (DW), one that walked with a human companion (HW), and a control group (C).

Aim: The first aim was to explore dog walking and the older adult through a quantitative lens. The second aim examined dog walking and the older adult through a qualitative approach.

Results: Statistical difference was found in overall total program walking distance in feet in DW (M=112,429.12, SD=89,796.47) compared to HW (M=50,863.35, SD=41,859.38) $f_{(1,33)=}7.75$, p=0.01, with an effect size of $Eta^2=0.19$. Additionally, statistical significance in overall total walking time in minutes was found in DW (M=1,480.69, SD=583.94) compared to HW (M=742.87, SD=452.21) $f_{(1,33)=}17.17$, p=0.00, with an effect size of $Eta^2=0.34$. Aim Two outcomes were that the experiences with the walking companion were overall positive. The participants expressed joy in interaction with both the dog and human companion. An

interesting outcome in the HW group was that they expressed dissatisfaction when their walking partners did not want to walk. This could be due to the possibility that humans may be unreliable, whereas dogs are not. In response to the program, both groups expressed that the program itself added to the overall motivation to continue walking.

Conclusion: This study has addressed the many benefits of older adults engaging in a more active lifestyle. Ideally, dog walking in older adults may motivate older adults to engage in a more active lifestyle.

Keywords: Animal-assisted activity, exercise, dog walking, walking in older adults

Introduction and Background

More sedentary time and low physical activity are a growing concern in the older adult population (Yerrakalva et al., 2019). Physical inactivity among older adults is associated with a decreased quality of life, complications from chronic diseases, and higher mortality rates (Curl et al., 2017). Approximately 31 million people over 50 are inactive, with only one quarter to one-third of adults 65 and older meeting the current physical activity recommendations (Centers for Disease Control and Prevention [CDC], 2017). Physical activity in older adults can help treat and minimize the effects of several chronic diseases, thereby improving the quality of life in this age group (National Institute on Aging [NIA], 2018). According to Toohey et al. (2013), physical activity may also help combat many mental health issues that riddle the elderly such as depression, loneliness, and social isolation (Toohey et al., 2013). The CDC (2017) stated that over 20% of adults aged 55 and older have a mental health disorder that is not considered a normal part of aging. Preliminary data suggest that seniors who own and walk dogs may be more likely to engage in continuous physical activity (Richards et al., 2016). Therefore, dog walking activities could allow older adults to reap the benefits that physical activity may offer, such as better physical and mental health (NIA, 2018).

Because of the rampant problems with inactivity in older adults, there is a need to encourage and increase exercise within this population (U.S. Department of Health and Human Services Physical Activity Guidelines Advisory Committee, 2018). Walking is a trendy exercise choice among older adults. Walking is easy to do, and it can be performed almost anywhere (Curl et al., 2017). Dog walking provides an added incentive for the older adults' activity because of their perception of the animals' need for exercise (Curl et al., 2017). This perception, in turn, may help the older adult be more apt to sustain the activity of walking with their dog (Curl et al.,

2017). Some investigators found that walking the dog strengthens the bond between the human and dog and further enhances motivation to walk (Brown & Rhodes, 2006; Campbell et al., 2016; Campbell et al., 2017; Curl et al., 2017; Degeling et al., 2015; Degeling & Rock, 2012; Herbert & Greene, 2001; Hoerster et al., 2011; Janevic et al., 2019; Johnson & Meadows, 2010; Knight & Edwards, 2008; Smith et al., 2017; Westgarth et al., 2017).

The U.S. Department of Health and Human Services (2018) recommends that older adults obtain a minimum of 150 minutes of vigorous activity per week to support the individual's health. Dog walking assists in allowing seniors to meet this goal. Unfortunately, Harris et al. (2009) found that only 2.5 % (6/238) of the older adults surveyed met the activity goal of meeting these exercise guidelines. Jeffries et al. (2014) found that those that met this 150-minute activity goal were younger age (around 65), had fewer health issues, had fewer self-reported falls, a higher self-efficacy, and less depression. Thorpe et al. (2006) found dog walkers were more likely than non-dog walkers to obtain this goal over three years. From the literature examined above, the older adult still falls short in meeting the 150-minute guidelines. However, these studies demonstrate that those older adults that participate in dog walking are meeting this goal better than those who do not dog walk (Harris et al., 2009; Jeffries et al., 2014; Thorpe et al., 2006).

Many of the physiological benefits of dog walking include lowered BMI, decreased problems with chronic health conditions, lowered blood pressure, and tighter blood glucose control when comparing dog walking groups to non-dog walking groups (Curl et al., 2017; Lentino et al., 2012; Motooka et al., 2006). Fewer studies have examined the psychological effects of dog walking, and the outcomes have mixed results. Some studies show that physical activity may help combat mental health issues such as depression, loneliness, and social isolation

(Toohey et al., 2013). In contrast, Dunn et al. (2018) found no statistical differences in self-reported depression and hopelessness scores between dog walking and non-dog walking groups.

Several studies cite the benefits that dog walking brings to humans. One of the benefits from walking their dog is that the dogs act as a type of "social lubricant." This phenomenon occurs when people are more apt to speak to each other due to the dog being a catalyst in interactions between humans, which serves as a positive impact on the sense of belongingness (Antonacopoulos & Pychyl, 2014; Calise et al., 2018; J. Campbell et al., 2017b; K. Campbell et al., 2016; Schneider et al., 2015; Toohey et al., 2013). Additionally, some studies found that not only is dog walking beneficial in promoting interactions with other humans, but the act of being with the dog also acts as social engagement with the owner (Janevic et al., 2019; Knight & Edwards, 2008; Peacock et al., 2020; Smith et al., 2017).

Based on an examination of the literature above, data supports the benefits that older adults may obtain from dog walking. Through the lens of a mix of a qualitative and quantitative perspectives, the scientific community can better understand the components of dog walking and the older adult, with the many intricacies that present themselves from this combined approach.

Theoretical Framework

Bandura's Social Cognitive Theory (SCT) can illustrate dog walking's effects as an incentive for older adults to exercise. SCT uses a concept called Reciprocal Determinism to explain how a person's behavior is determined (Bandura, 1997; Figure 2).

Bandura's concept of reciprocal determinism states that personal, behavioral, and environmental factors interact with one another to produce choices that the older adults make that ultimately affect their health (Richards, 2016). Under the primary constructs of SCT, self-efficacy is a crucial subconstruct under personal factors. Bandura (1997) defined self-efficacy as

confidence in their ability to exert control over their behavior. An example of self-efficacy in this study is self-efficacy for walking, where the individual decides to dog walk. That activity reinforces their ability to perform subsequent walks with their dogs. The second construct in the SCT of behavioral factors produces the next sub-construct of health outcomes. The older adult has a choice to engage in healthy or unhealthy behaviors. Richards (2016) found that older adults who possess a more positive effect and mood engage in frequent dog walking sessions. Repetition of dog walking benefits older adults by enhancing their outlook, which may improve mental health. (Toups et al., 2017).

The last central construct in SCT is environmental factors that utilize social support as a sub-construct. Historically, older adults who live alone or in an assisted living facility can have a predisposition towards lack of social support, either because they do not live with anyone or do not leave their home/room to engage in social activities (McCormack et al., 2016). Dog walking is helpful in two dimensions of this. The dog itself assists the older adult as a companion. The act of taking the dog outside, generally in their neighborhoods or parks, allows the senior to interact with other people, who might approach and speak to someone with a dog (Wood et al., 2013). This interaction may help offset isolation and depression or lack of interaction or communication with others (Cameron et al.,2014). This isolation can create loneliness, which is the older adult's perception of social isolation. Additionally, the bond that the older adult forms with their dog assist with companionship, being socially engaged, and a feeling of belonging and being loved (Cutt et al., 2008).

The purpose of this study was to use a secondary analysis to examine the effects of dog walking on older adults and their experiences in the program among older adults in three different communal living facilities in the Midwest. The three groups were divided into dog

walkers (DW), human walkers without dogs (HW), and control(C). All three groups were measured based on intent to exercise and mood states. Additionally, the HW and DW groups were measured in total program walking distance (feet), total program walking time (minutes), dog bond, and qualitative perceptions of the program using secondary data analysis (Johnson et al., 2008).

Method

Original (Parent) Study Design

Johnson (2008) conducted the original study, a longitudinal, three-group, non-randomized trial. This study took place over 12 weeks, with the participants meeting daily for five days/week. The study was approved by the University's Health Sciences Institutional Review Board. Participants from three similar assisted living facilities in the Midwest were assigned a group (DW, HW, C) per each facility. The original plan was to give each facility a condition randomly, but participants would only agree to be in the study if they could be in their desired condition (Johnson et al., 2008). The study's inclusion criteria were adults 65 and older, ability to read and write English, and whose primary health care provider gave assent for program participation. Written consent was obtained by those who met the criteria and wished to participate. The original study was funded by Waltham Pet Nutrition and the American Association of Human-Animal Bond Veterinarians (now Waltham Petcare Science Institute).

The shelter dogs used in the DW cohort were obtained from the Central Missouri Humane Society. Each shelter dog used in the study was screened using the American Society for the Prevention of Cruelty to Animals (ASPCA) Meet Your Match Safely Assessment for Evaluation Rehoming (SAFER) (Weiss, 2007). These dogs were scored from one-five, with higher scores representing more aggression. Dogs scoring a five or above were not deemed

appropriate for walking in this study. Each participant was matched with dogs suitable for them. For example, participants using an assistive walking device were matched with smaller dogs who did not provide as much tension on the leash and would be easier for the older adult to walk with (Johnson et al., 2008).

A rich set of data was collected during this parent study, as outlined in Table 3. Due to space limitations, this study's focus will be on the instrumentation used for the secondary data analysis. Details on the instrumentation used in the primary study can be found in supplement one.

Instruments

The Physical Activity and Stage of Change (PASOC) instrument (Table 4) measures physical activity readiness using eight statements that range from Stage1 "I do not do regular vigorous or moderate exercise now, and I do not intend to start in the next six months" to Stage 8 "I have been doing vigorous exercise three or more days per week for the last six months or more" (Prochaska et al., 2002). This instrument has well-established validity and reliability (Cardinal, 1997). The PASOC survey was taken at the baseline of the original study (week 1), mid-way (week 6), and the end (week 12) for all three groups and took approximately one to three minutes to complete.

The Profile of Mood States (POMS) is a 65 item instrument (Table 5) listing feelings that people might have (i.e., weary, lively), asking respondents to score to what extent each word describes their feelings over the previous week (0=not at all, 4=extremely) (Shacham, 1983). These 65 items correspond with seven mood states: tension-anxiety, depression-dejection; anger-hostility; vigor-activity; fatigue-inertia; confusion-bewilderment, and a summation of the entire 65 mood states (Shacham, 1983). The POMS-short form's reliability scores showed good internal

consistency with a Cronbach alpha score of 0.78- 0.91 on the six subscales (Baker et al., 2002). The POMS survey instrument was taken at the baseline of the original study (week 1) and the end (week 12) for all three groups and took the participants five to 15 minutes to complete.

The Center for the Study of Animal Wellness Pet Bonding Scale (CSAWPBS) is a 28-item questionnaire asking questions such as "the dog companion likes me" and "the dog companion knows when I feel happy" (Table 6). The respondent rates the statement on 5 point Likert scale of 1=more often false to 5=more often true(Johnson & Meadows, 2003). Possible scores range from 28-140, with higher scores indicating more perceived bonding. This instrument has three subscales to measure bonding factors: unconditional acceptance from the dog (human) companion, feeling of reciprocity from the visit, and attachment to the animal (human) (Fulton, 2005). This instrument contained three subscales: unconditional acceptance, reciprocity, and attachment to the walking companion. This instrument was used for both the HW group and DW groups. For the HW group, the term "dog companion" was replaced with "human companion" to determine the attachment between the participant and their human companion. This instrument is internally consistent with a Cronbach alpha score of 0.892 among older adults in a dog walking study with trained visiting dogs (Fulton, 20057). The CSAWPBS questionnaire was given to the HW and DW groups after completion of the program (week 12) and took the participants five to 15 minutes to complete.

The qualitative portion of this primary study used seven open-ended questions that the HW and DW participants answered in writing. Examples of questions the participants were asked, included "what is the best part of the program" and "please tell me about your experiences with the dog walking and the exercise program (Johnson, 2008)." These seven questions are in Table 7. The participants were given this question in paper format at the end of the study (week

12) and asked to record their answers to the seven questions. This allowed participants to describe their perceived benefits and challenges of the program, their perceptions of the dog and human companion in the program, and the motivators to join and continue participation within the program (Johnson et al., 2008).

Original (Parent) Study Procedures

After informed consent and primary care provider assent, the participants were fitted for proper walking shoes (Johnson et al., 2008). Data were collected at baseline (week 1), daily, weekly, mid-study (week 6), and after the study (week 12; Table 3).

The DW group participants were taken via facility van to the animal shelter to walk for the five days/week, 12-week study (Johnson et al., 2008). All participants were oriented to the program, proper dog handling, and helped select a pre-screened (via SAFER) shelter dog that corresponded with their walking capabilities. Much care was taken to use the 6-minute walk test from each participant to match them with the corresponding correct dog in size, breed, and temperament (via SAFER). The walking course was a paved road at the shelter that was pre-measured. The participants were led through a series of warm-up exercises led by a study investigator (Johnson et al., 2008). Participants were allowed to walk for one hour and were provided with bottled water. The distance and time of the walk were recorded by study staff.

The HW group participants met in their facility lobby and walked with a human companion of their own choice (Johnson et al., 2008). They also walked on a pre-measured, paved course near their facility for up to one hour, with study staff recording walking distance and total walking time. Participants in the C group maintained their regular activity but participated in data collections outlined in Table 3.

There are four significant data collection points taken during this original study, detailed in Table 3. This table details which group (HW, DW, C) participated in each measurement and at what time during the study (baseline, daily, weekly, mid-point, and exit).

Secondary Analysis Design and Measures

The raw data used in this study have been de-identified to protect the participant's interests and privacy. The MU Institutional Review Board reviewed this study's application and deemed that it is exempt and appropriate for use in this analysis.

This study focused on a mixture of measurements taken either: before initiating the 12-week program, after completing the 12-week program, or a measurement of accumulated data acquired throughout the 12-weeks (Table 8). Figure 3 details the design of this study.

Question one of Aim 2 examined the DW and HW groups' self-expressed experiences that the DW group had with their dog companion and the HW group self-expressed experiences that the HW group had with their human companion. The last question of Aim 2 used open-ended questions given to the DW and HW group inquiring about their self-expressed experiences of participation in the program.

Secondary statistical and qualitative analysis methods

A secondary analysis was performed on the quantitative data using IBM SPSS Statistics 27.0 software. A detail of the statistics used per each question is detailed in Figure 4. A descriptive analysis of participant demographics was performed. Under Aim 1, normality tests were run for all questions, and the assumptions for the Multiple Analysis of Variance (MANOVA) were tested. Question One pre and post intent to walk (PASOC) scores between the three groups (HW, DW, C) test failed the test for normality, so Friedman's Analysis of Variance (ANOVA) was conducted. Question two examined the 7 subsets of mood scores (POMS-64)

between the three groups pre and post, so a One-Way Repeated Measures MANOVA was conducted. Question three and four examined total walking distance and time, respectively, between the walking groups (HW, DW), so a One-way ANOVA was conducted. This analysis was chosen over a t-test because t-tests assume equal variance, which is not the case with this dataset (Field, 2018). Lastly, Question five examined the bonding relationship between the participant bonding with their walking partner (dog or human) among the two groups (HW, DW) after completing the CSAWPBS instrument. This instrument was scored into three subscales: unconditional acceptance, reciprocity, and attachment to companion, so a One-way MANOVA was conducted (Field, 2018).

Aim two examined the experiences of the DW and HW groups with their walking partners and in participation in the program through the 7 open-ended questions. The qualitative data from seven open-ended questions given to the dog walking (DW) and human walking (HW) groups were analyzed using a coding method developed by Saldana (2016). The responses to these questions were transcribed into one document and sent to two authors for coding individually, with discrepancies in interpretation decided upon by a third author, to stabilize reliable results. The initial coding method (Level 1)used Values Coding, a subsetting of Affective Coding (Saldana, 2016). Saldana (2016) states that Values Coding is applicable in transcripts from participant-generated material because it can explore someone's values, beliefs, and attitudes about a particular system of culture. This method was chosen because it was able to take the participants' perceptions and feelings about the program and their companions. Also, by using Values Coding, we were able to undercover strong values that the participants had or explored through the walking program (Saldana, 2016). Details on how the coders were trained are in Supplement 2.

The last coding process (Level 2) is considered a second-cycle coding process called pattern coding. Saldana (2016) describes pattern coding to group summaries of the initial coding process into smaller themes or concepts. In this method, Pattern Coding was used to take initial values, attitudes, and beliefs found in Level 1 and divide them into the themes or patterns that will be discussed in the result portion of this study. The participants' responses in these studies were coded by two independent coders, with a third independent investigator determining any discrepancies between coders one and two. This method was done to ensure consistent coding to facilitate the analysis's credibility (Burla et al., 2008; Church et al., 2019).

Results

Sample characteristics. The descriptive analysis is summarized in Table 10. The majority of the participants were well educated, averaged two children, and did not currently own a pet (Johnson, 2008). Additionally, most of the participants were female, widowed, and Caucasian (Johnson, 2008).

Results for Aim One. In question one, a comparison between intent to walk (PASOC) in the three groups (HW, DW, C) showed no statistical difference among the groups from the beginning and at the completion of the program through Friedman's ANOVA $\chi^2(1)=0.35$, $p=0.56$ (Figure 5). An independent samples Kruskal-Wallis test comparing the three groups pairwise (HWpre/HWpost, DWpre/DWpost, Cpre/Cpost) from pre to post confirmed that the median scores for these pairwise groups were not statistically significant finding $\chi^2(5)=6.01$, $p=0.31$.

In question two, a comparison of the seven subcategories of mood states (tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia, confusion-bewilderment, total mood disturbance score), among the three groups also showed no statistical difference across the groups or within the groups from the beginning to the end of the program using One-

way repeated measures MANOVA $f_{(12,94)=}0.99$, p=0.46 (p>0.05). Pillai's trace was selected to measure within subjects' effect and found no significance. Pillai's trace was chosen because the data met all the assumptions except univariate normality, and the data were not transformed. Figure 6 compares the raw means (pre and post) of each subcategory among the three groups and the total mean, yet there is no statistical difference in these groups.

In comparing total walking distance in feet for question three (Figure 7), a 1-way ANOVA test showed a statistically significant difference in total walking distance between DW and HW groups $f_{(1,33)=}7.75$, p=0.01, with a smaller effect size of $Eta^2=0.19$. The human walking group averaged significantly less mean accumulated walking feet (M=50,863.35, SD=41,859.38), while the dog walking group averaged (M=112,429.12, SD=89,796.47).

In comparing total walking time in minutes for question four (Figure 7), a 1-way ANOVA test showed a statistically significant difference in total walking time between DW and HW groups $f_{(1,33)=}17.172$, p=0.000, with a moderate effect size of $Eta^2=0.342$. The human walking group averaged significantly less mean accumulated walking minutes (M=742.87, SD=452.21), while the dog walking group averaged (M=1,480.69, SD=583.94).

The bonding relationship was analyzed both within and between groups. The four subcategories of bonding (unconditional acceptance, attachment, reciprocity, and total bonding) were compared between HW and DW. A one-way MANOVA multivariate analysis of variance was run to determine the effect of unconditional acceptance, attachment, reciprocity, and total bonding on the bonding scale scores on the bonding scale instrument (Figure 8). Figure 9 depicts the outcomes of the estimated marginal means, with confidence intervals for both walking groups. However, it is essential to note that using one-way MANOVA on the combined dependent variables, demonstrated to be not statistically significant, $f_{(3,31)} = 1.65$, $p = .20$;

Pillar's Trace=0.14; partial η^2 = .14. A test of between-subject effects found that among the four subsets and walking groups, reciprocity was statistically significant F(1,33)=4.58, p=.04, p<0.05, partial η^2 = .12. However, caution should be taken in this assumption of significance because the overall analysis using MANOVA did not find overall significance.

Results from Aim two. Aim two examines the experiences of the older adult in the dog walking experience expressed in their own words. Question one of Aim two examined the dog/human companion's experiences in the program, with the dog walking and human walking groups, as expressed by each participant. Tables 11 and 12 outlines the outcomes from the coding.

The initial level of coding discovered the beliefs, values, and attitudes that the participants had about their walking partner (Table 11). This coding resulted in three principal themes: (1) they expressed that they enjoyed the social aspects of being around the people/dogs; (2) they felt that they were walking to help the dogs; and (3) there were a few statements that expressed negative experiences with their walking companion. Level two coding discovered three sub-categories from social aspects of being around their walking companion. These categories were: the enjoyed meeting new people/dogs and the companionship that this relationship brought (HW=16, DW=21); they enjoyed being around the program workers (HW=8, DW=3), and enjoyed learning more about others (dogs/people) in the program (HW=2, DW=3). In the second main code from Level 1 Coding, walking to help the dogs discovered two sub-categories. The first sub-category is the participants who walked because they felt the need to help the dogs get their needed exercise (DW=3), and they walked to help the dogs get out of their cages (DW=3).

Many statements made by the participants were positive sentiments. However, a few negative comments were discovered from Level one coding that the participants expressed regarding their companions. Level two coding found three sub-categories. These categories were: the participants expressed concerns about falling (DW=4), feeling discouraged because their walking partner did not want to walk (DW=2), and having an inconsistent walking partner (HW=1, DW=2).

Question two of Aim two examined the participants' overall program experiences in the DW and HW expressed (Table 12). Level one coding discovered six main themes from this question. These themes were the participants felt that: (1) the program gave them the motivation to walk; (2) that walking was beneficial; the program created a desire for consistency; (3) the program helped with self-efficacy for exercise; they expressed the best part(s) of the program; and (4) they expressed the worst part(s) of the program.

Level two coding discovered sub-themes that were consistently positive. Motivation to walk created two subcategories, the participants felt the program encouraged them to be more active/created a realization for the need to be active (HW=31, DW=2), and that the participants look forward to exercising (HW=6). The level one code that the participants felt that walking was beneficial created three sub-categories in Level two coding. These sub-categories were that the participants: overall enjoyed the program (HW=7, DW=5); felt overall better/healthier from participating in the program (HW=10, DW=2), and that participating in the program helped with a specific health condition (HW=5, DW=2). The primary code that the program created a desire for consistency with the participants created two sub-categories in the Level two coding. These sub-themes were that the participants liked the routine/schedule of walking (HW=7, DW=2), and they liked how the walking program was run and enjoyed the structure and organization of the

program (HW=3, DW=3). Self-efficacy for exercise was another primary theme from Level one coding that resulted in two sub-theme in Level two coding. These sub-themes were that the participants felt that walking gave them confidence in their abilities in other areas of their life (HW=2, DW=1) and that participating in the program allows them to now walk longer or better (HW=2, DW=5). The last positive theme from level one coding, the participants expressed as the best part of the program, resulting in four sub-themes in Level two coding. These sub-themes were that they enjoyed: being outdoors/greenspace(HW=5), the free t-shirts and shoes that the program gave them (HW=5); the overall exercise (HW=3, DW=1); representing their institution/felt like they were contributing to something overall (DW=5).

Again, most of the statements that the participants expressed about the program were positive. The participants were asked to describe the worst part of the program, which created three sub-themes under level two coding. These sub-themes were that the participants expressed that they did not like dealing with hot/inclement/bad weather (HW=4, DW=4); the timing of the walk/having to wake early (HW=5, DW=3); when they did not feel like walking/dealing with health issues that prevent them from participating (HW=6, DW=2).

Serendipitous outcomes from the DW group study were that the participants were found to socialize with each other in the facility and were very encouraging of each other in their walking and fitness progress (Johnson et al., 2008). Additionally, this group moved their walking times to earlier in the day during hotter weather by leaving their facilities earlier and asking their chef to provide muffins and juice for them to eat on the way to the dog shelter (Johnson et al., 2008).

Conversely, the human-companion group was discouraged from walking from other residents not participating in the program. For example, some were told, "you are too old to be out there walking," and "you people (study staff) have no business trying to get old people to

walk" (Johnson et al., 2008, p. 18). Participants in the human-walking group were heard to discourage each other from walking. Some examples are, "it's hot today, let's not walk very far," or "I'm busy this morning, let's not walk so far" (Johnson et al., 2008, p.19).

Even though stringent measures were in place to ensure participant safety while walking, there were three fall incidents. One participant in the dog-walking group, who used a walker, fell when the dog leash became entangled in her walker (Johnson et al., 2008). On two other occasions, one participant in the HW group fell after re-entering his facility from the walk. Fortunately, neither participant was injured and continued in the program.

Discussion

Other studies have demonstrated that people who dog walk are more likely to meet the CDC guidelines for physical activity level than those who do not dog walk (Harris et al., 2009; Jeffries et al., 2014; Thorpe et al., 2006). The present study demonstrated that dog walkers walked more in mean accumulated walking feet (M=112,429.12, SD=89796.47) than the human walking group (M=50,863.53, SD=41859.38), ($p<0.05$). Additionally, we found that dog walkers walked more in mean accumulated walking minutes (M=1480.69, SD=583.94), while the human walking group averaged (M=742.87, SD=452.21). These findings are congruent with other studies that found that dog walkers walked more than non-dog walkers (Abate, 2011; Feng et al., 2014; Herbert & Greene, 2001).

In this study, it is interesting that some of the prevalent themes that came from the DW and HW were the bond or joy they experienced from being around their walking companions. One DW participant expressed how they enjoyed the mere aspect of just walking and being with the dog, “[I participate] so that I could get exercise with a dog.” Additionally, many participants in the HW and DW groups expressed their joy in the companionship of being around other

people, both their walking companions and others in the program. One participant in the DW group said that "it's nice to have something in common with the others who walked the dogs." These findings of dog walking promoting interactions with other humans, assisting in creating a positive impact in the sense of belongingness (Antonacopoulos & Pychyl, 2014; Calise et al., 2018; J. Campbell et al., 2017; K. Campbell et al., 2016; Schneider et al., 2015; Toohey et al., 2013).

It is interesting to note that, the participants in the DW group expressed the social aspect of being around the dogs is a common thread that encourages these participants to continue walking in the program. This unusual bond between the participants and their shelter dog, that is not their own pet, demonstrates that one does not need to own the dog, to receive the benefits of dog walking (Johnson & Meadows, 2010). The findings from this study reinforce an earlier study with loaner dogs and public housing, that found that the participants in the program benefited from the walking the dog, without the responsibility of caring for a dog (Johnson &Meadows, 2010). This is helpful for those that may not be able to physical manage care of the dog, or deal with the financial burden that owning a dog requires.

In an analysis of expression of why participants in the DW group engaged in walking, they stated that they walked to help the dogs, not only because they feel that the dogs need the exercise, but because they enjoyed being around the dogs, "[I] liked the happy dogs, but they all needed to get walked and loved." Additionally, the participants felt that walking the dogs helped get the dogs out of their cages, "[I participated for] my exercise but mainly getting the dog out of his cage." This coincides with another study that showed that dog walking provided an added incentive for exercise because of the perception of the animals' need for activity (Curl et al., 2017).

In examining the participants' expressed experiences of the program overall, many in the DW and HW group cited the program itself, added motivation to walk, and perceived the walking as beneficial. One participant in the HW group stated, “It [the program] made me get up and feel like I wanted to do something.” Another DW participant noted that the program made them “aware of how important regular walking is.” Our findings correspond with Richards's (2016) results that dog walking habits can create a purposeful activity that the older adult makes a habit. Additionally, the participants in our program perceived that walking was beneficial to them. Perhaps it is the routine and desire for consistency that causes the older adults to remain active. In our study, DW and HW participants expressed the benefit of “getting up early” and “routine of the walk.” This is also reflected that dog walking creates routine and purposeful activity can aid in the repetition of that activity (Toups et al., 2017).

Bandura (1997) defines self-efficacy as confidence that someone can exert control over their behavior. An example of self-efficacy in this study is self-efficacy for walking. Many of our participants in the DW and HW groups noted that the program gave them confidence. One HW participant remarked “I found out I can walk pretty well after I walked a while.” A DW participant stated, “It’s easier to walk than before.” This factor of self-efficacy helps to explain the determinants that mediate the aspects of why people chose to dog walk (K. Campbell et al., 2016; Richards, 2015, 2016; Richards et al., 2013, 2017).

Limitations

Because this study is secondary data analysis, some limitations are in place that would not be present in a prospective study. The opportunity to follow up with participants regarding their feedback in the qualitative portion of the study to verify and triangulate their statements was not available. Still, measures were made to incorporate reliability by using multiple

investigators in the coding process. Additionally, the sample demographics were relatively homogenous: primarily female, Caucasian, and widowed, which might bring to light what the outcomes would be with a different demographic population.

Areas for further research

Further investigation on the outcomes of dog walking for older people is warranted. The act of holding the dog on a leash creates a varying tension for the older adult and may have inadvertently given the older adult gains in upper body strength. Further studies examining this effect would be needed for follow-through. Although our study did not find significance between the groups in intent to walk, mood states, and bonding, there was qualitative evidence suggesting that the dog walking program did improve self-efficacy, improve overall outlook, and provide social interaction companionship. Further studies exploring these concepts would be needed to expand on these areas of outcomes on dog walking and older adults. Shelter dog walking may also be beneficial for older adults because of the opportunity for altruism, time spent outdoors, and the social aspect of interacting with the dogs and co-walkers.

Conclusions

This study has addressed the many benefits of engaging in a more active lifestyle for adults over 65. Dog walking and the older adult points positively towards encouraging, the older adult to engage in exercise that promotes a healthier lifestyle. By embracing and encouraging these healthy behaviors, the older adult can actively engage the idea of "aging in place."

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Tables/Figures

Table 3

Measurements Taken in the Primary Study

Measurement	Time of Data			
	Baseline	Daily/weekly	Mid-Point	Exit
Demographic Questionnaire	H,D,C			
Self-Rated Health Questionnaire	H,D,C			
Physical Activity & Stage of Change (PASOC)	H,D,C		H,D,C	H,D,C
Social Provisions Scale	H,D,C			H,D,C
Pet Attitude Inventory	H,D,C			
Daily Data Collection Tool (dog & human)		H,D		
Bodyweight/height	H,D,C	H,D	H,D,C	H,D,C
6-Minute Walk	H,D,C		H,D,C	H,D,C
7-day PAR	H,D,C		H,D,C	H,D,C
CSAWPBS/HBS				H,D
Exit Satisfaction Questionnaire				H,D

Note: H=Human Walking group, D=Dog Walking group, C=Control group

Baseline=before initiating 12-week program; Mid-Point=Midpoint of study around week 6; Post=after completion 12-week program; Daily/Weekly=Daily/weekly data collection

Using the original study's research design, "Walk A Hound and Lose a Pound and Stay Fit for Older Adults" by R. Johnson (2008).

Table 4

Physical Activity and Stage of Change (PASOC)

Participants were asked the circle the number of the ONE sentence that is most like them

	Statement
1	I don't do regular vigorous or moderate exercise now, and I don't intend to start in the next 6 months
2	I don't do regular vigorous or moderate exercise now, but I have been thinking of starting in the next 6 months.
3	I'm trying to start doing vigorous or moderate exercise, but I don't do it regularly.
4	I'm doing vigorous exercise less than 3 times per week or moderate exercise less than 5 times per week
5	I've been doing 30 minutes a day of moderate exercise 5 or more days per week for the last 1-5 months.
6	I've been doing 30 minutes a day of moderate exercise 5 or more days per week for the last 6 months or more.
7	I've been doing vigorous exercises 3 or more days per week for the last 1-5 months.
8	I've been doing vigorous exercise 3 or more days per week for the last 6 months or more.

Note-Using the research design from the original study, "Walk A Hound and Lose a Pound and Stay Fit for Older Adults " by R. Johnson (2008).

Table 5

Profile of Mood States (POMS)

Participants were asked to rate the feeling from 0-4 to best describe how they have been feeling during the past week, including today.

(0=Not at all; 1=A little; 2=Moderately; 3=Quite a bit; 4=Extremely)

	Mood		Mood		Mood		Mood
1	Friendly	**18**	Blue	**35**	Lonely	**52**	Deceived
2	Tense	**19**	Energetic	**36**	Miserable	**53**	Furious
3	Angry	**20**	Panicky	**37**	Muddled	**54**	Efficient
4	Worn out	**21**	Hopeless	**38**	Cheerful	**55**	Trusting
5	Unhappy	**22**	Relaxed	**39**	Bitter	**56**	Full of pep
6	Clear-headed	**23**	Unworthy	**40**	Exhausted	**57**	Bad-tempered
7	Lively	**24**	Spiteful	**41**	Anxious	**58**	Worthless
8	Confused	**25**	Sympathetic	**42**	Ready to fight	**59**	Forgetful
9	Sorry for things done	**26**	Uneasy	**43**	Good-natured	**60**	Carefree
10	Shaky	**27**	Restless	**44**	Gloomy	**61**	Terrified
11	Listless	**28**	Unable to concentrate	**45**	Desperate	**62**	Guilty
12	Peeved	**29**	Fatigued	**46**	Sluggish	**63**	Vigorous
13	Considerate	**30**	Helpful	**47**	Rebellious	**64**	Uncertain about things
14	Sad	**31**	Annoyed	**48**	Helpless	**65**	Bushed
15	Active	**32**	Discouraged	**49**	Weary		
16	On edge	**33**	Resentful	**50**	Bewildered		
17	Grouchy	**34**	Nervous	**51**	Alert		

Note-Using the research design from the original study, "Walk A Hound and Lose a Pound and Stay Fit for Older Adults," by R. Johnson (2008).

Table 6

Center for the Study of Animal Wellness Pet Bonding Scale (CSAWPBS) For the Dog/Human Companion

Participants were asked to make an "X" in the column that best shows your views about each statement

	Statement	More Often False **1**	**2**	**3**	**4**	More Often True 5
1	The dog companion likes me.					
2	I talk to the dog companion.					
3	I confide in the dog companion.					
4	The dog companion understands what I say.					
5	The dog companion knows when I feel bad.					
6	The dog companion is always glad to see me.					
7	The dog companion prefers me to others.					
8	The dog companion has become my friend.					
9	I look forward to getting up in the morning on days when I will see the dog companion.					
10	I tell others about the dog companion.					
11	The dog companion knows when I feel happy					
12	I would like to have the dog companion come to my home.					
13	I will remember the dog companion after my program.					
14	The dog companion makes walking easier.					
15	The dog companion tries to comfort me.					
16	The dog companion makes me feel better.					
17	The dog companion is boring.					
18	I feel attached to the dog companion.					
19	The dog companion gives me energy.					
20	I miss the dog companion between visits.					
21	The dog companion doesn't judge me.					
22	I look forward to the dog companion.					
23	The dog companion makes me feel happy.					
24	The dog companion accepts me just the way I am.					
25	I make the dog companion feel better.					
26	I make the dog companion feel happy.					
27	The dog companion takes my mind off my troubles.					
28	The dog companion helps me feel secure.					

Note-Using the research design from the original study, "Walk A Hound and Lose a Pound and Stay Fit for Older Adults," by R. Johnson (2008).

Table 7

Open-ended questioning Regarding Companion/Program

Participants were asked to answer the questions in their own words.

Question	Question Content
1	Please tell me about your experiences with the dog walking & exercise program
2	What is the best part of the program?
3	What is the worst part of the program?
4	In what way has the program affected you?
5	Would you recommend a program like this to someone else?
6	Why or why not?
7	Could you say a little more about the program?

Note- Qualitative interview questions used in the qualitative portion of the study.

Table 8

Summary of Completed Assessments Used in Secondary Analysis Study

Assessment	Dog Walking Group (D.W.)			Human Walking Group (H.W.)			Control Group (C)		
	Pre	***Post***	***Acc.***	***Pre***	***Post***	***Acc.***	***Pre***	***Post***	***Acc.***
Total Walking Distance (feet)			X			X			
Total Walking Time (minutes)			X			X			
PASOC (intent to exercise)	X	X		X	X		X	X	
POMS (mood state)	X	X		X	X		X	X	
CSAWPBS (dog bonding)		X			X				
Interview Questions		X			X				

Note: Pre=At beginning of study; Post=At completion of study; Acc.=Accumulation of measurement during entire length of study

Table 9

Estimated Marginal Means Table, With Confidence Intervals on Subsets of Bonding Between HW and DW

Subset of Bonding	Estimate	SE	95% CI	
			LL	UL
HW Unconditional/acceptance	17.20	.50	16.20	18.21
DW Unconditional/acceptance	15.67	.69	14.27	17.06
HW Attachment	48.68	1.77	45.09	52.28
DW Attachment	43.57	2.45	38.59	48.54
HW Reciprocity	40.27	1.37	37.46	43.07
DW Reciprocity	35.25	1.90	31.38	39.12
HW Total Bond	106.16	3.38	99.28	113.03
DW Total Bond	94.49	4.68	84.97	104.00

Table 10

Demographic Information of Participants

Variable	Dog Walking Companion Participants N=12	Human Walking Companion Participants N=23	Control N=19
Age (years)	Range=74-84 Mean=82.0	Range=67-93 Mean=85.7	Range=75-92 Mean 85.16
Gender	Males=3 Females=9	Males=6 Females=17	Males=5 Females=14
Race	Caucasian=10 African American-1 Native American=1	Caucasian=23	Caucasian=16 Native American=3
Marital Status	Married=2 Widowed=9 Divorced=1	Married=10 Widowed=12 Never Married=1	Married=6 Widowed=11 Never Married=1
Education	No High School=1 High School Graduate=1 Some college=3 Bachelor's Degree=2 Graduate Work=5	No High School=2 High School Graduate=2 Some college=7 Bachelor's Degree=5 Graduate Work=7	High School Graduate=8 Some college=7 Bachelor's Degree=3 Graduate Work=1
Number of Children	Range=1-5 Mean=2 One child=1 One-Four children=10 Five-greater children=1	Range=0-6 Mean=2 No children=4 One-Four children=20 Six children=1	Range=0-6 Mean=2 No children=3 One-Four children=14 Six children=2
Dog ownership	Pet owners=3 Non-pet owners=9	Pet owners=2 Non-pet owners=21	Pet owners=2 Non-pet owners=17

Table 11

Summary of Aim 2, Question1: Older Adult Self-expressed experience with human/dog companion in the program

First Coding Theme	Second Coding Sub-theme (pattern)	Example quote	
		Human Walking Participant	**Dog Walking Participant**
I enjoy the social aspects of being around people/dogs	I enjoyed meeting new people/dogs and the companionship they brought	"I enjoy visiting with other walkers and making new friends"	"I liked being introduced to different dogs."
	I enjoyed being around the program workers	"I really love it and the whole staff that were always there to help us."	"I like the dogs and the staff very much"
	I enjoyed learning more about others (dogs/people) in the program	"I now have a better attitude about some of the residents here at the Terrace and of course I like the regular exercise."	"This program helped me to come and change my thinking about dogs"
I walk to help the dogs	I walk because I help the dogs get their needed exercise	Not applicable	"I liked the happy dogs, but they all need to get walked and loved."
	I walk to help the dogs get out of their cages	Not applicable	"I enjoyed my exercise but mainly getting the dog out of his cage."

First Coding Theme	Second Coding Sub-theme (pattern)	Example quote	
		Human Walking Participant	Dog Walking Participant
Expressed negative experiences regarding the companion	I have concerns about falling.	No statements made	"Most dogs did not walk well with a walker."
	My companion did not want to walk	No statements made	"I didn't like it when the dog refused to walk"
	I had an inconsistent walking partner	"I didn't find a regular person to walk with"	"I didn't like having a different dog everyday as you could not get adapted to your dog"

Table 12

Summary of Aim 2, Question 2: Older Adult Self-expressed overall program experiences in the human/dog walking groups

First Coding Theme	Second Coding Sub-theme (pattern)	Example quote	
		Human Walking Participant	**Dog Walking Participant**
The program gave me motivation to walk	The program encouraged me to be more active/created a realization for the need to be active	"It has reassured me that the activities of the program must be done consistently-not on again-off again"	"It has made me very aware of how important regular walking is"
	I look forward to exercising	"I looked forward to days we walked, disappointed if we had a rainy day."	No statements made
I feel that the walking was beneficial	I enjoyed the program overall	"I just had a good experience"	"I think it was a good experience in many ways."
	I felt better/healthier overall from participating in the program	Not applicable	"I enjoyed my exercise but mainly getting the dog out of his cage"
	It helped with my _____(specific) health condition	"Walking kept my blood pressure down"	"One year ago, I had a bone density test and the doctor put me on medicine. August of this year, I had another test, and all medicine has been removed for the bones"

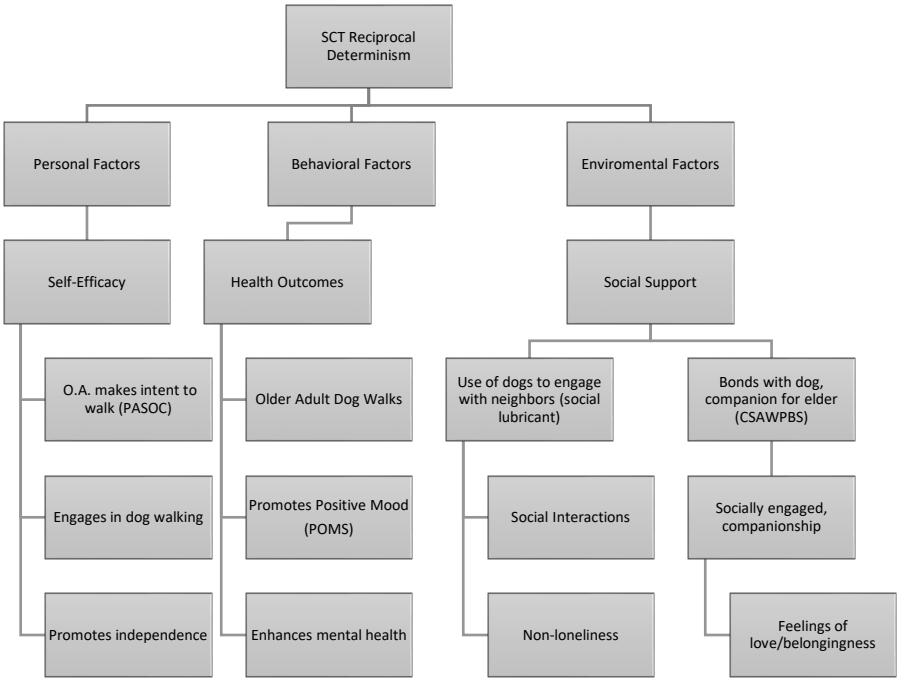
First Coding Theme	Second Coding Sub-theme (pattern)	Example quote	
		Human Walking Participant	**Dog Walking Participant**
The program created a desire for consistency	I like the routine and schedule of walking	"The routine of a morning away from my unit is good for me"	"I like the routine of getting up"
	I like how the program is run and enjoyed the structure and organization of the program	"I liked how the program was run"	"A good program that is well managed"
Self-efficacy for exercise	Walking gave me confidence in my abilities in other areas of my life	"It has given me the courage to do more outside activities, like shopping"	"I appreciate the confidence that walking has given me"
	Participating in the program allows me to now walk longer/better	"I walk more often"	"It is easier to walk than before"
Expressed best part of the program	I enjoy being outside/greenspace	"I enjoy the fresh air and seeing other people"	No statements made
	I like the free t-shirts and shoes that the program gave me	"The best part was the shoes and t-shirt I received"	"Getting a cute, good dog, getting new shoes"
	The best part was the exercise	"good exercise"	"I feel the exercise was helpful"
	I like representing my institution/I feel like I am contributing to something	No statements made	"It was satisfying. It fills a need to be helpful"

First Coding Theme	Second Coding Sub-theme (pattern)	Example quote	
		Human Walking Participant	**Dog Walking Participant**
Expressed worst part of the program	I didn't like the hot/inclement/bad weather	"I didn't like the rain and inclement weather—we had to walk in the hall instead"	"It was too hot. Better in the Spring or Fall"
	I didn't like the timing of the walk/having to wake early	"I didn't like getting up earlier than usual"	"The program is too early in the morning"
	I didn't like walking when I didn't feel like walking/health issues won't allow me to walk	"I didn't like walking sometimes when I didn't feel quite up to it"	"I didn't like walking when I'm tired or hurting"

Figures

Figure 2

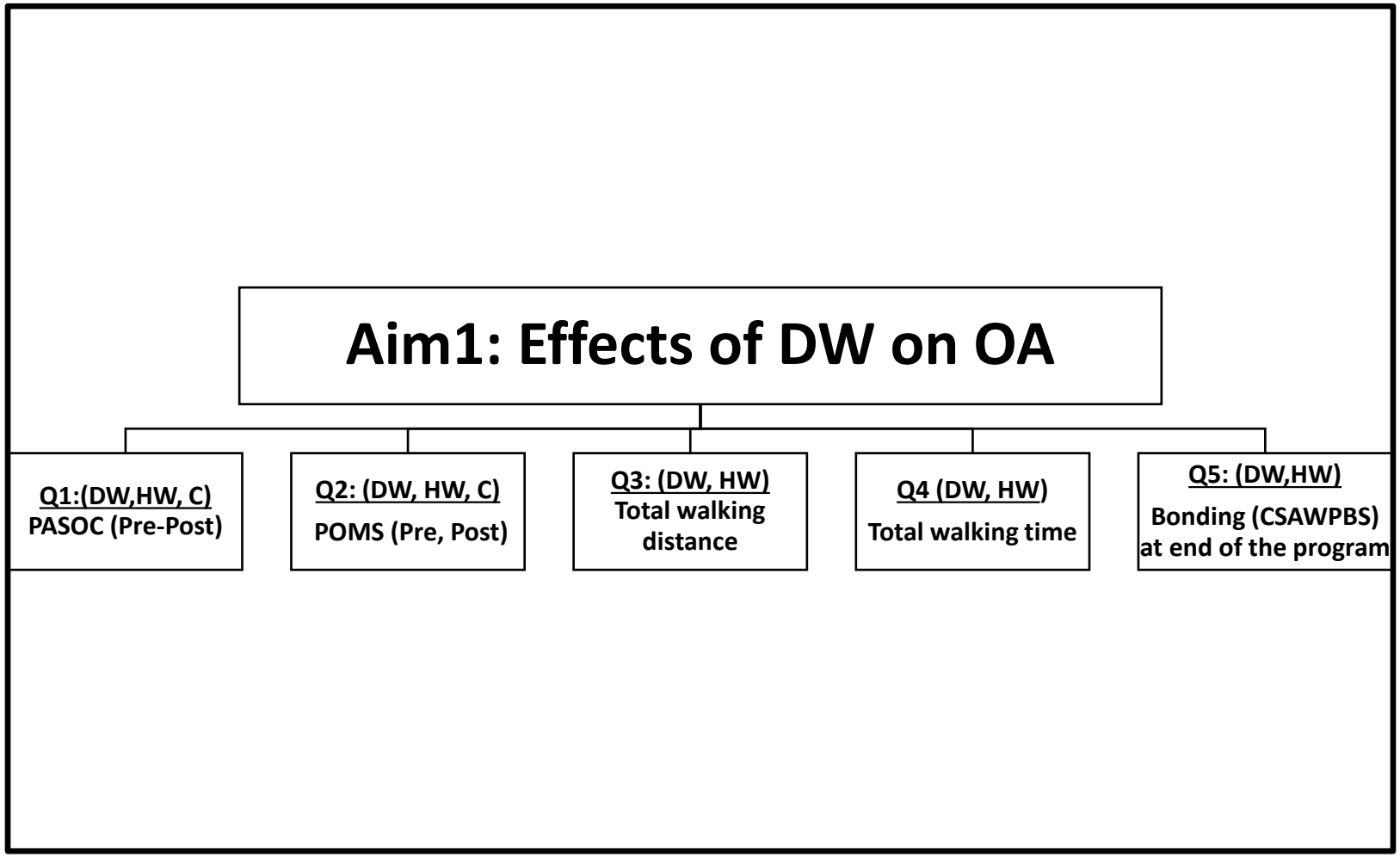
Dog walking as an incentive for older adults to exercise and SCT with Reciprocal Determinism



Note- Using Bandura's Social Cognitive Theory to introduce personal, behavioral, and environmental factors to promote self-efficacy, positive health outcomes, and social support Adapted from "Self-Efficacy: The Exercise of Self-Control," by A. Bandura, 1997, W. H. Freeman. (permission in process)

Figure 3

Design plan



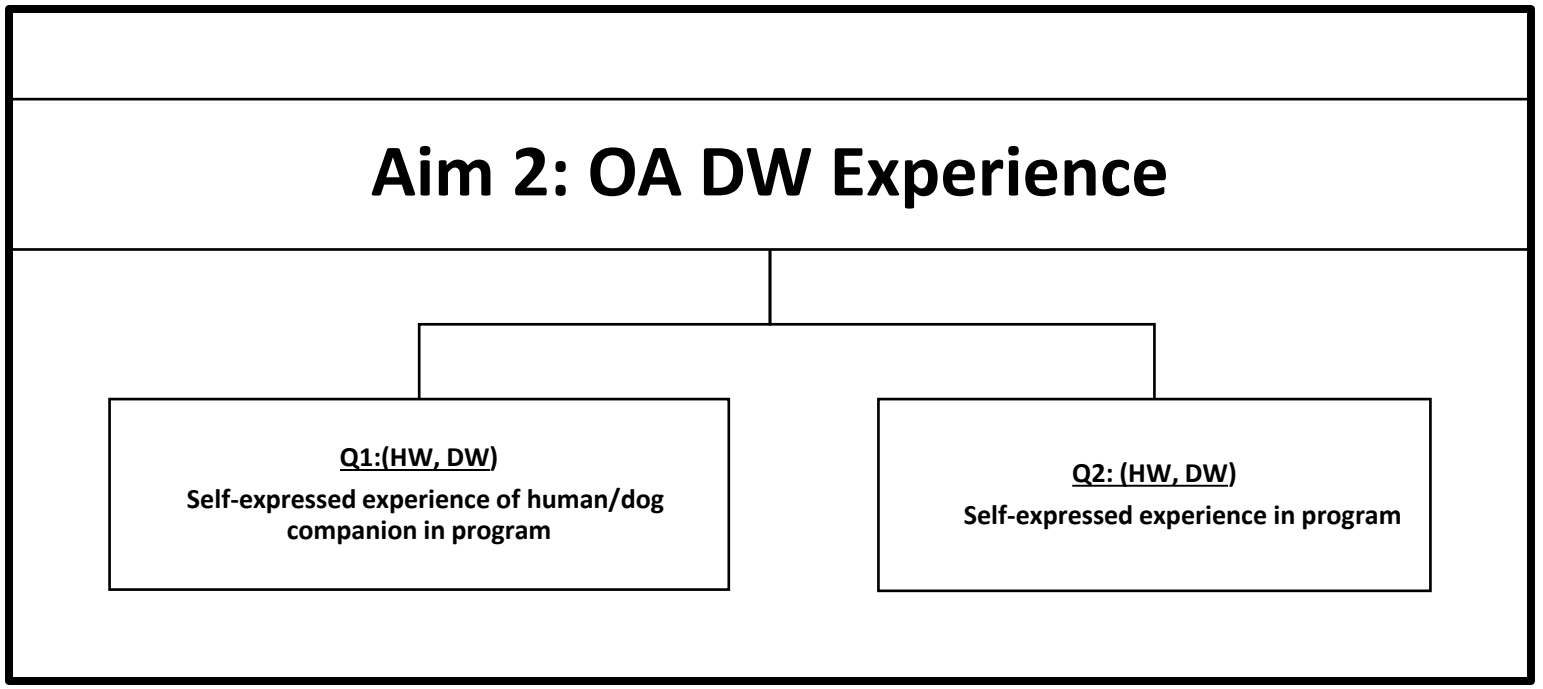
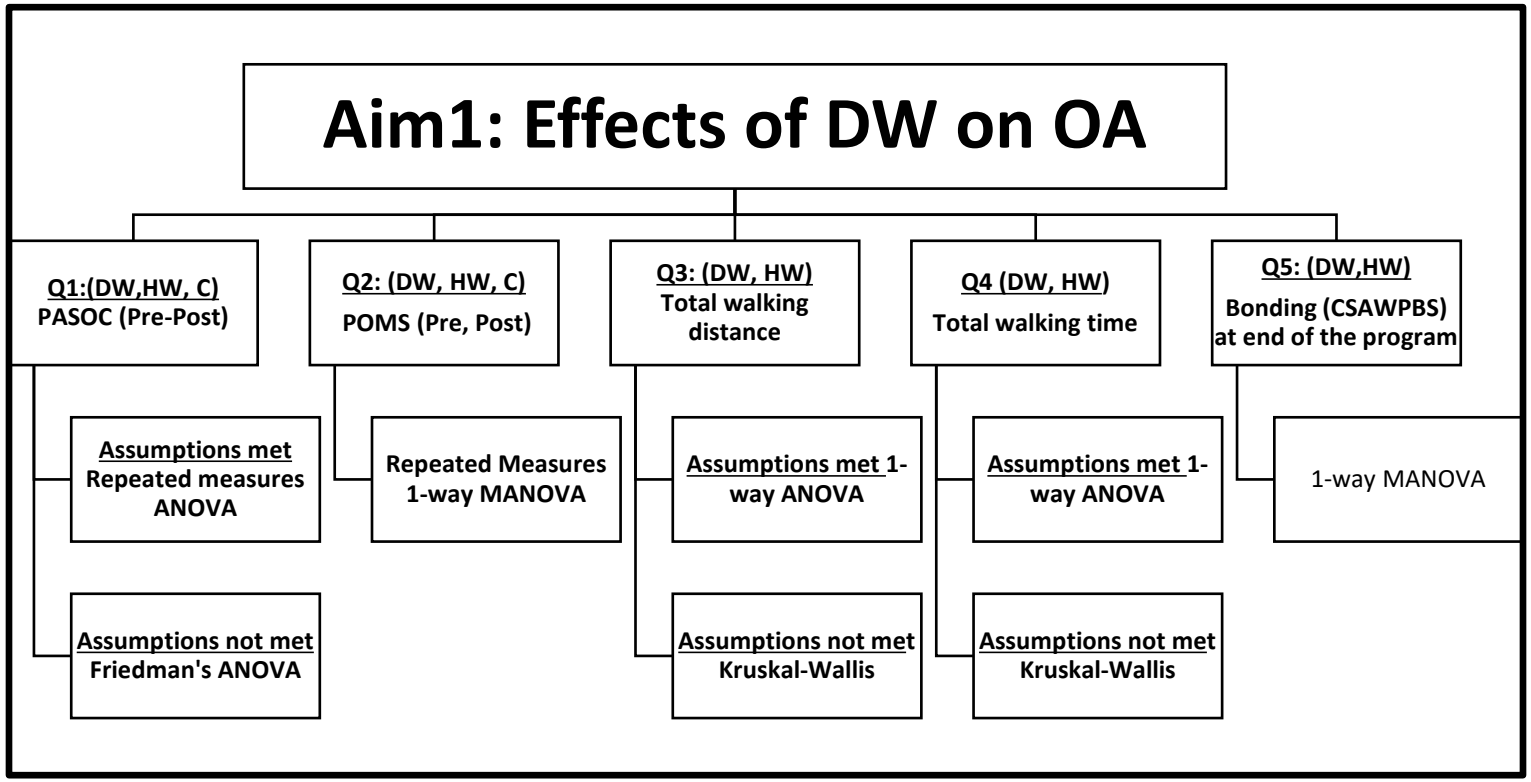

Aim 2: OA DW Experience
Q1:(HW, DW)
Self-expressed experience of human/dog companion in program
Q2: (HW, DW)
Self-expressed experience in program

Figure 4

Analysis plan for secondary analysis



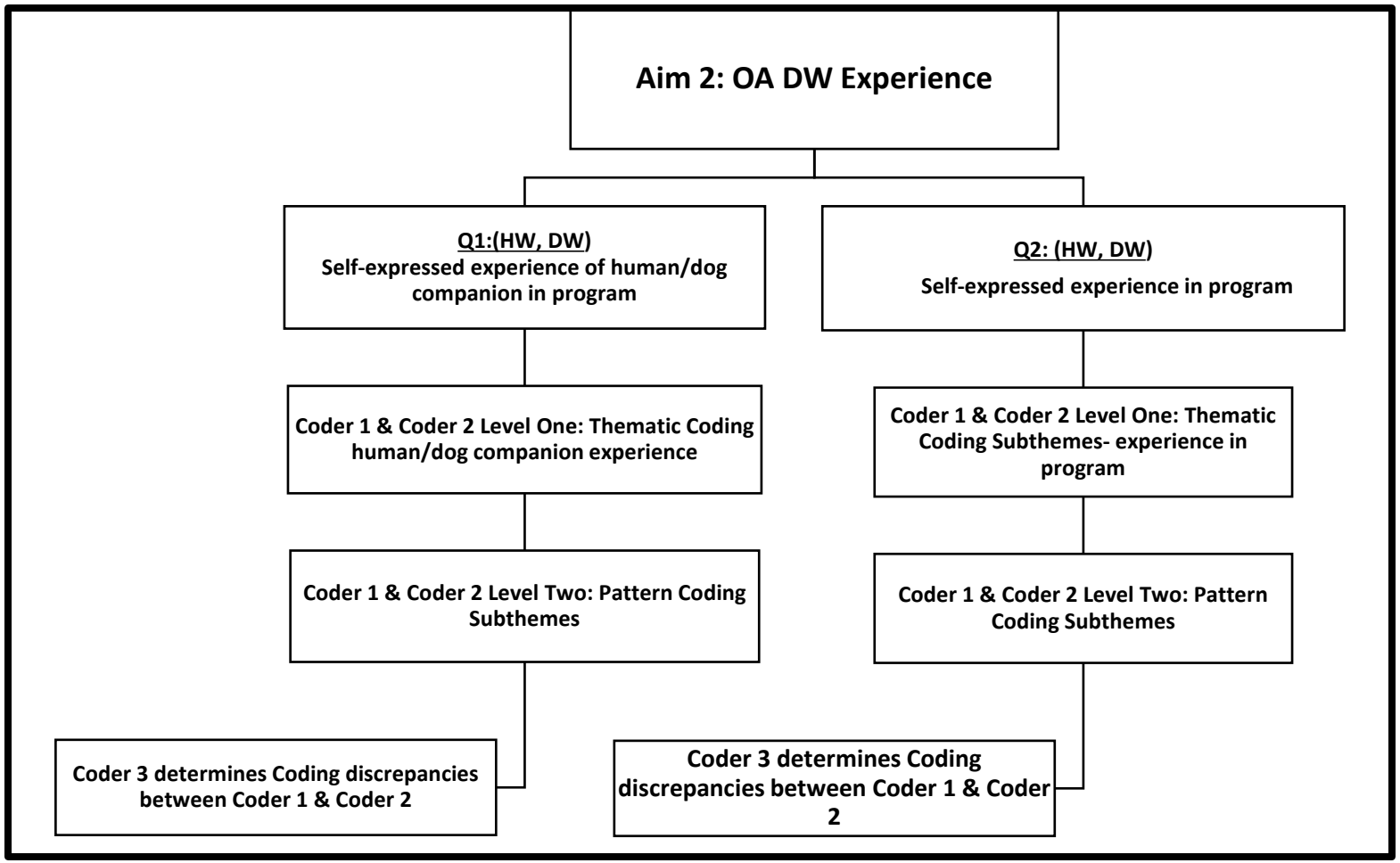
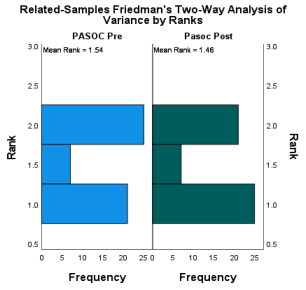

Aim 2: OA DW Experience
Q1:(HW, DW)
Self-expressed experience of human/dog companion in program
Q2: (HW, DW)
Self-expressed experience in program
Coder 1 & Coder 2 Level One: Thematic Coding human/dog companion experience
Coder 1 & Coder 2 Level One: Thematic Coding Subthemes- experience in program
Coder 1 & Coder 2 Level Two: Pattern Coding Subthemes
Coder 1 & Coder 2 Level Two: Pattern Coding Subthemes
Coder 3 determines Coding discrepancies between Coder 1 & Coder 2
Coder 3 determines Coding discrepancies between Coder 1 & Coder 2

Figure 5

Output from Physical Activity and Stage of Change (PASOC)

A



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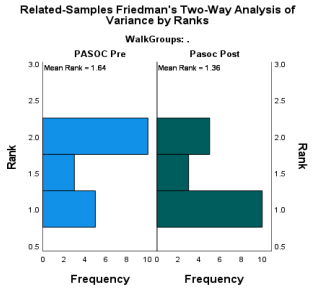

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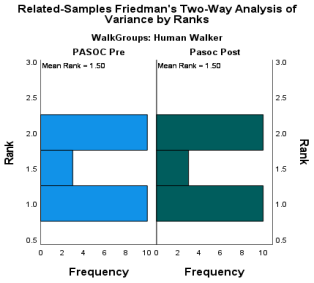

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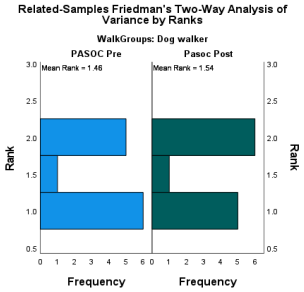
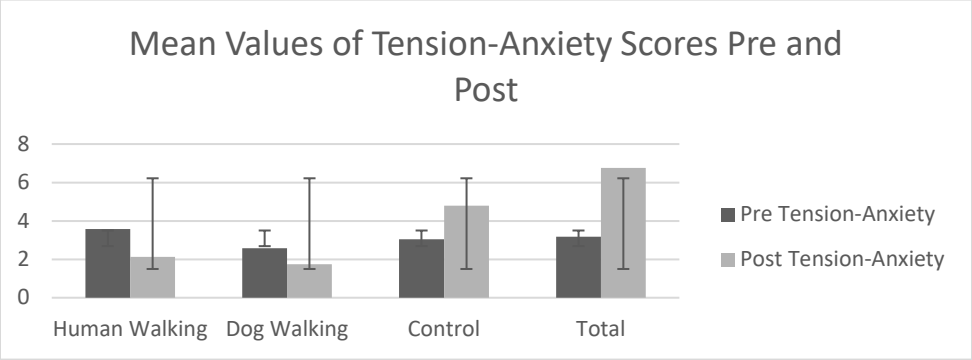


Note: Based on Friedman's ANOVA $\chi^2(1)=0.348$, $p=0.555$. Panel A: Mean Rank of between groups Pre and Post PASOC. Panel B: Mean Rank within Control groups Pre and Post PASOC. Panel C: Mean Rank with Human Walking group Pre and Post PASOC. Panel D: Mean Rank with Dog Walking group Pre and Post PASOC

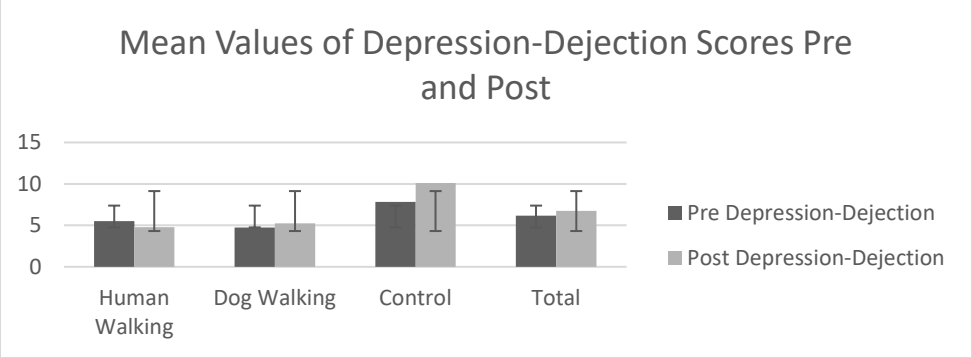
Figure 6

Output from Seven Profile of Mood States (POMS) Subscores

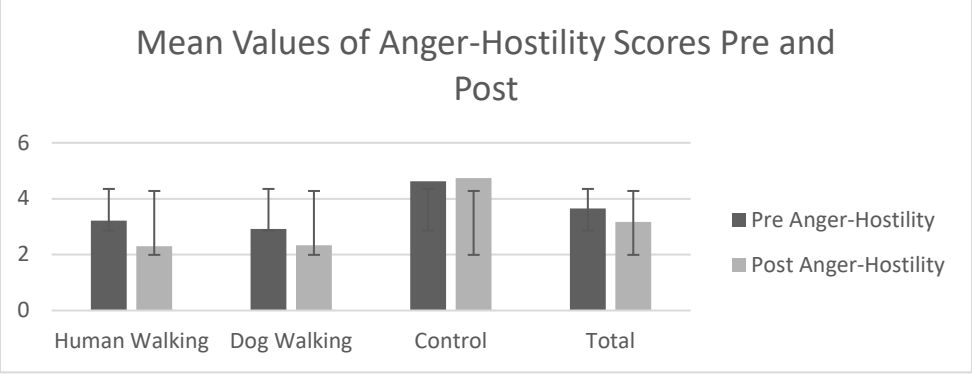
A



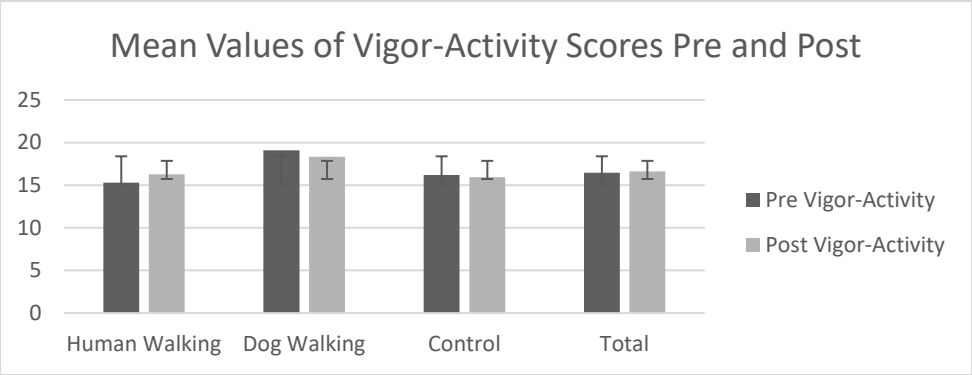
B



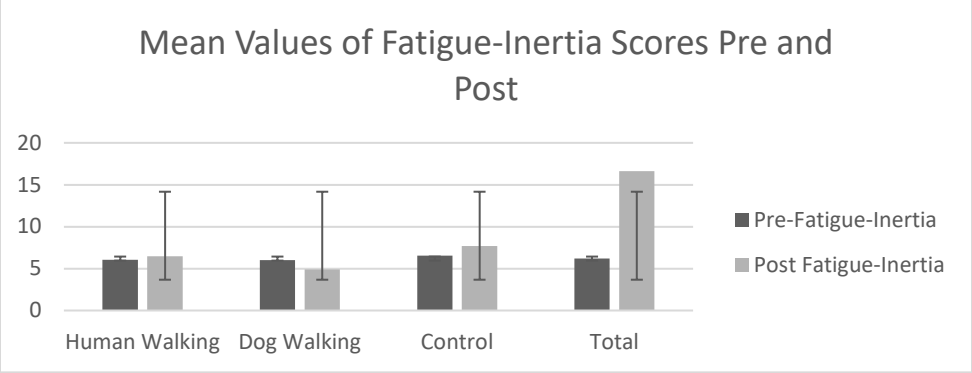
C



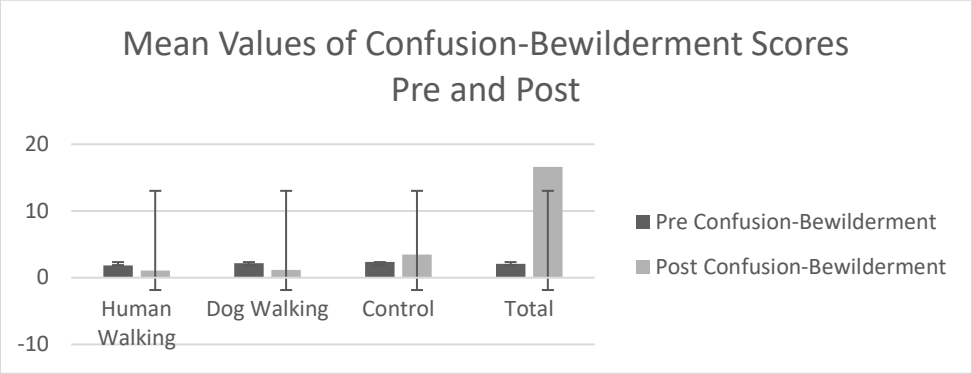
D


Mean Values of Vigor-Activity Scores Pre and Post
25
20
15
10
5
0
Human Walking
Dog Walking
Control
Total
Pre Vigor-Activity
Post Vigor-Activity

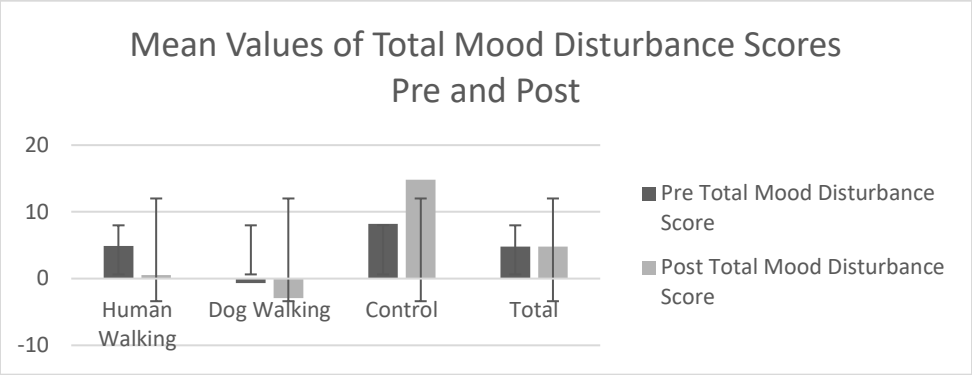
E


Mean Values of Fatigue-Inertia Scores Pre and Post
20
15
10
5
0
Human Walking
Dog Walking
Control
Total
Pre-Fatigue-Inertia
Post Fatigue-Inertia

F


Mean Values of Confusion-Bewilderment Scores Pre and Post
20
10
0
-10
Human Walking
Dog Walking
Control
Total
Pre Confusion-Bewilderment
Post Confusion-Bewilderment

G

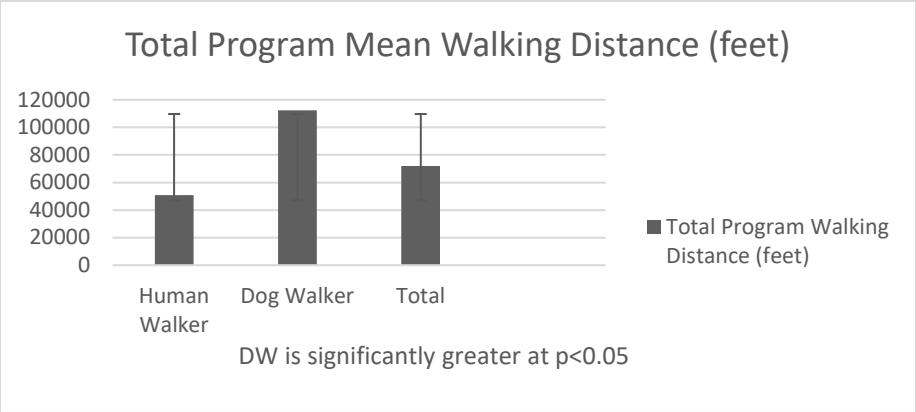


Note: Based on 1-way Repeated Measures MANOVA, F(12,94)=0.994, p=0.461. Panel A: Raw means of the subgroup of POMS Pre Tension-Anxiety and Post Tension-Anxiety in Human Walking group, Dog walking group, control, and the overall mean. Panel B: Raw means of the subgroup of POMS Pre Depression-Dejection and Post-Depression-Dejection in Human Walking group, Dog walking group, control, and the overall mean. Panel C: Raw means of the subgroup of POMS Pre Anger-Hostility and Post Anger-Hostility in Human Walking group, Dog walking group, control, and the overall mean. Panel D: Raw means of a subgroup of POMS Pre Vigor-Activity and Post Vigor-Activity in Human Walking group, Dog walking group, control, and the overall mean. Panel E: Raw means of a subgroup of POMS Pre Fatigue-Inertia and Post Fatigue-Inertia in Human Walking group, Dog walking group, control, and the overall mean. Panel F: Raw means of a subgroup of POMS Pre Confusion-Bewilderment and Post Confusion-Bewilderment in Human Walking group, Dog walking group, control, and the overall mean. Panel G: Raw means of the subgroup of POMS Pre Total Mood Disturbance Score and Post Total Mood Disturbance Score in Human Walking group, Dog walking group, control, and overall mean.

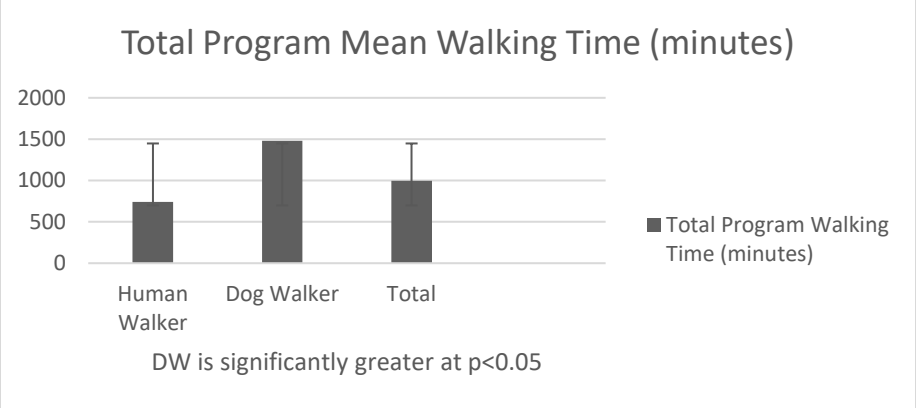
Figure 7

Output from Total Program Walking Distance (feet) and Total Program Walking Time (minutes)

A



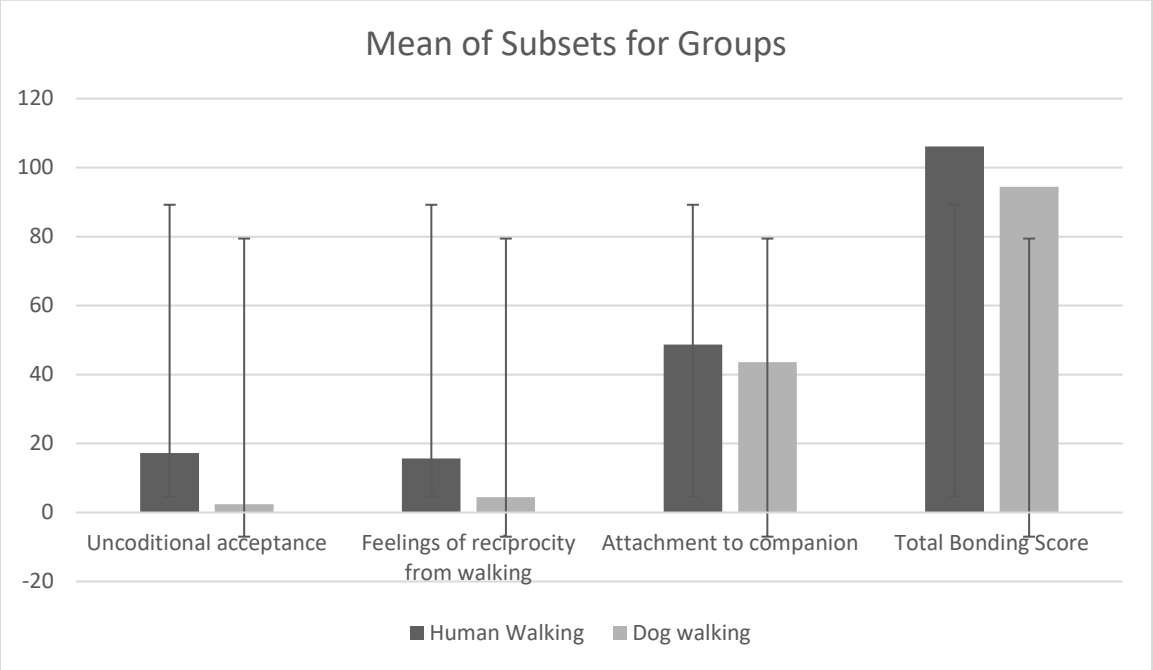
B



Note: Based on 1-way ANOVA, Total walking distance $F(1,33)=7.75$, $p=0.01$, $Eta^2=0.19$. Total walking time $F(1,33)=17.17$, $p=0.00$, $Eta^2=0.34$ Panel A: Raw means of total program walking distance (feet) between Human walking group, dog walking group, and overall total mean. Panel B: Raw means of total program walking time (minutes) between Human walking group, dog walking group, and overall total mean.

Figure 8

Output from The Center for the Study of Animal Wellness Pet/Companion Bonding Score (CSAWPBS) Subsets



Supplement 1

Information on Instrumentation Used in Original (Parent) Study

Demographic questionnaire

The demographic questionnaire was given to all three groups that contained information on age, race, marital status, educational level, number of children, pet ownership, and specific questions regarding pets. This questionnaire was collected at baseline (before week 1) in all three groups and takes approximately three to ten minutes to complete.

Health History

This was an investigator developed a self-rated questionnaire to rate their physical and mental health as they perceive it (Johnson et al., 2008). Additionally, participants were asked to list any health problems they have, the duration of the issue, and whether they are taking medication for this issue. Questionnaires were collected at baseline in all three groups. Completion of these questionnaires took approximately three to ten minutes to complete.

Seven-Day Physical Activity Recall (PAR)

This instrument collects the accumulated amount of physical activity (P.A.) that participants engage in over seven days (Johnson et al., 2008). This instrument asks the participant to recall their P.A. level over the past week and rate intensity level of activity from "moderate, hard, or very hard" (Sallis et al., 1985). Reliability coefficients range from 0.66-0.99 for a two-week test-retest (Sallis et al., 1985). The PAR data were gathered baseline (week 1), mid (week 6), and at the end (week 12) for all three groups and took the participants five to 15 minutes to complete.

Six-Minute Walk Test

The six-minute walk is a test that measures the total distance walked in six minutes. In this original study, the participants walked in their facility hallways with a staff member measuring their yardage using a yardage recording device that they pushed along with the participant (Johnson et al., 2008). During this test, participants were allowed to rest, slow down, or continue to walk as long as they could in six minutes (Johnson et al., 2008). This test was conducted at baseline (week 1), mid-way (week 6), and post-study (week 12) in all three groups.

Supplement 2

Information on how the Coding Training and Coding Method Took Place

The transcripts from the DW and HW group were typed up into one document by the original investigators. There were two initial coders involved in coding the output from these transcripts with a third independent coder that decided when the two original coders were not in agreement. The coders were all given the Specific Aims and Research Questions for this study, with information on Saldana's use of Value Coding for the first coding method and Pattern Coding for the second level (Saldana, 2016). The coders initiated an inductive approach to coding and read the transcripts using Saldana's method to determine the first level of Coding themes to use. Once these first themes were discussed and agreed upon with the coders, they then returned to the transcript to place the codes accordingly to either the perceptions about the walking companion in the program (Aim2, question1) or the perceptions about the walking program (Aim 2, question 2). With a follow-up discussion on classification and comprehension, this method of an inductive coding scheme has been used previously as a viable means of quality assurance of content analysis (Burla et al., 2008). The coders developed the primary codes, with definitions of the codes, discussed the codes to be used in this first round coding, and then returned to the transcripts to code the first code for Aim2. After completing the Level 1 coding, the coders were then instructed to take the Codes that were derived from Level 1 (Values Coding) and determine patterns in these codes that could be grouped into smaller themes or concepts. After finishing Level 2 coding, the coders returned and discussed these sub-themes found in the second level and returned to their transcriptions to complete the Level 2 coding process. When the two coders did not concur, a third coder was presented with the data to determine any discrepancies, and then the outcomes were compiled into one spreadsheet.

CHAPTER SIX

CONCLUSION

The ubiquity of inactivity is an ongoing problem today in our society (Carlson et al., 2018). The prevalence of lack of activity in adults ages 65 and above is even more significant than the occurrence in younger age categories (Carlson et al., 2018). Sedentary behaviors in older adults can contribute to worsening chronic physical and mental ailments, thus decreasing the individual's overall quality of life (National Institute on Aging, 2018). Walking is an easy option for the older adult to engage in. This activity can be done anywhere, is inexpensive, and relatively easy to do (Curl et al., 2017). Richards et al. (2016) state that older adults who own and walk dogs may be more likely to engage in purposeful physical activity. This may be a significant key to incite the older adult to become more active and gain the benefits of an active lifestyle.

The older adult needs to obtain a minimum of 150 minutes of vigorous activity per week to assist with their overall health (U.S. Department of Health and Human Services, 2018). There is evidence to support those older adults who engage in dog walking meet this guideline better than those who do not dog walk (Harris, Owen, Victor, Adams, & Cook, 2009; Jefferis et al., 2014; Thorpe et al., 2006). Dog walking may provide an additional incentive for the older adult to walk because of the perception that the dog needs the activity (Curl et al., 2017). The bond that occurs between the dog and the human may further encourage this motivation to walk (Brown & Rhodes, 2006; J. Campbell et al., 2017a; K. Campbell et al., 2016; Curl et al., 2017; Degeling et al., 2015; Degeling & Rock, 2012; Herbert & Greene, 2001; Hoerster et al., 2011; Janevic et al., 2019a; R. A. Johnson & Meadows, 2010; Knight & Edwards, 2008; C. M. Smith et al., 2017; Westgarth et al., 2017).

Like any other physical activity routine, dog walking may assist the older adult in many physiological benefits and better control of existing chronic diseases (Curl et al., 2017; Lentino et al., 2012; Motooka et al., 2006). Additionally, many studies state that dog walking helps the older adult by the social support and companionship that the dog provides for humans (Janevic et al., 2019a; Knight & Edwards, 2008; Peacock et al. One of the adjunctive benefits of dog walking is the dog acts as a "social lubricant" to encourage interaction between the owner another human (Akrow, 2015). For example, many studies state that people are more likely to approach someone who is walking a dog, which can assist the older adult in a feeling of community and belongingness (Antonacopoulos & Pychyl, 2014; Calise et al., 2018; J. Campbell et al., 2017a; K. Campbell et al., 2016; Schneider et al., 2015; Toohey et al., 2013).

From the examined literature, there are many advantages for older adults to engage in dog walking activities. Dog walking and the older adult encompasses many realms of physical, emotional, and social health and well-being.

Dissertation Overview and Findings

The purpose of this dissertation project was to assess dog walking with older adults in the examination of outcomes of dog walking, the literature that examines this activity, and the theoretical constructs involved in reviewing dog walking and older adults. As noted in chapter two, there is an extensive compendium of information on dog walking and the older adults that demonstrate its complexities that encompass various constructs and subjects. There is still so much to discover about this topic. Chapter three examined the dissection of two common mid-range theories on dog walking. This examination found that the Theory of Planned Behavior (Ajen, 1991) and the Social Cognitive Theory (Bandura, 1997) are two mid-range theories similar in their abilities to explain dog walking's various concepts correctly.

Chapter 4 is the research proposal that explored two primary research aims. The first question in Aim 1 compared the participants in all three groups (DW, HW, C) both at the beginning and end of the primary study on intent to exercise. All three groups took the Physical Activity and Stage of Change (PASOC) questionnaire, which measured the participant's readiness for physical activity. The second question in Aim 1 used the Profile of Mood State-short form (POMS) questionnaire to determine any relationships with positive or negative effects among the three groups. Question three of Aim 1 examined the difference in the cumulative walking distance in feet. While Question four examined the cumulative walking time in minutes among the DW and HW groups after the 12-week program. Question five of Aim1 examined the bonding between the shelter dog and the DW group and the bonding between the human companion in the HW group using the Center for the Study of Animal Wellness Pet Bonding Scale (CSAWPBS).

Question one of Aim 2 examined the DW and HW groups' self-expressed experiences that the DW group had with their dog companion and the HW group self-expressed experiences that the HW group had with their human companion. The last question of Aim 2 used open-ended questions given to the DW and HW group inquiring about their self-expressed experiences of participation in the program.

Approach

This study used secondary analysis of the "Walk A Hound, Lose a Pound and Stay Fit for Older Adults" longitudinal, three-group, non-randomized trial of a dog walking program community-dwelling older adults residing in three different retirement facilities in the mid-west (Johnson et al., 2008). This study took place over 12-weeks. The individuals were divided into three groups: one group walked with a human companion (HW), one group walked with a shelter

dog (DW), and one group did not walk (C). The DW and HW group meet five times a week and either walked outside of their assisted living facility with their human companion (HW) or were driven to a local shelter to walk with a shelter dog (DW). The original study obtained a wealth of data based on physical outcomes measurements and psychosocial measurements. The dissertation study examined the results from intent to walk (PASOC instrument), mood states (POMS instrument), total walking time and distance (minutes and feet), bonding with their walking companion (CSAWPBS instrument), and participants expressed experiences of their walking partner and overall walking experience based on the open-ended questionnaire.

Major Findings

The participants in the program ages ranged from 67-93 years, they were well-educated, averaged two children, and the majority did not currently own a pet (Johnson, 2008).

Results from Aim One

In question one, a comparison between intent to walk (PASOC) in the three groups showed no statistical difference between and within the groups from the beginning to complete the program through Friedman's ANOVA $\chi^2(1)=0.35$, $p=0.56$. In question two, a comparison of the 7 subcategories of mood states among the three groups showed no statistical difference between the groups and within the groups from the beginning to the end of the program through One-way repeated measures MANOVA ($p>0.05$). Pillai's trace was selected to measure within subjects' effect and found no significance at $F(12,94)=0.99$, $p=0.46$.

In question three, statistical significance was found in comparing total walking distance showing a statistically significant difference in total walking distance between DW and HW groups $F(1,33)=7.75$, $p=0.01$, with a smaller effect size of $Eta^2=0.19$. HW group averaged significantly less mean accumulated walking feet ($M=50,863.35$, $SD=41,859.38$), while the dog

walking group averaged (M=112,429.12, SD=89,796.47). In question four, a) a 1-way ANOVA test showed a statistically significant difference in total walking time between DW and HW groups F (1,33)=17.17, p=0.00, with a moderate effect size of Eta^2=0.34. The human walking group averaged significantly less mean accumulated walking minutes (M=742.87, SD=452.21), while the dog walking group averaged (M=1,480.69, SD=583.94). Lastly, question five, the comparison of unconditional acceptance, attachment, reciprocity, and total bonding on the CSAWPBS showed no statistical significance, $F(3,31) = 1.65$, $p = .20$; Pillar's Trace=0.14; partial $\eta^2 = .14$, between the DW and HW groups using a one-way multivariate analysis of variance (MANOVA). A test of between-subjects effects found that among the four subsets, reciprocity was statistically significant F(1,33)=4.58, p=0.40, p<0.05, partial $\eta^2 = .12$.

Results from Aim Two

In the coding of question, one of Aim two discovered three principal codes that the participants made regarding their perspective walking partners. These codes were: that they enjoyed the social aspects of being around the people/dogs; they felt that they were walking to help the dogs; there were a few statements that expressed negative experiences with their companion such as not having a consistent walking partner, they were afraid of falling, or they were discouraged if their walking partner did not want to walk. It should be noted that the major of beliefs, however, were overwhelmingly positive. Very few participants had negative comments.

In the coding of question two of aim two, discovered six main themes from the participants expressed overall experiences that they had in the program among the HW and DW groups. These themes were that the participants felt that: the program gave them the motivation to walk; the walking was beneficial to them; being in the program created a desire for

consistency; the program helped with self-efficacy for exercise; they expressed the best part(s) of the program as-- being outdoors, the free items they received, the overall activity, and representing their institution; they expressed the worst part(s) of the program as—walking in hot weather, walking early in the day; walking when they didn't want to.

Discussion

This study's strengths were that it examined the outcomes of a dog walking program and older adults through a qualitative and quantitative approach. This allows for a different perspective of dog walking and the older adults and perhaps a better understanding of the overall outcomes. Additionally, this outcome from this study reinforced the premise that dog walking may be beneficial in encouraging physical activity in this population and that it has the opportunity to provide older adults with many positive outcomes. Our study showed that the DW group walked more accumulated program distance and time than the HW group ($p<0.05$).

From the qualitative portion of our study, many discoveries emerged from the coding of the participants' self-expressed experiences. The experiences with their walking partner were resounding positive. The participants in both groups expressed positive feelings about their walking companions, which confirms the findings in other literature that dog walking can promote interactions with other humans, which help to impart a sense of belongingness (Antonacopoulos & Pychyl, 2014; Calise et al., 2018; J. Campbell et al., 2017a; K. Campbell et al., 2016; Schneider et al., 2015; Toohey et al., 2013). Additionally, the DW group expressed the need for participation because of the perception of the dog's benefit, which coincides with other literature that dog walking can act as an incentive for activity (Curl et al., 2017).

In an examination of the participants' overall perceptions of the experience in the program, they again expressed predominately positive experiences. Several of the most common

themes were the program itself, which helped to contribute to motivation to walk and create purposeful activity, which is also reflected in other studies involving dog walking (Richards, 2016).

The most obvious limitation is that this is a secondary analysis, limiting the opportunity to follow up with participants regarding statements requiring data triangulation. Additionally, the population sampled is relatively similar in sociodemographic status, limiting the generalizability to other groups not included in this study. Lastly, this study had a sample size of 54. Perhaps a larger sample size would generate more robust statistical findings.

Future Research

The outcomes of this study encourage future research on this topic. As mentioned in Chapter 5, the DW participants used a leash to walk their dogs, which created a varying degree of resistance for the participant. This action could cause incidental increases in upper body strength. Therefore, future studies could include the measurement of upper body strength for these participants. Another area to explore is the effects of walking the dog off the leash. For example, would the bond that the older adult forms with the dog be similar if the dog were walked off the leash? Lastly, this dissertation study (Chapter 5) discovered that a significant component expressed from the participants regarding their perceptions of the program's best part was being outdoors and enjoying the greenspace. Additionally, one of the essential elements of the program's worst was walking in the heat and humid weather. Future investigations could examine a comparison of dog walking indoor and dog walking outdoors.

There is a wealth of literature demonstrating that dog walking can lower BMI, decreasing problems with chronic health conditions such as reduced blood pressure and better blood glucose control (Curl et al., 2017; Lentino et al., 2012; Motooka et al., 2006). There are mixed results in

how dog walking affects mental health issues such as depression, loneliness, and social isolation. Toohey et al. (2012) demonstrated that dog walking helps combat those mental health issues. In comparison, Dunn et al. (2018) found no statistical significance in self-reported mental health measurements. These discrepancies speak to a gap in the literature, where further investigation would warrant a better understanding of this issue.

The nurse continues to be at the forefront of patient care and patient advocacy. Therefore, as discussed in Chapter 4, the nurse can be the primary motivator to engage the older adult in the activity. The use of dog walking as an adjunct for increasing physical activity in older adults is an innovative and inexpensive method that can be used to encourage older adults to function at their highest possible functioning level.

Conclusion

This dissertation project incorporates the many facets of dog walking and the older adult. The Systematic Literature Review (Chapter 2) discussed the major components found in the literature of dog walking and the older adult. An in-depth comparison of two of the primary theoretical constructs used in dog walking and the older adult (Chapter 3) discovered that two mid-range theories could better explain the factors involved in whether, the older adult decides to engage in dog walking activities. Our investigation of the secondary analysis of the "Walk a Hound and Lose a Pound, and Stay Fit for Older Adults " (Johnson, 2008), in Chapter 5, shows promise for the benefits that may occur when the older adult engages in dog walking. Through the thorough investigation conducted in this dissertation project, we hope to demonstrate that dog walking can greatly assist the older adult in embracing the idea of "aging in place."

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VITA

Lynette P. Harvey was born in Northern Virginia and lived with her sister and parents. Her father, who is her mentor in education, has a doctorate in United States and Civil War History, and has many publications and accolades from his many years of education and scholarship. Her mother is a master's prepared nutritionist, which fueled her passion for health and vitality. Lynette received a BS and MS from Virginia Tech in Exercise Physiology, where she worked for several years in fitness and Cardiac Rehabilitation before obtaining her nursing degree. She worked for several years in the Cardiac Interventional Laboratory in Blacksburg, Virginia before continuing her nursing career as an Intensive Care Nurse (ICU) at Lewis Gale Hospital Montgomery. She continued her passion in critical care nursing when she and her family moved to the panhandle of Florida, where she worked in several ICUs in the area before she found her passion for teaching. She then ventured into education and taught nursing at a local community college in Madison, Florida, where she and her family reside. After thoroughly enjoying her experience in education, she then decided to pursue a doctorate in nursing from the University of Missouri in 2018. Lynette was awarded the Robert Wood Johnson Foundation Future of Nursing Scholars Grant for her education and research endeavors at the University of Missouri. Her research interests lie in Human-Animal Interaction, specifically, in the use of canines (dog walking) to support and facilitate exercise in older adults. Lynette lives in Madison, Florida, on a small farm with her husband, two boys, and a multitude of animals.