Faculty of Health Sciences

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The Role of Peer Leaders in the Promotion of Physical Activity,

Health and Psychological Wellbeing in Older Adults

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Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgement has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University.

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007) – updated March 2014. The proposed research study received human research ethics approval from the Curtin University Human Research Ethics Committee (EC00262), Approval Numbers HRE2016-0114 & HRE2016-0187).

Signature:

Marlene Kritz

Date: 23/04/2020

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Dedication

This thesis is dedicated to my parents – Dr. Anneliese Kritz and Dr. Harald Kritz.

Thank you both, for your unconditional love, support, and for giving me the strength

to chase my dreams.

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List of Abbreviations

RiAT	Residents in Action Trial
WP	Walked with peers at least once a week
WA	Walked alone at least once a week, and less than once/week with others.
MVPA	Moderate-vigorous-intensity physical activity
PA	Physical Activity
WHO	World Health Organisation
UN	United Nations
SCT	Social Cognitive Theory
SDT	Self-Determination Theory

Abstract

Background and Overall Objectives: There is an urgent need for effective

physical activity interventions that are tailored to older people, and that can be

translated to community settings. Previous research demonstrates that the majority of

older adults are insufficiently physically active, and are putting themselves at risk for

premature mortality, chronic illness and dependence on health care systems. Many

older adults lack the confidence, motivation and social support to be physically

active. Self-determination theory and social cognitive theory both highlight the

importance of social influence in fostering motivation and confidence. Recent

research has highlighted the importance of social support and has demonstrated that

peers- who share similar characteristics with the target population- may be effective

at delivering physical activity interventions. Peer volunteers have the potential to

provide a low-cost and self-sustainable opportunity for promoting physical activity.

However, little is known about how peers can best promote physical activity and

health in an older population, and the factors that determine the retention of such

volunteers. This thesis, therefore, aimed to understand how older peers can support

the physical activity behaviour and health of others, identify characteristics of an

effective older peer leader, and examine the factors that help them maintain their

role.

Rationale Aims and Key Findings: Walking may be carried out alone or

with others. It is currently unknown if regularly walking with peers is better than

walking alone for improving motivation, confidence, physical activity behaviour,

and health outcomes in older adults. This was, therefore, examined in Study 1.

Findings from Study 1 suggest that regularly walking with others may benefit

motivation, physical activity, walking self-efficacy, and health, more so than walking

alone, in older adults. Research suggests that older adults prefer to walk with similar-aged peers, but often do not have access to a walking partner, highlighting the potential of peer volunteers. Intervention research suggests that older peer leaders are often difficult to recruit and frequently abandon their role as a volunteer. Little is known about how to best support such volunteers to remain in their role. Study 2, therefore, compared motives, barriers, and facilitators of peer walk leaders who persisted as a volunteer with those who dropped out during a 16-week walking intervention. Findings highlight the relevance of social skills, altruism, optimism and need satisfaction for facilitating processes that motivate volunteers to persist in their role. One reason for interventions often not reaching the most inactive older adults and failing to be effective, may be the diversity of needs among older adults. Study 3, therefore, examined effective peer leader traits as perceived by different groups of older adults. Findings highlight the importance of a compassionate, optimistic and encouraging peer leader, and provide comprehensive insight on what older adults with varying levels of group walking and peer leader experience perceive to be effective attributes. Researchers have highlighted the need for studies identifying effective peer leader behaviours. Study 3 highlights the importance of a motivating peer leader. Past research has identified behaviours that can promote autonomous motivation in younger populations in sport and exercise settings, and which have been used by professional exercise instructors. However, studies suggest that behaviour change strategies working with younger adults are not transferable to an older population. Study 4, therefore, examined perceptions of peer leader behaviours that are related to the satisfaction of psychological needs required to experience autonomous motivation in older adults. Findings identify need-supportive behaviours perceived as useful by older walkers and peer leaders.

Implications and Future Direction: Overall, the presented findings may have important implications for future peer-led walking interventions with older adults. Findings from Study 1 demonstrate that peers play a crucial role in promoting motivation, confidence, physical activity behaviour, and health. These results highlight the importance of peers and suggest that while tailoring an intervention to individual needs may be important; this should not be at the expense of reducing opportunities for social contact. Study 2 adds an understanding of how older peer leaders can best be supported to remain in their role, highlighting the importance of selecting suitable volunteers, offering role flexibility and supporting perceptions of competence. Findings from Study 3 provide an enhanced understanding of effective peer leader attributes, which can inform future intervention design and selection of older peer leaders. Study 4 provides an understanding of motivationally supportive peer leader behaviours, which can be taught to future peer walk leaders, and help them feel effective in their role. Recommendations for policy, research and practice, in particular on the selection, training, and support of future older peer walk leaders, are provided.

Publications and Presentations Arising From This Thesis

Journal Publications[1]

Kritz, M., Thøgersen-Ntoumani, C., Mullan, B., Stathi, A., & Ntoumanis, N. "It's better together": A Nested Longitudinal Study Examining The Benefits Of Walking Regularly with Peers versus Primarily Alone in Older Adults. Revise and resubmit at *Journal of Aging and Physical Activity.* -
Presented as **STUDY 1 in Chapter 2**.

Kritz, M., Ntoumanis, N., Mullan, B., Stathi, A., & Thøgersen-Ntoumani, C. Motivation for Volunteering in Older Peer Walk Leaders: A Longitudinal Qualitative Investigation. Revise and resubmit at *The Gerontologist.* -
Presented as **STUDY 2 in Chapter 3.**

Kritz, M., Thøgersen-Ntoumani, C., Mullan, B., McVeigh, J., & Ntoumanis, N. (2020, April). Effective Peer Leader Attributes for the Promotion of Walking in Older Adults, *The Gerontologist*, https://doi.org/10.1093/geront/gnaa014.-
Presented as **STUDY 3 in Chapter 4.**

Kritz, M., Thøgersen-Ntoumani, C., Mullan, B., Stathi, A., & Ntoumanis, N. "How Can Older Peer Leaders Best Support Self-Determined Motivation for Walking in Physically Inactive Older Adults? A Self-Determination Theory Perspective." Is currently under review with "Psychology and Health".
Presented as **STUDY 4 in Chapter 5.**

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[1] Submitted journal paper abstracts can be found in Appendix G.

Conference and Public Presentations

Kritz, M., Thøgersen-Ntoumani, Mullan, B., C., Burton, E., Hill, K., Cerin, E., Biddle, S. (2017, July). *In Search of Key Attributes Of Peer Leaders for the Promotion of Physical Activity in Older Adults- Preliminary Results* [Oral presentation]. ISSP 14th World Congress of Sport Psychology, Seville, Spain.

Kritz, M. (2019, March) *The Role of Peer Leaders in the Promotion of Physical Activity, Health and Psychological Wellbeing in Older Adults- Studies 2-3.* [Oral presentation]. 3-Minute Thesis Competition, Mark Liveris Research Student Seminar, Perth, Australia.

Kritz, M., Thøgersen-Ntoumani, C., Ntoumanis, N., Mullan, B. (2019, April) *The Potential of Peer Leaders in the Promotion of Physical Activity in the Context of RIAT* [Oral presentation]. Residents in Action Trial Dissemination Event, Perth, Australia.

Kritz, M., Thøgersen-Ntoumani, C., Ntoumanis, N., Mullan, B. (2019, July). *In Search of Key attributes of Peer Leaders for the Promotion of Physical Activity in Older Adults* [Oral presentation]. ECSS 24th Annual Congress of the European College of Sport Science Prague, Czech Republic.

Kritz, M., Thøgersen-Ntoumani, C., Ntoumanis, N., Mullan, B., Stathi, A. (2020, June). *Motivation for Volunteering in Older Peer Walk Leaders: A Longitudinal Qualitative Investigation* [Online oral presentation]. ISBNPA X Change Initiative.

Kritz, M., Thøgersen-Ntoumani, C., Ntoumanis, N., Mullan, B., Stathi, A. (2020, June). *"It's Better Together": Benefits of Walking Regularly with Peers versus Primarily Alone in Older Adults* [Online oral presentation]. ISBNPA XChange Initiative.

Kritz, M. (2020, May) *The Role of Peer Leaders in the Promotion of Physical Activity, Health and Psychological Wellbeing in Older Adults- Studies 1-4.* [Online oral presentation]. 3-Minute Thesis Competition, Mark Liveris Research Student Seminar, Perth, Australia.

Copyright Statement

CHAPTER 1 - INTRODUCTION

Background

The number of older adults (aged 60 and older) is increasing at an unprecedented rate, and at a much faster rate than any other age group (United Nations, 2019). It has been predicted that by the year 2050, approximately 20% of the global population will be aged 60 or older, and the proportion of adults aged 80 and older is expected to triple and reach 400 million (United Nations, 2017). Figure 1.1 illustrates the predicted global growth of the older population over the next 30 years.

Figure 1.1

Predicted Percentage of Population Aged 60 Years and Over from 2020 to 2050.
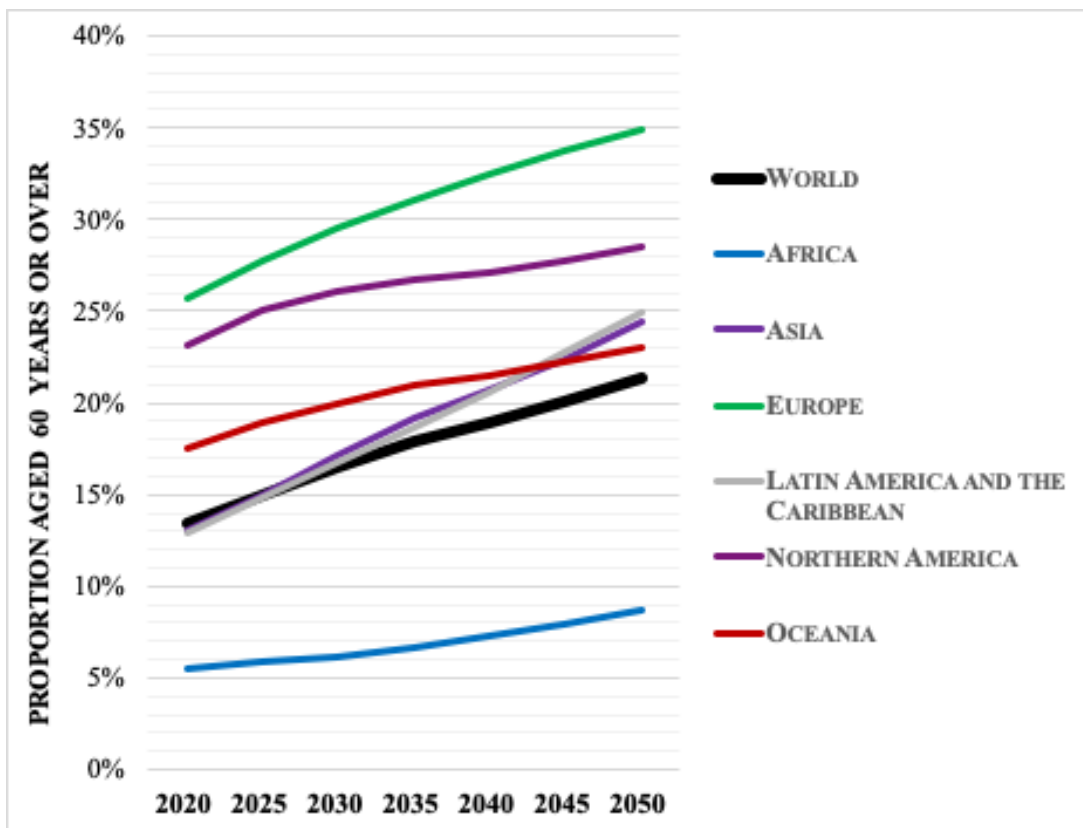
Note. Figure is based on data obtained from "*2019 Revision of World Population Prospects*" by United Nations, 2019, https://population.un.org/wpp/Download/Standard/Population.

Aging is associated with physical decline and an increased risk of non-communicable chronic disease and physical dependency (United Nations, 2019). About 86 percent of older adults suffer from at least one chronic condition, and 61% have at least two (Ward et al., 2014). Chronic diseases account for the largest proportion of health care expenditure in Australia (Willcox, 2014).

Physical Activity to Promote Healthy Aging.

Engaging in regular physical activity can help older adults maintain mental and physical health, reduce their risk of developing chronic illness, as well as alleviate the impact of existing conditions (Cunningham et al., 2020; Ji et al., 2017; Windle et al., 2010). Cross-sectional research has found that older adults who are moderately or highly active, are less likely to use prescription drugs and have a reduced risk of developing depression (Musich et al., 2017). A recent review found that physically active older adults have lower rates of cardiovascular mortality, and reduced risks of cognitive decline, and for developing breast and prostate cancer or physical limitations (Cunningham et al., 2020). Good physical health, while aging is associated with a reduced risk of falling and can promote greater independence and quality of life (Achour et al., 2011; DiPietro et al., 1996). An estimated 50% of all age-related physical decline is preventable if recommended levels of physical activity are maintained (Andersen et al., 2000; Nies et al., 2003).

Older adults are advised to maintain health by engaging in activities that promote cardiovascular fitness, balance, flexibility and strength (Department of Health, 2016). Aerobic activities aim to increase cardiovascular health and include, for example, brisk walking and swimming. Balance and flexibility can be maintained through regular walking and stretching activities. Strength training activities primarily focus on building muscle strength, such as lifting weights and resistance

exercise (Geidl et al., 2019). Table 1.1 describes current physical activity

recommendations for older adults as specified by the World Health Organisation.

Table 1.1

Physical Activity Recommendations for Older Adults to Maintain Health.

Aerobic Activities.[1]	Older adults should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity. Aerobic activity should be performed in bouts of at least 10 minutes duration. For additional health benefits, older adults should increase their moderate-intensity aerobic physical activity to 300 minutes per week or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate-and vigorous-intensity activity.
Balance and Strength Activities.	Muscle-strengthening activities, involving major muscle groups, should be done on 2 or more days a week. Older adults, with poor mobility, should perform physical activity to enhance balance and prevent falls on 3 or more days per week.
Other Considerations.	When older adults cannot do the recommended amounts of physical activity due to health conditions, they should be as physically active as their abilities and conditions allow.

Note. Information retrieved from *Global Recommendations on Physical Activity for Health*, by WHO, 2010, p.31, https://www.who.int/dietphysicalactivity/publications/9789241599979/en/.
1 = Aged 65 years and Above.
2 = Examples of moderate-intensity (3-6 MET; Metabolic equivalents) activity include brisk walking and moving the lawn. Examples of vigorous-intensity activity (> 6 METS) includes jogging and hiking.

To meet recommendations, the Australian Department of Health (2016) has advised older adults to engage in a minimum of 30 minutes of moderate-vigorous intensity physical activity (MVPA) on most, preferably all, days of the week. Despite an emphasis on the time spent in MVPA, it is increasingly recognised that, for physically inactive cohorts, some activity is better than none, regardless of the intensity (Bielemann et al., 2020; Holme & Anderssen, 2015; Lee et al., 2019). For example, Holme and colleagues found that older men who started engaging in 30 minutes of physical activity six days a week, had a 40% mortality risk reduction (Holme & Anderssen, 2015), irrespective of the intensity/type of activity. Further evidence, using accelerometer-based data, suggests that older adults benefit from light-intensity exercise (Fuzeki et al., 2017; Lee et al., 2019; Loprinzi et al., 2015) and do not need to engage in bouts of > 10 minutes to obtain benefits (Jefferis et al., 2019). For this reason, recent American guidelines excluded the requirement that an activity must be accumulated in moderate-vigorous bouts of at least 10 minutes (Committee., 2018). In sum, these findings suggest that older adults can benefit from an increase in physical activity, regardless of intensity and pace.

Despite the recognised benefits of physical activity, the majority of older adults do not meet the levels of physical activity needed to achieve health benefits (Guthold et al., 2018; Kalisch, 2019). Globally, just over a quarter (26.1%) of older adults (65 years and older) meet the minimum recommended physical activity levels, needed to maintain health (Kalisch, 2019). A survey found that people aged 80 years or older are over 50 % less likely than those in their early fifties to engage in exercise or to want to increase their activity levels (Department for Culture, 2011). In a recent report, only 35% of Australians aged 65 and over reported being sufficiently active (i.e., meeting recommendations mentioned in Table 1.1); 29% reported doing no

exercise at all (Australian Bureau of Statistics, 2019). Since self-reported measures often reflect an overestimation, actual physical activity levels are likely to be even lower (Lee et al., 2011; Loney et al., 2011). Physical inactivity in older adults is associated with risk of physical dependence and a higher likelihood of requiring medical care services, making it a serious public health problem (Musich et al., 2017; United Nations, 2019).

Physically inactive older adults have the potential to benefit the most from increasing their levels of physical activity (Ogilvie et al., 2007). Interventions have had some success at promoting physical activity in this cohort (Howlett et al., 2019; Ogilvie et al., 2007), but often fail to achieve sustained behaviour change (Kwasnicka et al., 2016). An ageing, insufficiently active population is expected to rapidly increase the financial demand on our health care system (Sato et al., 2020). Finding ways to effectively promote sustained physical activity in physically inactive older adults has, therefore, become a public health priority.

Promoting Walking to Increase Physical Activity Levels.

Researchers have suggested that effective physical activity interventions need to be tailored to individuals, successful at changing behaviour, and translatable to community settings (Chong et al., 2014; Ogilvie et al., 2007). Walking is increasingly used to promote physical activity as it is popular among older adults, can be easily tailored to individual needs, and is an effective way of meeting health recommendations (Amireault et al., 2019; Lee et al., 2019). In comparison to other activities, walking is affordable, accessible, safe, and can easily be incorporated into everyday life (Nathan et al., 2014). The majority of older people, except the very frail and disabled, can engage in walking, and it does not require special equipment or training and is joint-friendly (Hardman & Morris, 1998). Older adults who engage in

regular walking have better physical, functional and mental health than their physically inactive peers (Roh & Park, 2013; Scherder et al., 2014; Snyder et al., 2006; Parkatti et al., 2012). Meta-analytical evidence found that healthy previously inactive individuals who start walking experienced an increase in fitness, and a reduction in both fat levels and blood pressure (Murphy et al., 2007). Based on expert opinion, it has been recommended that to maintain health and depending on health conditions, older adults should walk 4400 –10,000 steps a day (Tudor-Locke et al., 2011). Recent research using accelerometry has linked walking as few as 4400 steps/day to decreased mortality in older adults (Lee et al., 2019).

How Effective are Current Walking Interventions?

Interventions that have focused on walking have had some success at promoting physical activity and positive health outcomes in older adults (Hanson & Jones, 2015; Kassavou et al., 2013). For example, a randomised controlled trial found that physically inactive adults aged 65 or older, who took part in a neighbourhood-level paid leader-led walking intervention, improved mental and physical wellbeing, and increased walking behaviour (Fisher & Li, 2004). In another study, two biweekly group walking interventions for older retirement village residents (*M*age = 84.1) resulted in improvements in step counts and cognitive function after three months (Rosenberg et al., 2012). Despite their efficacy, existing programs struggle to reach physically vulnerable cohorts, and often fail to achieve sustained behaviour change, and translate into community settings (Brawley et al., 2003; Hughes et al., 2011; Ogilvie et al., 2007). Researchers have noted a need for research on how to maintain older adults in programs and how to adapt programs to the requirements of vulnerable populations (e.g., those who have physical limitations) (Grimmett et al., 2019; Hughes et al., 2011).

Physical limitations, health problems or disability often discourage older adults from engaging in walking (Haley & Andel, 2010; Ory et al., 2016) and take part or sustain in organised physical activity programs (Bethancourt et al., 2014). However, it has been found that even functionally able older adults do not engage in walking or maintain participation in such programs (Simonsick et al., 2005). This may be (partly) because older adults have specific idiosyncrasies, not only in terms of determinants of exercise participation (Brunet & Sabiston, 2011), but also in terms of perceived barriers, and in their response to existing intervention strategies (Bravata et al., 2007; French et al., 2014). While most older adults prefer walking with others, feeling embarrassed about their appearance, fear of not keeping up with others, or a de-motivating group leader can stop them from taking part in group-based programs (Bethancourt et al., 2014). Qualitative research found that a group leader who pushed them too hard, and a lack of professional guidance discouraged older adults from taking part in such programs (Bethancourt et al., 2014). Perceived lack of social support (Victor et al., 2016), poor mental health (Ory et al., 2016), low levels of confidence, fear of falling and lack of motivation (Bethancourt et al., 2014; Chong et al., 2014), are additional barriers to participation. To summarise, findings highlight the need for approaches that offer effective social support, are accessible, and help older adults deal with psychological and age-specific barriers.

The Role of Social Support for Promoting Physical Activity Behaviour and Health in Older Adults.

There is consistent evidence suggesting that an accessible and cohesive social environment is pertinent to healthy aging (Giles et al., 2005) and associated with higher physical activity levels among older adults (Chong et al., 2014; Gebauer et al., 2020; Nathan et al., 2014; Smith et al., 2017). Longitudinal research found that

among adults aged 70 years or older, a larger social network of peers was associated with higher rates of survival over a 10-year period (Giles et al., 2005). Correlational research found that older retirement village residents who had access to an active social network were more physically active than those without such access (Nathan et al., 2014). Cross-sectional research has further shown a positive link between neighbourhood cohesion (i.e., the perceived level of connectedness and companionship between community members) and physical activity among adults with arthritis (Gebauer et al., 2020) and a general population of older adults (Leung & Chung, 2020). Similarly, a recent mixed-methods systematic review found that social connectedness was positively associated with long-term adherence rate among older adults participating in community-based group exercise interventions (Farrance et al., 2015). In contrast, older adults, who perceived poor (as compared to high) neighbourhood cohesion, were less likely to be frequent walkers (Ory et al., 2016).These findings suggest that having access to meaningful social relations may be associated with sustained physical activity behaviour in older adults.

There is growing evidence that the benefits of a social network are likely to be determined by the *type* of social support provided (Nieboer & Cramm, 2019; Smith et al., 2017; van Stralen et al., 2009). Definitions of social support vary widely in the literature (Williams et al., 2004). Social support is the provision of resources by other people (Marmot & Wilkinson) and can include emotional and practical support (Wilkinson & Marmot, 2003). Williams et al, synthesised the available literature, and key themes relating to social support included having social relationships that are reciprocal (mutually beneficial) and having access to reliable resources that provide support and distract from stressors. For the current thesis, social support is, therefore, defined as *perceiving* positive support from others (e.g.,

in the form of meaningful relationships or company) *as well* as having *access* to actual existing resources within their social network.

The literature is inconsistent on what *type* of social support is effective for promoting physical activity in an older population (Smith et al., 2017). Correlational research found that older adults prefer support from familiar contacts (Nathan et al., 2014), which aligns with research suggesting that a social agent who is trustworthy may be important for older adults (Souesme & Ferrand, 2019). Similarly, a recent review found social support that was specific to physical activity, and was provided by family members and friends, but not a peer group, to be positively linked to physical activity behaviour in older adults (Smith et al., 2017). In contrast, a review found that social support from a physical activity instructor, an exercise partner, and exercise group members was associated with sustained physical activity behaviour in older adults (van Stralen et al., 2009). These findings highlight a need for further understanding, on the factors that determine whether a specific type and source of support will lead to increased physical activity behaviour in older adults.

Further research suggests that many older adults benefit from receiving social support *while* exercising (Chong et al., 2014; Harada et al., 2019; Hayashi et al., 2018). Exercising with others, compared to alone, has been associated with improved wellbeing among middle-aged and older adults (Harada et al., 2019), as well as with fewer falls among older adults (Hayashi et al., 2018). In contrast, exercising alone at home, as opposed to with others, has been linked to social isolation among older adults. (Robins et al., 2018) A cross-sectional study with mainly female (80%), healthy older adults (*N* = 679) in Hong Kong, found that the *presence* of other people, but not of a single walking companion, positively predicted the walking behaviour of older people (Leung et al., 2018). However, qualitative research

suggests that the need for a walking companion providing social support while being physically active is dominant among physically vulnerable cohorts (Chong et al., 2014). Cognitively impaired older adults, but not healthy older adults, mentioned "not having a companion" as an important barrier to physical activity (Chong et al., 2014). Further research suggests that older adults prefer professional guidance from an exercise group leader (Bethancourt et al., 2014) and benefit from walking and talking (Hamid et al., 2018) while exercising. However, other research suggests that for some older adults dual-tasking (i.e., interacting with a peer while walking) can overwhelm cognitive resources, and increase the risk of falls (Beauchet et al., 2009). Collectively, these findings suggest that while social support is important, the required form and level of support may differ across different groups of older adults (Ogilvie et al., 2007).

The quality of social interactions appears to play an additional role in determining benefits on physical activity (Nieboer & Cramm, 2019; Ntoumanis et al., 2020). For example, cross-sectional research has demonstrated that peer interactions can discourage or encourage older adults from being physically active (Nieboer & Cramm, 2019). Nieboer and colleagues found that physical activity behaviour was determined by the extent to which older adults perceived their social environment as "enabling" or supportive. There is further evidence on the benefit of interventions using motivationally supportive communication styles for promoting physical activity behaviour and health (Gillison et al., 2019; Ntoumanis et al., 2020). However, how older walk leaders can best provide quality support that will motivate their peers to become and remain physically active has not been examined.

In summary, the benefit of social support on health and physical activity in older adults is well supported in the literature. Group-based approaches provide a

promising opportunity for supportive social interactions between peers. However, further understanding, on what type and format of social support is most effective at promoting physical activity in older adults and in such settings, is needed.

The Potential of Peer Volunteers.

Qualitative research suggests that older adults prefer group-based programs that are delivered by a motivating social agent (Bethancourt et al., 2014; Victor et al., 2016) and that provide opportunities for fun social interactions (Devereux-Fitzgerald et al., 2016; Nathan et al., 2014). Several reviews suggest that group-based walking interventions are effective at promoting physical activity behaviour and increasing wellbeing in older adults (Hanson & Jones, 2015; Kassavou et al., 2013). However, such programs often do not reach physically vulnerable cohorts (Grimmett et al., 2019), with many not translating to behavioural maintenance (Kwasnicka et al., 2016). Furthermore, professionally- led group-based interventions are not always sustainable with many older adults perceiving cost as a barrier to PA and preferring free programs (Chong et al., 2014).

A systematic review found that peers, who share similar characteristics with the target population are just as effective as professionals at delivering physical activity programs (Ginis et al., 2013). Another review found that older adults who took part in peer-led programs improved their self-perceived health, self-efficacy, mobility, balance, and reduced their fall incidence (Wurzer et al., 2017).

Cross-sectional research has shown that older adults prefer exercising with similar-aged individuals (Beauchamp et al., 2007). A similar-aged peer can provide support as a group leader or individually, by offering guidance and helping others achieve a desirable goal. Older peers have the potential to give effective social support by empathizing with age-specific barriers and facilitators (Hulteen et al.,

2019). Using older peer volunteers to lead physical activity programs could, therefore, provide a cost-effective, and promising alternative, as compared to health professionals (Beauchamp et al., 2018; Buman et al., 2011; Burton et al., 2017; Thøgersen-Ntoumani et al., 2019; Wurzer et al., 2017).

Extant research has provided limited information on the specific factors determining the effectiveness of peer-led programs (Hulteen et al., 2019). In this thesis I use the term "peer leader" to refer to volunteers who support a person or a group of people, with whom they share specific characteristics (e.g., age, living circumstances, background) (Ramis et al., 2015). A peer differs from a "friend", in two fundamental ways. A friend can be defined as a familiar individual who a person likes. In contrast, a peer is not necessarily familiar, or liked, but characterised as someone who shares age-specific characteristics. For a friend to be classified as a peer, they would need to share such characteristics, which is not always the case. On the other hand, a peer could become a friend after becoming familiar and liked. Even though I primarily focus on peers who function as a group leader, I also address other forms of peer support (i.e., one-one support) (Burke et al., 2019). In some studies, this role may be termed as "peer-mentor" (Beauchamp et al., 2016), "peer volunteers" (Stathi et al., 2019),"peer-supporter" (Thomas et al., 2012) or "lay-leader" (Lamb et al., 2002). The role of older peers for promoting physical activity and health is poorly understood (Matz-Costa et al., 2019). Specifically, factors that determine the retention of such volunteers, and ways in which peer leaders can be most effectively selected and trained to support physically inactive older adults to increase levels of physical activity has not been evaluated. Current peer-led walking interventions, consequently, lack guidelines and information on how to best select and train peer volunteers, to achieve behaviour change in an older population.

To address the aforementioned gaps in the literature, the current thesis aims to examine the role of peer leaders in the promotion of physical activity and health in older adults. Specifically, the thesis focuses on determining how peers can support each other to increase physical activity levels and improve health, motivational factors determining the persistence as a volunteer in such settings, and what contributes to peer leader effectiveness. By examining the perceptions of different groups of older adults, efforts are made to obtain a comprehensive understanding of a population which differs in their physical capability, and in their experience with walking groups (Chong et al., 2014). Building on findings that document the benefits of walking groups in this cohort, and the lack of understanding of older peer-led walking interventions, this thesis focuses on older peers volunteering as walk leaders. The findings from this work aim to advance understanding of the role that older adult peer leaders play in facilitating the adoption and maintenance of walking, in previously physically inactive older adults.

Aim of and Scope of This Thesis

The overarching aim of this thesis is to obtain an understanding of how older peer leaders can promote physical activity behaviour and achieve positive health outcomes in physically inactive older adults.

The study objectives are:
- To examine the relative efficacy of walking with peers versus alone for promoting physical activity, confidence, motivation and health in older adults.
- To explore motivational processes underpinning peer walk leader retention and dropout in older adults.

- To examine effective peer walk leader characteristics as perceived by different groups of older adults.

- To identify need-supportive behaviours of older adults volunteering as walk leaders.

Theoretical Foundation and Literature Review

The previous section discussed the potential of peer leaders for promoting physical activity in an older population. The following section aims to provide context for the proposed research by providing a theoretical overview and associated empirical evidence to examine the *processes* by which peer leaders may promote physical activity, as well as identifying factors that determine their retention and effectiveness as volunteer walk leaders. To achieve this, first, an overview of theory and research on social determinants of behaviour change, the factors that influence the retention of older volunteers, and the characteristics of effective leadership will be provided. It will then be discussed how an older peer leader may be effective at driving behaviour change. The second part of this section will then summarise gaps in the literature and provide an overview of the proposed studies.

Social Determinants of Behaviour Change.

Social cognitive theory (Bandura,1998; SCT) and self-determination theory (Ryan & Deci, 2017; SDT) both describe processes that specify how social agents may facilitate behaviour change and therefore lend themselves well to understanding the potential impact of an older peer leader.

Social Cognitive Theory and the Role of Self-efficacy.

SCT explains human behaviour in terms of reciprocal determinism (Figure 1.2), whereby the person, environment (i.e., social context), and behaviour (i.e., the

response to a stimulus to achieve a goal) continuously interact. This means a person can simultaneously induce change and respond to change. Key components of the theory include observational learning, reinforcement, behavioural capability and self-efficacy (Bandura, 2004). Observational learning pertains to the idea that an individual's behaviour is shaped by observing what happens to other people as well as examining their perceptions of the environment. Reinforcements (i.e., triggers that increase the possibility of reoccurrence) can be self-initiated or from the environment and can be positive or negative. Behavioural capabilities refer to an individual's actual ability (i.e., skills and knowledge) to perform the behaviour. Self-efficacy refers to a person's confidence in their ability to successfully carry out a specific behaviour in a given context, and is influenced by their behavioural capability, but also by individual characteristics and environmental factors (i.e., barriers and facilitators) (Baranowski et al., 2002). Further determinants of behaviour include an individuals' self-control (i.e., their ability to control one's actions in the absence of external influences), as well as outcome expectations. The latter refers to the perceived consequences of performing a specific behaviour and the values placed on those outcomes, which are largely determined by past experiences. Consequently, an individual is unlikely to engage in a behaviour if they do not know how to perform the behaviour, do not value associated outcomes, or are not confident that they will be able to overcome barriers. Figure 1.2 provides an overview of key components of reciprocal determinism, and examples applicable to a walking context.

Figure 1.2

Social Cognitive Theory: Key Components of Reciprocal Determinism and Examples Applicable to a Walking Context.

Personal Factors

Emotional and Physiological States.

Self-Control.

Self-Efficacy.

Behavioural Capabilities.

Outcome Expectations.

Environmental Factors

Observational Learning.

Walkable Environment.

Verbal Persuasion from Peers.

Behavioural Factors

Joining a Walking Group.

Engaging in Regular Walking Either Alone or with Others.

Mastery Experiences.
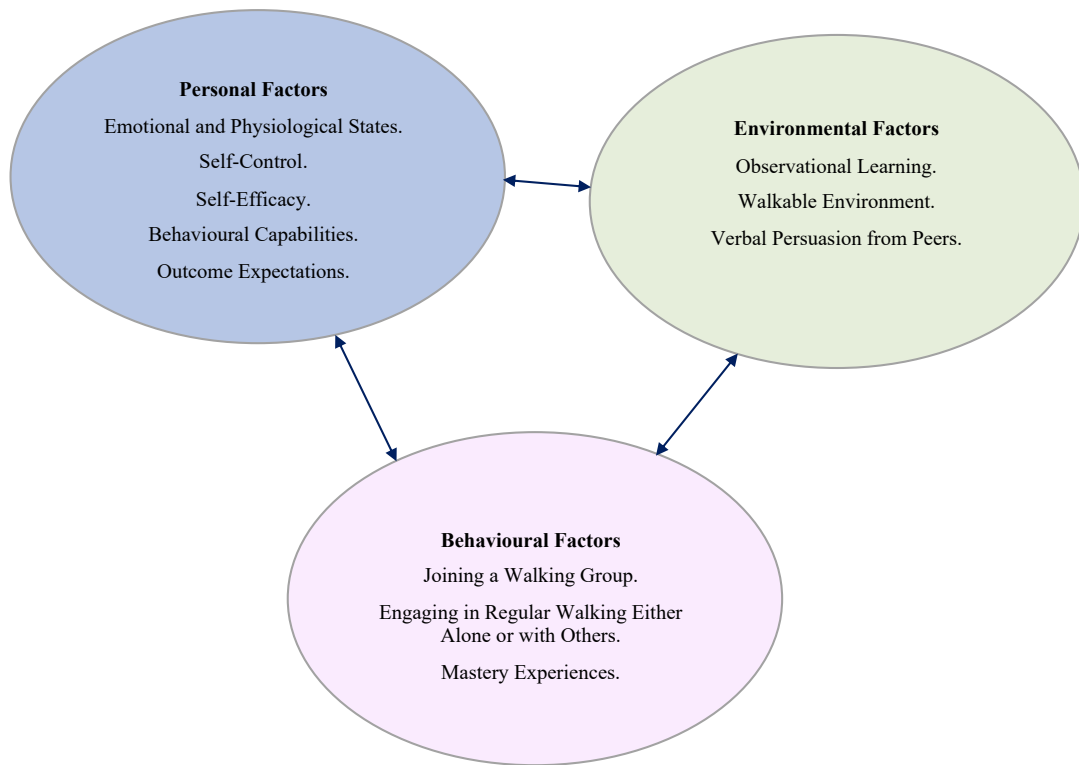
SCT proposes that self-efficacy is a crucial determinant of behaviour (Bandura, 1998). The theory suggests that the most important source of self-efficacy is mastery experience or having successfully enacted the behaviour in the past (Rhodes et al., 1999). Aligned with SCT, research has provided consistent evidence demonstrating a link between self-efficacy and sustained physical activity behaviour in the general population (Sharma & Sargent, 2005) and among older adults (Kosteli et al., 2016; Perkins et al., 2008; van Stralen et al., 2009). Low self-efficacy (e.g., fear of falling) can discourage older people from engaging in walks (Jung, 2008). Experimental research has further shown that self-efficacy mediates the effects of interventions on device-based measures of physical activity (Burke et al., 2008). From the perspective of social cognitive theory, observational (modelling) experiences, that is seeing other individuals with similar attributes successfully engage in behaviour, can enhance efficacy expectations, thus facilitating behaviour change (Bandura, 2004).

SCT constructs are useful for promoting physical activity because they can potentially be modified by a salient social agent (Bandura, 2004). For example, a peer leading a walk could improve physical activity behaviour in others by providing encouragement (verbal persuasion) and acting as a physically active role model (observational learning) (van Stralen et al., 2009). A peer leader could also encourage group members to change their perceptions about walking (e.g., using positive reinforcement), and help them build confidence in overcoming barriers (i.e., increasing self-efficacy). For example, walkers can be shown in how to engage in a safe outdoor walk, and be taught skills in self-control (e.g., goal-setting and self-monitoring). In sum, the theory is relevant for understanding how a peer leader may

initiate behaviour change using multiple strategies, such as acting as a relatable role model and offering social support.

Self-determination Theory and the Role of Motivation.

One limitation of SCT is that it assumes that the central psychological predictor of behaviour is the perception of self-efficacy (i.e., feeling competent) and does not consider other aspects of motivation. According to SDT an individual needs to feel relatively self-determined in their actions to engage in sustained behaviour and experience wellbeing (Ryan & Deci, 2017). Research has consistently supported this notion in the health context and found that self-determined motivation-the desire to pursue an activity for internal (as opposed to external) reasons-is linked to higher levels of physical activity behaviour (Ntoumanis et al., 2020; Ryan & Deci, 2017).

A sub theory of SDT, the organismic integration theory, proposes that different types of motivation reflect varying levels of self-determination which lie along a continuum. These include amotivation, extrinsic motivation and intrinsic motivation (Ryan & Deci, 2017). Amotivation is when an individual lacks the motivation to enact the behaviour. Individuals are extrinsically motivated when their behaviours are guided by external rewards (external regulation), when they act to avoid feelings of guilt (introjected regulation), when they engage in behaviour because its outcomes are important (identified regulation), or because the behaviour is in line with personal beliefs and values (integrated regulation). Intrinsic motivation is evident when the action is motivated by the pleasure generated by the activity itself (Ryan & Deci, 2000). Examples relating to each type of motivation are illustrated in Figure 1.3.

Figure 1.3

Organismic Integration Theory: Examples Illustrating Different Levels of Self-Determination.

Self-determined

Intrinsic Motivation	Pleasure generated by the activity itself: "I walk because its fun".
Integrated Regulation	Personal beliefs and values: "I consider walking to be part of my identity".
Identified Regulation	Behavioural Outcomes: „I value the benefits of walking".
Introjected Regulation	Avoiding feelings of guilt. „I feel guilty when I don´t walk".
External regulation	External rewards: „I walk because other people say I should".
Amotivation	No motivation: „I dont see why I have to walk".

Examples

Non-self-determined

Note. Figure was adapted to a walking context from "*Self-Determination Theory Applied to Health Contexts: A Meta-Analysis*" by *J.* Ng et. al., 2012, *Perspectives on Psychological Science, 7*(4), p. 328. https://doi.org/10.1177/1745691612447309

The theory distinguishes between autonomous (i.e., intrinsic motivation, integrated regulation or identified regulation) and controlled (i.e., external regulation or introjected regulation) forms of motivational regulation, suggesting that the former determines sustained behaviour, while the latter is restricted to short term behaviour. In line with the theory, a systematic review by Teixeira and colleagues (2012) found that while identified regulation was central in predicting the adoption of physical activity, intrinsic motivation was the strongest predictor of behaviour maintenance (Teixeira et al., 2012). Recent meta-analytical evidence examining the impact of SDT-informed interventions demonstrated that changes in autonomous motivation were associated with changes in health behaviours at post-intervention and follow-up (Ntoumanis et al., 2020). In summary, these findings demonstrate that autonomous motivation is imperative for behavioural persistence.

From the perspective of self-determination theory (see Fig. 1.4), autonomous motivation is regulated by the degree to which psychological needs for relatedness, competence and autonomy are satisfied (Ryan & Deci, 2017). The need for competence is similar to the concept of self-efficacy described by SCT and pertains to the need of feeling capable of doing the activity itself. In contrast to SCT, SDT suggests that an individual also needs to feel autonomous (i.e., experience a sense of volition and choice) and feel meaningfully related (i.e., experience a sense of connection and trust) to others, to experience autonomous motivation and feel motivated to change.

Figure 1.4

Self-Determination Theory: Psychological Need Satisfaction, Self-Determined Motivation and Behaviour.

For example, in the context of a walking group, competence can represent the need to feel confident to pursue the walk, keep up with the group or achieve desired outcomes (e.g., improve fitness levels). Relatedness pertains to the need to experience connection with other group members, the peer leader and the group environment. Autonomy represents the need to experience a sense of control and choice while walking with the group. The satisfaction of basic psychological needs has been associated with autonomous and intrinsic motivation (Ntoumanis et al., 2020) and been linked physical activity behaviour in older adults (Kirkland et al., 2011).

SDT suggests that the degree to which the social environment supports the satisfaction of an individual´s psychological needs will determine their self-determined motivation and behavioural adoption and maintenance (Ryan & Deci, 2017). Interventions that create a social environment which supports psychological need satisfaction have been successful at increasing levels of self-determined motivation in health contexts (Gillison et al., 2019; Ntoumanis et al., 2020). Such support can be provided by salient social agents (usually in positions of authority, such as exercise leaders, medical professionals, teachers) who can use communication strategies that will foster the satisfaction of the three basic psychological needs for autonomy, competence and relatedness in the individual within a particular life domain (Ntoumanis et al., 2018; Teixeira et al., 2020).

A need-supportive communication style consists of the provision of autonomy support (e.g., offering meaningful choice), structure (e.g., providing timely and consistent feedback), and interpersonal involvement (e.g., showing warmth and care) (Hancox et al., 2018; Reeve et al., 2004). In contrast, a need-thwarting

communication style reduces self-determined motivation by providing outcome-contingent incentives and pressure and enacting controlling behaviours (Hancox et al., 2018). There is strong empirical support for the assumption that individuals who are the recipients of need-support experience higher levels of psychological need satisfaction and self-determined (Ng et al., 2012; Ntoumanis et al., 2020). Interventions that create a social environment which supports psychological need satisfaction have been successful at increasing levels of self-determined motivation in health contexts (Gillison et al., 2019; Ntoumanis et al., 2020). Figure 1.5 illustrates how need-supportive communication can impact physical activity behaviour.

Figure 1.5

Need Support: The Relationship between Need Support, Self-Determined Motivation and Behaviour.
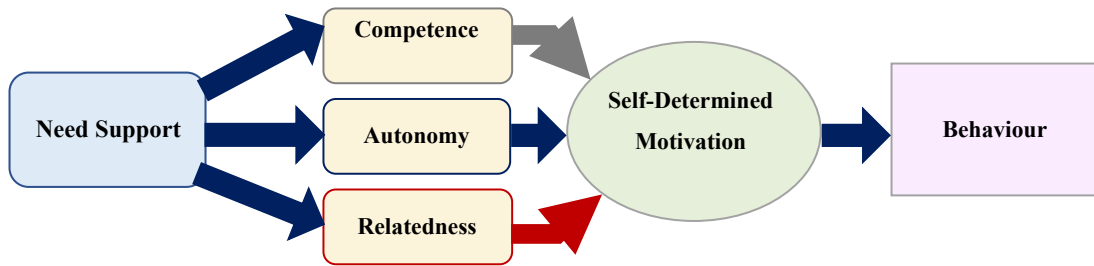
Note. Figure was adapted from "*Self-Determination Theory Applied to Health Contexts: A Meta-Analysis*" by J. Ng et. al., 2012, *Perspectives on Psychological Science, 7*(4), p. 330. https://doi.org/10.1177/1745691612447309

Research has shown that it is possible to train social agents in need-supportive strategies that support basic psychological needs, to enhance self-determined motivation and behaviour (Perez-Gonzalez et al., 2019). A meta-analysis by Ntoumanis et al. (2020) of SDT-based studies in the health domain, including physical activity interventions, showed that need-supportive intervention programs are effective at changing the motivating style of a social agent (effect size = 0.64). The authors further found that positive changes in need support, need satisfaction, and increases in autonomous motivation, all led to improved psychological wellbeing and positive changes in health behaviours (Ntoumanis et al., 2020). These findings highlight the potential of training social agents, such as a peer leader, in need-supportive strategies to promote sustained behaviour change. In summary, research has demonstrated that self-efficacy and motivation are key determinants of behaviour. The theories outlined in previous sections demonstrate the relevance of peers for modifying these behavioural determinants to promote behaviour change.

The Relevance of Peers for Increasing Self-efficacy and Motivation.

Social support has consistently been linked to self-efficacy, motivation, and physical activity behaviour (Ntoumanis et al., 2020; Sharma & Sargent, 2005; Smith et al., 2017). SCT and SDT propose different ways in which the social environment may promote self-efficacy and self-determined motivation for engaging in physical activity. From the perspective of SCT, seeing similar peers engage in physical activity behaviour may facilitate self-efficacy and encourage older adults to become active (Bandura, 2004). Other sources of efficacy are also critical. Verbal persuasion and positive encouragement have been shown to be effective in enhancing self-efficacy for physical activity among older adults (Salvador et al., 2009). In line with SCT, research, therefore, supports the notion that the social environment may affect

self-efficacy and physical activity levels of older adults (van Stralen et al., 2009). Research grounded in SDT suggests the *quality* of social interactions may play a pivotal role more motivating health-related behaviour (Ntoumanis et al., 2020) and for supporting older adults (Souesme & Ferrand, 2019; Stathi et al., 2019; Thøgersen-Ntoumani et al., 2019).

Research has highlighted the importance of a salient social agent such as a group leader, for promoting physical activity behaviour in older adults (Bethancourt et al., 2014; Smith et al., 2017). A systematic review with older adults found that social norms and verbal persuasion from friends and family were associated with physical activity initiation, while social support from a group leader predicted maintenance (van Stralen et al., 2009). From the perspective of SDT and SCT, a peer leader may promote physical activity behaviour by acting as a role model, providing positive encouragement to support self-efficacy, and provide need support to induce intrinsic motivation to be physically active (Perkins et al., 2008; van Stralen et al., 2009).

The Older Peer Leader.

The last section provided theoretical understanding on how peers can have an impact on determinants of behaviour change. However, the success of a peer-led intervention is determined by the volunteer adhering to their role and being effective as a peer walk leader. The following paragraphs will, therefore, link theoretical concepts to current evidence on determinants of older volunteering behaviour, effective leadership attributes, and supportive peer leader behaviours.

Determinants of Older Volunteering Behaviour.

The benefits of providing social support to others are well established and include decreased mortality, increased levels of happiness and self-esteem, greater social networks and sense of belonging (Brown et al., 2003; Nelson et al., 2016). Research suggests that older adults prefer to volunteer for roles that they consider meaningful, fun and for which they feel qualified (Tang et al., 2010). In contrast, lack of time, declining health, and competing priorities have been identified as barriers to volunteering in older adults (Petriwskyi & Warburton, 2007). Cross-sectional research has linked autonomous motives, and need satisfaction to the intention to sustain involvement as a volunteer (Bidee et al., 2013; Jones et al., 2015) Furthermore volunteers are more likely to benefit if they perceive their role as meaningful, and if they have altruistic and autonomous motives for the role (Bidee et al., 2013; Konrath et al., 2012) and feel effective in their role (Jiang et al., 2019). Overall, research highlights the importance of motivation for determining volunteering behaviour in older adults, but the evidence has mainly been cross-sectional, generalised across contexts, and focused on experienced volunteers (Bidee et al., 2013; Grano et al., 2008). Finding ways of supporting and training older adults to feel effective and motivated as a peer leader is likely critical for the success of a peer-led walking intervention.

Effective Leadership.

Leadership effectiveness is the extent to which a person fulfils the requirements of the role a leader (Judge et al., 2002). To gain a comprehensive understanding on effective peer leadership, characteristics and determinants of effective leaders need to be explored, including traits, leadership skills, and effective

behaviours which can be developed through training. The following section will, therefore, provide an overview of current knowledge on leadership and the role of leadership in physical activity settings.

Leadership Traits.

Earlier trait theories proposed that effective leadership is determined by a set of inherent traits and genetic predispositions (Ilies et al., 2004; Koman, 2007). Traits have been referred to as stable patterns of behaviour which are unaffected by situational contingencies (Zaccaro, 2007). In line with that approach, leaders have been perceived as effective if they have high scores on extraversion, agreeableness, conscientiousness and low scores on neuroticism (Judge et al., 2002; Moran & Weiss, 2006). However, more recently trait theories of leadership proposed that characteristics of effective leaders also include motivational attributes, cognitive capacities, expertise, and skills (Goleman, 2004; Northouse, 2018; Zaccaro, 2007).

Northouse (2018) reviewed the leadership literature and identified intelligence, self-confidence, determination, integrity, and sociability as being key traits of effective leaders. From a social identity perspective (Hogg et al., 2012) effective leaders need to also be prototypical of the group (i.e., embody and represent what the group is about) (van Knippenberg, 2011). Prototypical leaders have been perceived as more charismatic (Platow et al., 2006) and are more likely to be perceived effective after failures (Giessner et al., 2009) than non-prototypical leaders. Social identity theory proposes that to be prototypical, a leader needs to be able to understand collective norms, goals and values of the group (Stevens et al., 2017). Using this perspective, effective peer leaders (Ginis et al., 2013) could be compensating for lack of competence by being prototypical role models (due to their similarity with the target group) (Stevens et al., 2017; van Knippenberg, 2011).

Goleman (2004) further found that effective leaders are distinguished from non-leaders by a high degree of emotional intelligence. Emotional intelligence includes Self-Awareness, Self-Regulation, Motivation, Empathy, and Social Skills (Goleman, 2004). In line with that idea, research, conducted in health care settings, has found a consistent link between emotional intelligence and effective leadership (Coskun et al., 2018; Prezerakos, 2018). For example, a systematic review, including qualitative and quantitative studies, found that emotional intelligence was linked to effective leadership in nurse managers (Prezerakos, 2018). In summary, the position that leadership is determined by a set of inherent traits, has in recent years been replaced by the idea that leadership is a combination of several factors, including traits, motives and skills.

Leadership Skills and Behaviours.

Research suggests that leadership traits and skills may determine the extent to which an individual is inclined to engage in effective leadership behaviours (Astrup & McArthur, 2009; Ryan et al., 2019). Key skills of effective leaders include social skills, problem-solving skills and self-monitoring skills (Fitzgerald & Schutte, 2010; Fox et al., 2000). From a social identity perspective, social skills of effective leaders include the ability to create, develop, represent, and preserve a shared sense of identity among group members (Fransen et al., 2016; Stevens et al., 2017). A shared social identity (e.g., being a group walker) is proposed to then motivate group members to engage in behaviours that align with group norms (Stevens et al., 2017). Social skills and being agreeable have also been linked to need-supportive behaviours (Ntoumanis et al., 2018; Ryan et al., 2019).

Further evidence from the general leadership literature suggests that high levels of emotional intelligence may predispose an individual to engage in

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transformational leadership behaviours (Astrup & McArthur, 2009; Kim & Kim, 2017). The transformational leadership framework highlights four facets of supportive leadership skill: idealized influence, inspirational motivation, intellectual stimulation and individualised consideration (Bass & Riggio, 2006). Idealized influence is the extent to which leaders embody the values that they want followers to learn. Inspirational motivation involves helping followers leave their comfort zone to help them succeed. Intellectual stimulation involves encouraging followers to be innovative and creative. Individualised consideration refers to the extent to which the leader attends to individual needs, and thereby benefits the collective good. In a study on peer mentoring to help adults live with a spinal cord injury it was found that older adults who perceived the peer mentor to exhibit transformational leadership behaviours felt more motivated, confident, had better wellbeing and perceived themselves to have a better connection with their mentor (Beauchamp et al., 2016). In summary, research suggests that whether an individual is an effective leader is likely to be determined by a combination of skills, traits and behaviours (Fransen et al., 2020; Goleman et al., 2004; Ryan et al., 2019).

Leadership in Physical Activity Groups for Older Adults.

Effective leadership attributes for physical activity promotion in older people have received little attention. Estabrooks and colleagues (2004) conducted a qualitative study on leadership expectations in physical activity groups for older adults. They found that perceived leadership skills, the ability of the leader to bond with participants and achieve collective accomplishments were important (Estabrooks et al., 2004). Longitudinal research by Hawley-Hague and colleagues (2014) revealed that higher levels of leadership experience (measured by years of experience as a physical activity group leader) was related to greater attendance to

community exercise classes, while a conscientious personality of group leaders predicted long-term adherence among participants (Hawley-Hague et al., 2014). The importance of leadership experience is further confirmed by evidence suggesting that older adults prefer a qualified leader (Estabrooks et al., 2004), and benefit from professional guidance (Bethancourt et al., 2014). In contrast, for older adults, an extraverted leader has been linked to lower levels of attendance to physical activity classes (Hawley-Hague et al., 2014), which does not align with research from the general leadership literature (Judge, 2002). To summarise, the importance of a socially skilled (Estabrooks et al., 2004; Stathi et al., 2012), qualified (Estabrooks et al., 2004; Hawley-Hague et al., 2014) and motivating leader (Bethancourt et al., 2014) is evident from previous research, while there is less emphasis on extraversion. However, ideal attributes and behaviours of a volunteer peer leader whose role it is to motivate physically inactive older adults to increase levels of physical activity have not been identified.

The Potential of Need-supportive Communication Strategies.

A de-motivating exercise leader has been identified as a significant barrier for older adults to join a physical activity group (Bethancourt et al., 2014). From the perspective of SDT, peer leaders can provide need support to help older adults increase their quality of motivation and subsequently increase physical activity levels (Ntoumanis et al., 2020; Ryan & Deci, 2017). Need-supportive communication strategies have previously been developed and successfully implemented in younger populations and in sports and exercise settings (Hancox et al., 2018; Ntoumanis et al., 2020). Table 1.2 illustrates how a peer walk leader may use these strategies to support older adults to increase their physical activity levels.

Table 1.2

Need-supportive Communication Strategies Relevant to Walking Groups for Older People.

Need-supportive Communication Strategies	Examples Applied to Walking Groups for Older People
Provision of choice.	Allowing group members to have a say on the route and intensity of walks.
Encouraging individuals to give input or ask questions.	Asking group members whether they have any questions, encourage them to express their opinion and to give feedback.
Meaningful explanations.	Providing clear instruction about what to take for the walk, the route, and planned breaks.
Non-conditional praise.	Providing praise for the effort made (participating), not for following rules/speed of the group leader.
Offering a structured environment with clear plans and goals, open to feedback and changes.	Giving group members the chance to improve plans according to their needs. Avoiding the use of "must".
Provision of positive meaningful and accurate feedback.	Providing feedback that is clear and will help group members have a good walking experience (e.g. suggesting a walking stick).
Being empathetic, accessible and caring.	Showing care for peers who show fear and express difficulties and helping them feel good.
Promoting social links among members.	Using team building exercises, to help peers get to know each other.
Highlighting intrinsic goals and avoiding rewards.	Emphasising how walking is an activity that brings enjoyment.

Note. Listed strategies/examples were adapted to walking from *"Putting self-determination theory into practice: application of adaptive motivational principles in the exercise domain"* by J. Hancox et al., 2018, *Research in Sport, Exercise and Health, 10*(1), p. 75-91. https://doi.org/10.1080/2159676X.2017.1354059

Three recent studies have attempted to apply the concept of need support to the older population, including two intervention studies (Stathi et al., 2019; Thøgersen-Ntoumani et al., 2019) and one qualitative study (Souesme & Ferrand, 2019). Intervention developers have attempted to train older peers in need-supportive strategies (Stathi et al., 2019; Thøgersen-Ntoumani et al., 2019). However, there is little information available about what specific communication strategies may be useful for an older population. Souesme and Ferrand examined what health professionals perceive to be an autonomy-supportive environment for older adults. Interactions that encouraged older adults to express their requirements, help build trust with the health professional, and assisted them with following their treatment-regime were perceived as autonomy-supportive. However, it is unclear how these findings translate to physical activity settings and whether older adults share these perceptions.

Research Gaps, Aims and Innovations

Need for Research Focused on Older Peer Leaders.

The role of the peer leader in promoting physical activity and health in older adults has not been clarified. Research showing that peers can be effective at leading physical activity programs has largely been conducted with younger adults limiting the generalizability to older peer leaders (Hulteen et al., 2019). Studies found that older adults are likely to be not only diverse in terms of functional capability and motivation (Chong et al., 2014), but also differ from younger people in how they respond to interventions (French et al., 2014). For example, a meta-analysis by French and colleagues found that behaviour change strategies that were effective in motivating younger adults to increase physical activity (e.g., goal setting and

planning for relapse) led to reductions in self-efficacy and physical activity behaviour in older adults. Thus, there is a need for a comprehensive understanding on how to best select, train and support older volunteers in their role as a peer leader of a physical activity program.

To address gaps identified in previous studies, this thesis aims to explore the role of older peer leaders in the promotion of physical activity and health in older adults. This will be done by first examining the ***impact*** of peers on motivation, self-efficacy, physical activity behaviour and health. The second part will focus on volunteer ***retention*** and identify factors that determine adherence of older peers leading such programs. The final part of this thesis will then focus on ***effective peer leader*** *charact*eristics and behaviours.

Impact of Peers on Physical Activity and Health: Study 1.

In line with SDT and SCT, research has confirmed the importance of a lack of confidence (Gallagher et al., 2015; Perkins et al., 2008), and lack of motivation (Chong et al., 2014), as being key barriers to physical activity in older adults. Several reviews support the effectiveness of walking groups for promoting physical activity (Kassavou et al., 2013; Meads & Exley, 2018) and health (Hanson & Jones, 2015), particularly when targeted at older adults. For example, sedentary older adults participating in a walking intervention have been shown to experience improvements in step count, cognitive function, physical function, mobility, cardiovascular fitness, executive control tasks, and quality of life (Rosenberg et al., 2015). Little is known about the extent to which walking with others helps older adults improve motivation and confidence for engaging in physical activity (i.e., self-efficacy). Past studies have also not directly compared how walking with peers compares to walking alone, in terms of improving motivation, self-efficacy, physical activity behaviour, and health

outcomes in the older population. Study 1, therefore, examines whether walking with peers compares favourably to walking alone, for improving motivation, self-efficacy, behaviour and health outcomes in physically inactive older adults.

Retention of the Older Peer Leader: Study 2.

The success of a peer-led intervention is determined by the volunteer being effective and adhering to their role. Little is known about how older adults volunteering as a physical activity leader can be supported to remain in their role (Thøgersen-Ntoumani et al., 2019). Most of the research with volunteers has been conducted in non-physical activity settings. Findings from the general volunteering literature suggest that not enjoying the role, lack of time, poor health, and competing priorities or commitments often stops older people from volunteering (Petriwskyi & Warburton, 2007; Tang et al., 2010). Cross-sectional research suggests that motivation to volunteer is important for determining volunteer satisfaction in older adults (Grano et al., 2008). Altruism among older volunteers in different settings is linked to decreased mortality (Konrath et al., 2012) and intention to continue volunteering (Stukas et al., 2016). Further cross-sectional research suggests that need-satisfied volunteers are more likely to adhere to their roles (Jones et al., 2015). However, factors that determine the motivation and subsequent volunteering behaviour of older peer leaders have not yet been examined. Self-determination theory provides an ideal framework for longitudinally examining changes in motivational processes because it specifies precursors and outcomes of motivation. Using SDT as a framework, Study 2, therefore, longitudinally compares motivational processes of inexperienced peer leaders exhibiting different levels of adherence to a walking intervention.

The Effective Older Peer Leader: Study 3 and Study 4.

The mechanisms underlying the effectiveness of peer-led and group-based interventions are currently not understood (Estabrooks et al., 2012; Hulteen et al., 2019). While research has found that peer volunteers are effective in promoting physical activity in the older population, little is known about their role as walk leaders (Thøgersen-Ntoumani et al., 2019). Specifically, more information is needed to understand how peer leaders can best support older adults to increase and maintain their involvement in a walking group (Hulteen et al., 2019). Most of the evidence on peer-leaders in physical activity is limited to younger cohorts or is unclear in terms of what kind of peer provided what type of support. Qualitative research suggests that older adults have different motives for engaging in physical activity, and differ in their physical capabilities (Chong et al., 2014), highlighting the need for obtaining diverse understanding in this cohort. Thus, there is a need for a clarity on effective older peer leader characteristics and behaviours, addressing different groups of older adults, and allowing the possibility to obtain clear interpretations and generalizability of findings.

The processes by which peers influence physical activity behaviour in older adults are not well understood. It is unknown what kind of peer is effective in supporting different groups of older adults to become and remain active. Study 3, therefore, used mixed methodology to get a comprehensive insight on desired leadership attributes (i.e., personality traits and skills) from the perspective of different groups of stakeholders (i.e., peer leaders and walkers)**.**

Although social support has been repeatedly cited as an enabler of physical activity in older adults, (Smith et al., 2017) few studies have examined *how* to optimise social support in interventions. Specifically, *how* older peers can best

provide support in physical activity settings is currently unknown. As discussed earlier, social cognitive theory and self-determination theory both provide explanations on *how* a peer may influence self-efficacy and motivation, consequently determining physical activity behaviour. In line with propositions of SDT, recent research with older adults found that to achieve a positive impact on physical activity it is critical for social interactions to be need-supportive, encouraging and helpful (Nieboer & Cramm, 2019; Teixeira et al., 2020). Further research highlights the importance of autonomous motivation as a determinant of physical activity behaviour in older adults (Arnautovska et al., 2019). Research has documented a link between need satisfaction and physical activity behaviour in older adults. Need-supportive strategies have been successfully implemented in younger populations, when provided by professionals (Ntoumanis et al., 2020). However, studies have not provided information on need-supportive strategies that can be used by older peers who take on the role as walk leaders (Nunez & Leon, 2015). Furthermore, research suggests that older adults differ from younger adults, in how they respond to behavioural interventions (French et al., 2014). Seniors often face physical restrictions, and low confidence, which may affect the type of support they require. Drawing on Self-determination Theory, Study 4, therefore, aimed to identify need-supportive strategies that can be used by peer walk leaders to support autonomous motivation in older walkers.

Potential Impact of This Thesis

Findings of this thesis can inform policy, research and practice in several ways:

Policy: Findings of this thesis can be used by policymakers to help them decide which approach to take when promoting physical activity and healthy aging in

older adults. Findings from Study 1 can advance knowledge on the link between peer support and physical activity behaviour and positive health outcomes in older adults. Specifically, whether walking with peers provides an added benefit to only walking alone. The extent to which peer- accompanied walking benefits motivation, physical activity and health in older adults can then determine whether it is worthwhile to invest in peer-based walking interventions. Information on determinants of volunteering (Study 2) and effective (Study 3 and 4) leadership can then inform policymakers on what type of approaches are likely to be effective in such settings.

Research: Study 1 provides theoretical understanding on the impact of peers on motivation, self-efficacy, health and physical activity behaviour. Results from Study 2 can advance understanding on what factors determine volunteering behaviour in such settings. Important peer leader attributes identified in Study 3 can inform, recruitment strategies and broaden understanding on the needs and requirements of older walkers and peer leaders. Important attributes can also inform the development of future peer leader scales. These scales can then be used to determine how the identified characteristics affect the effectiveness of future peer leader training. By providing understanding on need-supportive behaviour specific to an older population, Study 4 adds to the SDT literature, making a conceptual contribution.

Practice: The findings of this thesis can be used by developers of future peer-led walking programs, which target an older population. The results of Study 1 can be disseminated to the broader community to inform them on the benefits of walking alone versus also with peers. Study 2 can provide insight on factors affecting motivation and retention of older adults volunteering as peer walk leaders. Results can further provide understanding on how to best select and support peer volunteers

to help them retain in their role. Study 3 can provide knowledge about relevant characteristics of an effective older peer leader and the results can guide peer leader recruitment for the future interventions, save unnecessary training costs, and increase the quality of the delivery of the intervention. Need-supportive behaviours identified as part of Study 4 can be used by peer walk leaders to provide motivational support to older adults who struggle with increasing activity levels. In sum, findings can guide recruitment strategies and selection of volunteers, peer leader training, and provide understanding on how to best support an older volunteer to retain in their role.

Overview of This Thesis

Chapters 2- 5 will present four studies that have been conducted to address the discussed research objectives, and gain understanding on the impact, retention and effectiveness of older peer walk leaders. Table 1.3 illustrates the order in which studies are presented and provides information on the research questions and design.

Table 1.3

Overview of Studies Presented in This Thesis.

Main Topic	Chapter and Title of Study	Research Question	Design
Impact of Peers on Physical Activity, Motivation, Self-Efficacy and Health.	**Chapter 2:** "It's better together": A nested longitudinal study examining the benefits of walking regularly with peers versus primarily alone In older adults.	**Study 1:** How does walking with peers compare to primarily walking alone, in terms of benefitting motivation, physical activity and health?	Prospective survey design.
Retention of the Older Peer Leader.	**Chapter 3:** Motivation for volunteering in older peer walk leaders: A longitudinal qualitative investigation.	**Study 2:** What factors determine motivational processes that lead to the retention and dropout of older volunteer walk leaders?	Longitudinal multiple case study design.
The Effective Older Peer Leader.	**Chapter 4:** Effective peer leader attributes	**Study 3:** What are effective peer leader attributes as perceived by older adults differing in leadership and group walking experience?	Mixed-methods concurrent triangulation design.
	Chapter 5: Need-supportive peer leader behaviours.	**Study 4:** How can older peer leaders best support self-determined motivation for walking in physically inactive older adults?	Framework approach.

CHAPTER 2 - STUDY 1

"It's better together":

A Nested Longitudinal Study Examining The Benefits of

Walking Regularly with Peers

Versus Primarily Alone in Older Adults

Note: The following chapter has been written up for publication and is currently under revision in the "Journal of Aging and Physical Activity".

The submitted abstract is provided in Appendix G.

Introduction

Aging is associated with an increased risk of physical decline and chronic illness, but regular physical activity can alleviate such risks (Cunningham et al., 2020; Holme & Anderssen, 2015; Windle et al., 2010). Walking is popular among older adults and is an effective and safe way to meet the recommended 150 minutes of moderate-intensity physical activity per week (Amireault et al., 2019). Older adults who engage in regular walking have a decreased risk of premature mortality (Lee et al., 2019), have better physical health (Murphy et al., 2007; Murtagh et al., 2015), have better mental health (Diehr & Hirsch, 2010; Ji et al., 2017; Scherder et al., 2014), are more socially integrated (Bertera, 2003; Nathan et al., 2014), and have improved functional capacity (Parkatti et al., 2012; Tomas et al., 2018) than their physically inactive peers. Reduced levels of functional capacity - the ability to master activities of daily life such as self-care and household activities- have been linked to mobility decline (Idland et al., 2013) and several comorbidities, such as cardiovascular disease, cognitive dysfunction, and depression (Enright et al., 2003). Despite known benefits of physical activity, the majority of older adults are insufficiently physically active and fail to meet recommended guidelines for health (Guthold et al., 2018; Kalisch, 2019).

Many older adults who are insufficiently physically active lack the social support and self-efficacy to engage in physical activity (Kosteli, Williams, & Cumming, 2016; Stathi et al., 2012; Witvorapong, 2018). Research suggests that older adults prefer exercising with similar-aged peers (Beauchamp et al., 2007; Bennet et al., 2018). Peers (i.e., those of similar age, background, health, and life experience) can be an excellent source of social support and motivation for older adults (Burton et al., 2017; Stathi et al., 2019). From the perspective of social

cognitive theory (Bandura, 2004), peers can enhance self-efficacy through modelling (e.g., seeing others cope with barriers to physical activity) and verbal persuasion (Chaudhury et al., 2016; Downward & Rasciute, 2016). However, empirical evidence shows that many older adults do not sustain participation in group walks (Jancey et al., 2007) or prefer to exercise alone (King et al., 1999; Wilcox et al., 2000). Many seniors also find it hard to adapt to a walking group, worrying about not keeping up with a group (Jancey et al., 2007), or being discouraged by "disabling peer behaviours", such as being told to slow down due to age (Nieboer & Cramm, 2019).

Hence, for group walks to result in positive outcomes, the quality of social support provided by peers may be important (Kazuhiro et al., 2020). Self-determination theory (Ryan & Deci, 2017) suggests that supportive social interactions can improve perception of competence and relatedness, which are associated with higher quality motivation and positive outcomes (Ng et al., 2012; Ntoumanis et al., 2020). For example, peers can reduce the perception of barriers (e.g., lack of confidence, fear of falling), and provide others with social support, verbal encouragement, and physical support during a walk (Devereux-Fitzgerald et al., 2016; Nieboer & Cramm, 2019; Thogersen-Ntoumani et al., 2019). Peer-accompanied walks can, therefore, provide older adults with a safe opportunity to be active and engage in meaningful peer interactions during or after walks (Morris et al., 2019; Thøgersen-Ntoumani et al., 2017).

Evidence from two meta-analyses and systematic reviews suggests that interventions that promote walking in groups are effective at increasing physical activity behaviour, particularly in older adults (Kassavou et al., 2013; Meads & Exley, 2018). In addition to increasing physical activity levels, walking programs

have been successful at improving the overall health of a previously sedentary population (Bravata et al., 2007; Hanson & Jones, 2015; Murphy et al., 2007). A meta-analysis showed that pedometer interventions that promote individual walking were associated with significant reductions in BMI, in addition to improving physical activity (Bravata et al., 2007). Hanson and Jones (2015) compared the effects of forty-two group walking interventions ($MAge$ = 58 years), including 15 studies with older adults, and found that participation in outdoor walking groups led to psychological (i.e., quality of life, depression), functional (i.e., 6-minute walk-test distance, physical functioning), and cardiovascular risk improvements (i.e., blood pressure, total cholesterol, resting heart rate). Similarly, Thomas and colleagues (2012) found that Chinese older adults who received peer support (i.e., regular phone calls and monthly group walks) during a walking program showed greater improvements in physical activity levels, and in functional capacity, and lost more fat (but were similar in BMI) after 12 months, compared to controls who were inactive or only walked alone.

Current understanding of the benefits of peer-accompanied walking is primarily derived from cross-sectional research focusing on general exercise behaviour (Seino et al., 2019), and experimental trials that compare group walkers to inactive controls, providing insufficient information about those who choose to regularly walk alone (Meads & Exley, 2018). Cross-sectional research has documented less falls (Hayashi et al., 2018), higher levels of subjective health status (Kanamori et al., 2016), improved physical function (Seino et al., 2019), and better psychological wellbeing (Harada et al., 2019; Kanamori et al., 2018) among older adults who self-reported exercising as a group as compared to exercising alone. However, given that a wide range of activities can be classified as "exercise

behaviour", it has remained unclear whether these effects apply when comparing those *walking* regularly with others versus primarily alone.

Study Rationale and Objectives.

Researchers have noted a need for longitudinal studies identifying the unique effects of group-walking programs (Meads & Exley, 2018). I identified only one study with older adults that compared the effects of peer-supported walking with walking alone (Thomas et al., 2012). However, in that study, "peer-support" was primarily provided in the form of encouraging telephone calls, and peer-accompanied walking was limited to monthly organized social walks. Most studies examining the effects of peer-supported walking have been conducted in controlled, group-based settings, providing little information on the experiences of older walkers who *naturally* choose to walk alone or with peers. It is important to also consider older adults who choose to walk with a partner and as part of a smaller group (Carr et al., 2019; Zubala et al., 2017). None of the reviewed studies examined motivation or self-efficacy for walking as outcomes. Finally, most studies examining the effects of walking have focused on heterogeneous groups of individuals, including clinical populations (Hanson & Jones, 2015). It has, therefore, remained unclear whether such improvements are generalisable to independent-living older adults who are sufficiently healthy to walk alone.

Given the overall benefits of walking (Lee et al., 2019), the effectiveness of interventions promoting individual walking (Bravata et al., 2007) and the potential of group-based approaches (Hanson & Jones, 2015; Meads & Exley, 2018; Seino et al., 2019), I was interested in understanding how *regularly* walking with peers (WP) compares to primarily walking alone (WA), among independent-living older adults. The specific aim was to determine whether WP is associated with greater changes in

self-efficacy, autonomous motivation, physical activity, body fat, and functional capacity than WA, among previously physically inactive older adults. Advancing past research, I examined a setting in which participants were encouraged to walk more but could decide for themselves whether they walked with others or only walked alone.

Building on research documenting higher physical activity levels in peer-supported walkers than inactive/solo walkers (Thomas et al., 2012), I expected the WP group to show greater improvements in physical activity than the WA group. In line with the evidence suggesting greater health benefits of group walking/exercising (Hanson & Jones, 2015), it was expected that the WP group will experience greater changes in fat loss (Thomas et al., 2012) and functional capacity (Seino et al., 2019) when compared to the WA group. Extending research that draws from social cognitive theory (Bandura, 2004; Ginis et al., 2013) and self-determination theory (Ng et al., 2012; Ryan & Deci, 2000), I expected the WP group to experience greater changes in self-efficacy and autonomous motivation, compared to the WA group.

Methods

Research Design.

I conducted a longitudinal cohort study which was nested within the Residents in Action trial (RiAT; Thøgersen-Ntoumani et al., 2017). The RiAT examined the effectiveness of a 16-week peer-led walking intervention to promote walking behaviour and wellbeing in physically inactive older adults living in retirement villages (Thøgersen-Ntoumani et al., 2019; Thøgersen-Ntoumani et al., 2017). The intervention was motivationally embellished in that walk leaders received training on how to motivate group members, and walkers were taught how to

overcome their own motivational barriers. Program-initiated walks included group-based and self-initiated walks (in both experimental arms). The group-based components of the trial offered triweekly walks with a peer-led group for the first ten weeks of the program.

All participants who provided consent to take part in the walking intervention, were invited to also take part in the present study. While the present study shared the participants and the timeline of the main trial, it was conducted separately, examined different research questions, and collected new data that were not analysed as part of the larger trial (See Figure 7.1, Appendix B, for further details). To be included in the analysis, participants had to identify as a regular walker (i.e., on average, walk at least once a week during the preceding eight weeks) at Week 16 of the intervention. Non-adherence to the program-initiated walks resulted in participants not walking as part of a group. However, non-adherence did not differ amongst individuals who walked alone or with others (i.e., with a partner) at post-intervention (Further details are provided in the Supplementary File B). Participants had to also complete at least one assessment at both time-points. Further details on the number of participants completing measures at each time point and excluded participants are provided in Appendix B, Figure 7.2.

The design of the intervention allowed me to explore outcomes based on the preferences of novice walkers. By focusing on the last eight weeks of the program, I was provided with an ideal context to explore the walking preferences of participants, who followed the structured components of the program (For further details on the trial please see Thøgersen-Ntoumani et al., 2017).

Procedure.

Ethical Statement and Eligibility Criteria. Ethical approval was obtained from Curtin University's Human Research Ethics Committee (Approval Number: HRE2016-0187). To be eligible for the main trial (and the present study), all participants had to be living independently and be healthy enough that they could complete a questionnaire and go for a walk. Participants had to be at least 60 years old, and be insufficiently active, which meant reporting that they engage in less than 150 min of moderate-intensity physical activity/week. Interested participants were informed about the study and asked to sign a written informed consent form.

Participants. Participants who met the eligibility criteria were asked to complete all assessments at baseline (T1) and post-intervention, i.e., at 16 weeks (T2). Of those completing baseline measures, participants were excluded from the analysis if they did not complete any measures post-intervention ($n = 24$), acted as walk leaders ($n = 3$), or who, at week 16, reported having walked on average less than once per week over the previous eight weeks ($n = 1$).

Measures. Demographic characteristics were determined at baseline using a paper and pencil questionnaire. Height was determined through verbal self-report. Weight, body-fat, and waist circumference were determined in the morning at both time-points, prior to administering the walk test. Measurements were taken twice without delay, and the mean value of the two measurements was recorded.

Weight and Body fat percentage. Weight and Body fat percentage were measured with a Tanita Professional scale (Model BC-551) and recorded to the nearest 0.1 kg. To determine Body Fat the Tanita Professional scale uses bioelectrical impedance analysis. Participants were required to be barefoot and in a standing position, with thighs not touching each other. Previous research has provided

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supportive evidence of the reliability and validity of scores from this scale for measuring body fat in older adults (Kabiri et al., 2015; Ritchie et al., 2005).

Waist circumference. Waist circumference was measured by a researcher using a measuring tape at the midpoint of the line between the coastal margin and the iliac crest in the midaxillary line (Howel, 2012).

Walking behaviour. To measure walking behaviour, I used the item "*In the last eight weeks approximately, how many times did you go for a walk 1) alone; 2) with a partner or friend, or 3) as part of a group?*". The question was asked via a questionnaire at T2 (Week 16), and participants were asked to estimate the number of walks over the last eight weeks. The total number of walks was then divided by the number of weeks to obtain a weekly estimate. Weekly estimates of walking behaviour were then used to classify walkers as WP or WA. We defined WP as engaging on average at least once a week with others in a purposeful walk for any reason. WA was defined as walking at least once a week alone, *and* less than once a week with others. As part of the questionnaire, it was clarified that "walking" pertained to going on a "purposeful walk".

Physical Activity. Overall physical activity was assessed using the Physical Activity Scale for the Elderly (PASE), a 12-item questionnaire requesting information about occupational, household, and leisure activities during the previous seven days (Washburn et al., 1993). Sample items include: "*Over the past seven days, how often did you take a walk outside your home or yard for any reason?*" (Washburn et al., 1993). A total physical activity score was determined by multiplying the time spent in each particular activity (hr/week) by validated weight scores (Washburn et al., 1993). The scale has been found to have excellent validity

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and test-retest reliability over a 7-week interval with older community-dwelling individuals (Ismail et al., 2015).

Motivation to walk. Motivation to walk was measured using the behavioural regulation for walking scale (Niven & Markland, 2016). The questionnaire contains 23 items that measure the level of self-determination for walking. I computed a score for autonomous regulation (Cronbach's alpha = .86) by averaging identified, integrated, and intrinsic items (Williams et al., 1996), and a score for controlled regulation (Cronbach's alpha = .59) by averaging across external and introjected items. In the exercise literature, such composite scores are often used to provide an overall representation of the types of motivation driving behaviour (Teixeira et al., 2012).

Walking self-efficacy. An adapted version of the Exercise Self-Efficacy Scale (McAuley et al., 2000) was used to assess participants' beliefs in their ability to walk at a moderate pace without stopping for 5, 10, 15, 20, 25, 30, 35, 40, 45, and 50 minutes. The 10-item scale is scored on a 100-point percentage scale of 10-point increments, ranging from *0% (not at all confident) to 100% (highly confident).* Scores from this measure have been found valid and reliable for use with older adults (McAuley et al., 2000; Wojcicki et al., 2009).

Functional capacity. The 6-minute Walk Test measures the distance walked in six minutes and was used to quantify functional capacity (Enright et al., 2003; Middleton et al., 2020). The test was conducted at the retirement villages, indoors or outdoors on a 30m course, using previously published guidelines (Guyatt et al., 1985). During the test, participants were instructed to "*walk as far as they can without jogging*". Each lapsed minute was called out to help with pacing (ATS, 2002). Assistive walking devices were permitted during the test. Participants who, at

baseline, started the walk but stopped walking before the six minutes elapsed were included (n = 3). In line with past research, I classified those who walked less than 300 meters in the allocated time as having low endurance (Bittner et al., 1993).

Analysis.

All analyses were conducted using the Statistical Package for Social Sciences (SPSS for Mac, Version 25). Descriptive statistics were calculated for socio-demographic characteristics. A two-tailed independent-samples t-test, the Mann-Whitney-U test (for non-normal data), and a Chi-square (for nominal data) were used to test for differences between the WP and WA groups in demographic and baseline characteristics that could affect outcomes. A mixed design multivariate analyses of covariance (MANCOVA) and mixed analyses of covariance (ANCOVA) was then conducted to determine the effect of time (T1, T2) and condition (WP vs. WA group) on outcomes. A MANCOVA was carried out for dependent variables, which could be combined (e.g., motivation and self-efficacy). For example, walking self-efficacy and autonomous motivation were combined when conducting the MANCOVA, as self-efficacy/competence is an antecedent of autonomous motivation (Ryan et al., 2017). An ANCOVA was conducted when dependent variables could not be conceptually combined with other variables (e.g., physical activity scores).

Results

Participant Characteristics.

Informed consent and socio-demographic data were obtained from 136 participants, of whom 107 participants completed baseline measures. Of these, 79 participants met the inclusion criteria for further analysis. The excluded group (n = 57) contained a higher proportion of employed individuals (11% vs. 0%, p = .003)

than the included group. T2 responders did not differ significantly (all $p > .05$) in any

other demographic or baseline measures from T1 responders. The majority of

participants identified as healthy - mentioned health conditions were minor or

included controlled chronic illnesses (e.g., diabetes). The socio-demographic and

health characteristics of all study participants are presented in Table 2.1.

Table 2.1

Participant Characteristics of the Overall Sample.

	N [a]	% Unless Stated Otherwise
Gender (Female)	66	83.5
Age, years	79	*Mean* = 77.7
		SD = 6.9, Range = 63-93
BMI (kg/m^2)	73	Median = 25.9, *IQR* = 5.5
		Range = 18.3 – 44.0
Ethnicity (White)	75	94.9
Australian born	55	69.6
Retired	79	100
Living alone	42	53.2
Number of years living in retirement village	79	*Median* = 5.8 IQR = 8, Range = 0.1 – 18.2
Major life event, last 6 months	35	44.3
Marital Status		
Married	33	41.8
Widowed/Separated	40	50.6
Never married	6	7.60
Highest Level of Education		
Secondary education	37	48.8
Vocational training	17	21.5
College or University	25	31.6
Health		
Current health issue	33	41.8
Use of assistive device	19	24.1
Never smoked	64	81.0
BMI > 30 kg/m^2	13	17.8
Obesity based on total body fat % [b]	18/62	29.0
Central obesity [c]	19/65	24.0

Note. SD = Standard Deviation, *IQR* = Interquartile Range
BMI = Body Mass Index (kg/m^2)
a = N = 79 unless stated otherwise.
b = Obesity cut off points, adjusted for older adults, for body fat percentage levels were: >=30% for men and >=41.5% for women (Ritchie et al., 2005) c = Central obesity: To determine the presence of central obesity, we used age-adjusted waist circumference cut-off points, for those aged 70 years and older (i.e., >=107cm for men, >=100cm for women; Heim et al., 2011). We used standard values for the remaining sample (i.e., cut off >=88cm for females, >= 102 cm for males) (i.e., cut off >= 88cm for females, >=102 cm for males; Lean et al., 1995) .

WP and WA Group.

Overall, participants reported walking an average of 4.62 times/week. Fifty-four percent (n = 43) of participants met the aforementioned inclusion criteria for the WP group. Members of the WP group reported walking with others on average 2.85 times/week, and 2.51 times/a week alone. The remaining participants (46%, n = 36) were classified as WA; members of that group walked on average 3.71/week alone. Further information on those who walked with a partner versus those who walked with a group is presented in Appendix B.

Demographic (See Table 2.2) and baseline characteristics (See Appendix B, Table 7.1, for further details) of the two groups were comparable except for a significant difference in health status and living status. The WA group contained a higher proportion of individuals suffering from a health condition (56% vs. 30%, x^2 = 5.16, p = .023) and more individuals living alone (67% vs. 42%, x^2 = 4.84, p = .024) than the WP group (Table 2.2.). I, therefore, controlled for these variables in all further analyses.

Table 2.2

A Comparison of Demographic and Health Characteristics between Those Who Walked Regularly with Peers (WP) and Those Who Walked Primarily Alone (WA).

	WP N = 43	WA N = 36	p
	% unless stated otherwise		
Age, years	Mean = 77.8 SD = 6.72 Range = 65-90	Mean = 77.6 SD = 7.24 Range = 63-93	.953[a]
Gender (Female)	81.4	86.1	.401[b]
Ethnicity (White)	97.7	91.7	.225[b]
Australian born	69.8	69.4	.975[b]
Living alone	41.9	66.7	**.024**[b]
Number of years living in retirement village	Median = 5.80 IQR = 7.80	Median = 8.40 IQR = 12.5	.180[c]
Marital status			
Married	48.8	33.3	.183[b]
Widowed/Separated	41.9	61.1	
Never married	9.30	5.60	
Highest level of education			
Secondary education	44.2	50.0	.954[b]
Vocational training	23.3	19.4	
College or University	32.6	30.6	
Health			
Body Mass Index (kg/m^2)	Median = 26.0 IQR = 3.80 Range = 19.6 – 40.8	Median = 24.9 IQR = 7.20 Range = 18.3 – 44.0	.099[c]
Use of an assistive device	20.9	27.8	.478[b]
Current health issue	30.2	55.6	**.023**[b]
Major life event, last 6 months	44.2	44.4	.982[b]
Never smoked	81.4	80.6	.539[b]

Note. SD = Standard Deviation, IQR = Interquartile Range
a = p values determined using one-way Analysis of Variance
b = p values were determined using Chi-square tests.
c = p values were determined using Mann Whitney U tests, due to non-normal data.

Comparison of Changes in Outcomes Between WP and WA Walkers.

Descriptive statistics and changes in outcomes across time for both groups are presented in Table 2.3. The results of all MANCOVAS and ANCOVAS are presented in Table 2.4. Visual representations of the obtained results are presented in Appendix B, Figures 7.3 – 7.6.

Table 2.3

A Comparison of Changes in the Dependent Variables of Those Who Walked Regularly with Peers (WP) and Those Who Walked Primarily Alone (WA).

	Pre	Post	*p*
	Mean (SE) unless stated otherwise		
PASE (*n* = 79)			
WP	108 (7.89)	136 (9.38)	**.001**
WA	115 (8.68)	105 (10.3)	.205
6 - Minute walk test, distance walked in meters (*n* = 56)			
WP	379 (11.6)	423 (12.8)	**.000**
WA	409 (14.6)	414 (16.1)	.683
Walking self-efficacy (*n* = 79)			
WP	49.9 (4.33)	63.4 (4.77)	**.001**
WA	61.6 (4.13)	54.0 (4.54)	.635
Autonomous motivation (*n* = 79)			
WP	2.93 (0.118)	3.32 (0.159)	**.005**
WA	2.85 (0.130)	2.75 (0.174)	.513
Controlled motivation (*n* = 79)			
WP	1.08 (0.103)	1.19 (0.124)	.411
WA	0.903 (0.113)	0.786 (0.136)	.412
Overall fat in % (*n* = 50)			
WP	36.75 (1.61)	32.35 (1.58)	**.000**
WA	34.31 (2.23)	33.12 (2.18)	.233
Waist circumference in cm (*n* = 51)			
WP	97.34 (2.00)	94.50 (1.91)	**.000**
WA	90.66 (2.77)	89.79 (2.64)	.336

Note. SE = Standard error.
Significant values are indicated in bold (p<.05); means have been adjusted for living status and health condition.

Table 2.4

Mixed Effect ANCOVA and MANCOVA Comparing the Changes of Outcomes Over Time of Those Who Only Walked Alone (WA) Vs. Those Who Regularly Walked with Peers (WP).

	Time (T1 vs. T2)		Group (WA vs. WP)		Time x Group	
	F (df)	*p*	F (df)	*p*	F (df)	*p*
PASE [a]	1.03 (1, 75)	.314	0.157 (1, 75)	.693	10.6 (1, 75)	**.002**
6 - Minute walk test	1.11 (1, 52)	.298	0.355 (1, 52)	.554	4.60 (1, 52)	**.037**
Motivation	0.920 (3, 73)	.436	2.05 (3, 73)	.078	3.58 (3, 73)	**.018**
Walking self-efficacy	2.14 (1, 75)	.148	0.021 (1, 75)	.885	7.21 (1, 75)	**.009**
Autonomous motivation	1.36 (1, 75)	.247	3.00 (1, 75)	.088	5.42 (1, 75)	**.023**
Controlled motivation	0.063 (1, 75)	.803	3.97 (1, 75)	.050	1.27 (1, 75)	.263
Overall fat	1.63 (2,44)	.207	1.88 (2,44)	.164	3.31 (2,44)	**.046**
Fat %	2.79 (1, 45)	.102	0.097 (1, 45)	.757	6.76 (1, 45)	**.013**
Waist circumference	2.76 (1, 45)	.104	2.90 (1, 45)	.095	3.03 (1, 45)	.088

Note. a = PASE: Physical Activity Scale for Elderly score indicating self-reported physical activity levels in the preceding week. Significant values are indicated in bold (p< .05).

Physical Activity. For physical activity, the interaction effect was significant (F (1, 75) = 10.6, $p < .01$, $\eta2 = 0.124$), showing that over the 16 weeks, the WP group improved more in physical activity levels than the WA group. Bonferroni pairwise comparisons revealed that despite similar levels at T1, at T2 the WP group was significantly more physically active than the WA group (F (1,75) = 4.68, $p = .034$, $\eta^2 = 0.059$).

Functional capacity. For functional capacity, the condition by time interaction was significant, F (1, 52) = 4.60, p = .037, $\eta2 = 0.08$. Further pairwise comparisons between T1 and T2, revealed that only WP participants improved over time (F (1, 52) = 16.23, $p < .01$, $\eta2 = 0.239$).

Body Fat. There was a significant condition by time interaction for changes in body fat, F (1, 45) = 6.76, $p = .013$, $\eta2 = 0.131$, indicating that the WP group experienced more significant improvements than the WA group. Follow up pairwise comparisons revealed that only the WP group lost overall body fat and reduced their waist circumference.

Motivation and Walking Self-efficacy. There was a significant condition by time interaction in autonomous motivation to walk (F (1, 75) = 5.42, $p = 0.23$, $\eta2 = 0.067$) and self-efficacy to walk (F (1, 75) = 7.21, $p < .01$, $\eta2 = 0.088$), indicating that the WP group experienced greater improvements in these variables.

Discussion

The aim of Study 1 was to determine whether independent-living older adults who regularly walked with peers experience improved physical and psychological outcomes, compared to those who walked primarily alone. It was found that the WP group experienced more positive changes in self-efficacy, autonomous motivation,

physical activity, fat loss, and functional fitness than the WA group. The two groups did not differ at baseline on any of the outcomes.

The finding that the WP group improved overall physical activity levels (i.e., large effect size) and functional capacity aligns with past research highlighting the benefits of group-based walking programs (Hanson & Jones, 2015; Meads & Exley, 2018; Thomas et al., 2012), the importance of social support (e.g. Smith et al., 2017, Davis et al., 2019) and the effectiveness of dyadic physical activity interventions (Carr et al., 2019).

In line with social cognitive theory, the present findings indicate a positive link between regularly walking with peers and walking self-efficacy. Self-efficacy is an essential determinant of sustained physical activity behaviour among older adults (Kosteli et al., 2016). A past study (Michael & Carlson, 2009) showed that participation in a volunteer-led group-walking intervention did not lead to higher levels of walking self-efficacy in seniors when compared to a control (only receiving health information). An explanation for this incongruence may be that in the present study, participants could choose with whom they walked (i.e., with a peer or a group) and may have sought out peers who exhibited enabling and competence-supportive behaviours or aligned with individual walking preferences (Nieboer & Cramm, 2019). In a setting (as in the study by Michael & Carlson, 2009) where participants are assigned to a group, the risk for discouraging behaviours (e.g., a group that walks too fast) may be higher. In line with this explanation is the finding that the WP group, but not the WA group, reported higher levels of autonomous motivation and physical activity behaviour at T2, when compared to T1. Supportive social interactions may have improved the quality of motivation and physical activity behaviour among those who walked with peers (Arnautovska et al., 2019; Ryan & Deci, 2017).

It was found that the WP group benefitted most in terms of fat loss (although the loss in abdominal fat did not reach significance) and functional capacity, which is consistent with past research documenting the beneficial health effects of group-based walking interventions in the general population (Hanson & Jones, 2015). These findings align with research indicating the physical benefits of exercise groups (Seino et al., 2019), and the benefits of peer-support for promoting fat loss through walking (Thomas et al., 2012).

Strength and Limitations.

The main strength of this study lies in its novelty of being the first to include functional capacity, self-efficacy for walking, and motivation as outcomes when comparing older adults who regularly walk with peers with those who walk primarily alone. Other strengths of the study include its longitudinal design, the inclusion of objective measures of body fat and functional fitness, as well as the study of an under-researched cohort (84 % of the oldest older than 70, including 15% over 85 years). The present findings are limited by relying on some self-report measures (e.g., physical activity and walking behaviour), and using a convenience sample that was predominantly female and white. However, given that we examined change, potential recall errors associated with self-reported measures should be of similar magnitude at both time points. It is also not certain whether weekly estimates represented an equal distribution of walks across the eight weeks. However, all included participants were still actively walking post-intervention. This was ensured by checking items that asked about walking behaviour, such as the PASE, at post-intervention. Finally, due to the non-experimental observational design of the present study, findings do not imply causality. Future studies could use experimental designs to replicate the present results, use device-based measures of physical activity, and

focus on other populations to determine the generalizability of findings to different groups of older adults.

Implications.

The findings of this study identify unique benefits experienced by older adults who choose to walk at least once a week with peers, advancing past research in the field (Kanamori et al., 2015; Seino et al., 2019). However, a better understanding of what makes a peer leader or a walking partner effective at increasing walking confidence, motivation, and behaviour, particularly in physically inactive older adults, is needed. Future research can also explore the role of technology in providing peer support for older adults lacking social networks. Research suggests that online peer support for walking (e.g., interacting with other walkers through an online message board) does not achieve positive effects in older adults, indicating the importance of physical company while walking (Kullgren et al., 2014). Comparing the present findings with other forms of peer support, such as the use of robots as a walking partner, can further advance understanding (Karunarathne et al., 2019).

Conclusion.

Overall, findings of Study 1 highlight the potential of regular peer-accompanied walks for promoting physical activity and health in older adults. Public health messages should encourage diversity in walking options for older adults as some people might prefer to walk with others and others on their own (Davis et al., 2019; Samra et al., 2019). The present findings suggest that investing in programs that promote regular peer-accompanied walks for older adults, especially for those who are less confident, may, be worthwhile. For individuals lacking confidence,

walking in smaller groups or with a partner may be an attractive alternative (Carr et al., 2019; Jancey et al., 2007). It is, therefore, recommended that such programs remain flexible in whether walks are pursued as a group or with a partner.

CHAPTER 3 - STUDY 2

Motivation for Volunteering in Older Peer Walk Leaders:

A Longitudinal Qualitative Investigation

Note: The following chapter has been written up for publication and is

currently under revision in "*The Gerontologist*".

The submitted abstract is provided in Appendix G.

Introduction

Walking as part of a group can provide older adults with a safe opportunity to meet physical activity recommendations while engaging in social interaction (Kassavou et al., 2013). In line with findings from Study 1, research suggests that peers, similar in characteristics such as health, age, and living circumstances, who take on a leadership role, can be effective at promoting physical activity behaviour in others (Ginis et al., 2013; Hulteen et al., 2019). Peer-led walking groups, therefore, offer a low-cost, self-sustainable avenue for promoting physical activity in older people (Thøgersen-Ntoumani et al., 2019).

For seniors, volunteering as a peer leader can provide a sense of role identity and purpose after retirement (Greenfield & Marks, 2004).Volunteering has been associated with better psychological wellbeing, a broader social network (Kragt & Djurre, 2019; Niebuur et al., 2018), and is linked to improved physical health in later life (Anderson et al., 2014). Peer-led walking programs, therefore, have the potential to benefit the health and wellbeing of older volunteers (Anderson et al., 2014) while creating social and economic benefits for the community (Burton et al., 2017). However, attracting and retaining older volunteer peer leaders is challenging (Thøgersen-Ntoumani et al., 2019).

Findings from the general volunteering literature suggest that lack of time, declining health, and competing priorities or commitments often stops seniors from volunteering (Petriwskyi & Warburton, 2007; Tang et al., 2010). Perceiving the role as meaningful and receiving adequate support can help older adults maintain their peer volunteer role, while inadequate program support is associated with dropout (Tang et al., 2010). The barriers to and facilitators of older adults volunteering as peer walk leaders have not been explored (Thøgersen-Ntoumani et al., 2019). This is

important because previous studies suggest that reasons for dropout vary across volunteering programs, indicating that findings from the general volunteering literature may not be generalisable to peer walk leaders (Tang et al., 2010).

Motivation for Volunteering.

While there is consensus that self-efficacy and intention to volunteer predict volunteering behaviour in older adults, little is known about underlying motivational processes (Grano et al., 2008; Jiang et al., 2019; Warburton & Terry, 2000). Researchers often distinguish between altruistic motives (i.e., desire to help others) and egoistic motives (i.e., self-orientated) for volunteering (Konrath et al., 2012; Stukas et al., 2016). Volunteering for altruistic reasons is positively linked to intentions to continue volunteering (Stukas et al., 2016) and improved psychological wellbeing of volunteers (Konrath et al., 2012). However, the altruistic/egoistic categorization does not explain *why* altruistic motives are more strongly related to positive outcomes than egoistic ones (Guntert et al., 2016).

Self-determination theory (SDT; Deci and Ryan, 2000) lends itself well to understanding motivational processes, as it proposes a comprehensive theoretical framework to explain antecedents and outcomes of motivation. The theory proposes that motives lie along a continuum ranging from controlled (i.e., lacking a sense of autonomy or choice) to autonomous (i.e., acting out of autonomy or choice) forms of regulation. Outside the continuum lies amotivation, which means a person is not motivated, and consequently does not intend to act. Similar to previous volunteering studies (Bidee et al., 2013; Haivas et al., 2012; Oostlander et al., 2014), the present study did not focus on amotivation, as participants had the motivation to sign up as volunteers.

SDT distinguishes between four types of extrinsic motivation. The most controlled form of extrinsic motivation is external regulation, whereby the individual engages in a behaviour to comply with external pressures or to obtain approval from others (e.g., agreeing to volunteer in order to please others). Externally regulated behaviours can be potent initiators of behaviour but are associated with poor behaviour maintenance (Ryan & Deci, 2017). Next is introjected regulation, a partly internalized form of extrinsic motivation, which pertains to reasons for volunteering in order to maintain self-esteem, or to avoid negative affective states such as feelings of guilt (e.g., volunteering to prove to oneself and others that one is a caring human being). High levels of introjection are usually associated with an unstable self-esteem, which fluctuates in response to outcomes (Ryan & Deci, 2017). The most autonomous forms of extrinsic motivation are identified regulation (e.g., perceiving volunteering as important and worthwhile) and integrated regulation (e.g., volunteering as part of one's identity). At the most autonomous end of the continuum lies intrinsic motivation, which refers to doing an activity out of self-interest and because one finds it fun or enjoyable (Ryan & Deci, 2000).

Few studies have used SDT to explain volunteering behaviour (Bidee et al., 2013; Wu & Chunxiao, 2019). Only one study has specifically focused on older adults ($n = 615$, aged 60 -90 years) of whom most (76%) were experienced in their role as a volunteer which included engaging in a variety of tasks for organizations such as museums or schools (Grano et al., 2008). Autonomous motivation has been linked to positive outcomes such as work-effort, optimism, resilience, psychological wellbeing of volunteers, and intention to volunteer (Bidee et al., 2013; Grano et al., 2008; Wu & Chunxiao, 2019). Correlational research demonstrated that older adults who volunteered for integrated or identified reasons exhibited positive attitudes

towards volunteering, showed confidence in overcoming difficulties, perceived

support from others, and experienced personal control over their behaviour (Grano et

al., 2008). In contrast, introjected regulation was negatively linked to beliefs

endorsing volunteering (Grano et al., 2008). Research suggests that different forms of

regulation may co-occur and change over time, highlighting the importance of multi-

dimensional and longitudinal understanding of the processes leading to volunteering

behaviour (Kragt & Djurre, 2019; Ryan & Deci, 2017).

SDT proposes that autonomous motivation is determined by the extent to

which the psychological needs for competence, relatedness and autonomy are

satisfied (Deci & Ryan, 1987; Ryan & Deci, 2000). Competence represents the need

to feel capable of achieving desired outcomes, and has been associated with intrinsic

motivation to volunteer (Wu et al., 2016) and sustained volunteering behaviour

(Jones et al., 2015). Feedback, adequate training, ongoing program support, receiving

recognition and opportunities for skill acquisition can foster feelings of competence

and have been linked to positive attitudes towards volunteering in older adults

(Jongenelis et al., 2019; Sellon, 2014). Relatedness pertains to the degree to which an

individual experiences social connection and has been linked to older volunteer

recruitment and retention (Sellon, 2014). For example, a recent study found that

older adults who began volunteering in a socially satisfying role, for a minimum of

60 minutes/week over six months, improved their attitudes towards volunteering

(Jongenelis et al., 2019). Autonomy entails experiencing a sense of control or free

will. Activities that permit self-initiation and allow choice can create situations that

support the need for autonomy (Oostlander et al., 2014). Autonomy has been

positively linked to perceived choice, enjoyment, interest, and volunteer satisfaction

(Oostlander et al., 2014; Weinstein & Ryan, 2010). Individuals who helped others by

choice (i.e., experienced autonomy) were more likely to be effective and persist with the activity (Weinstein & Ryan, 2010). Role flexibility is particularly important for recruiting older volunteers, highlighting the importance of autonomy in this group (Sellon, 2014).

Study Rationale and Objectives.

SDT suggests that a positive social environment (e.g., the opportunity for connection) or environmental triggers (e.g., positive feedback, choice) can satisfy basic psychological needs and promote autonomous motivation, which will subsequently lead to positive volunteering outcomes (e.g., sustained behaviour, enjoyment). The literature suggests that need-satisfied volunteers are more likely to adhere to their role (Jones et al., 2015). However, little is understood about the factors determining need satisfaction, and the motivational processes leading to the retention/dropout of older volunteers. Existing research on general volunteerism is primarily cross-sectional and focused on experienced volunteers (Grano et al., 2008; Kragt & Djurre, 2019). However, motives to volunteer are likely to change with experience, highlighting the importance of longitudinal insight (Kragt & Djurre, 2019). Finally, past research has not examined older adults who volunteer in physical activity settings. An in-depth qualitative understanding of barriers, facilitators, challenges, and motivational processes of older adults volunteering in such settings is needed to promote their engagement and retention. My overarching aim was, therefore, to examine the motivational processes involved in differential levels of persistence as a novice older walk leader, volunteering as part of a 16-week walking intervention (Thøgersen-Ntoumani et al., 2019).

Methods

Research Design.

A qualitative, longitudinal multiple case study design was employed. This design is useful for analysing individual processes within, and across, situations while considering the context of individual cases (Baxter & Jack, 2008; Faulkner & Biddle, 2004). This approach aimed to provide insight into the complexity and variability of difficulties faced by older volunteers, while explaining the "how and why" of subsequent behavioural outcomes (Faulkner & Biddle, 2004; Kinnafick et al., 2014).

Procedure.

Ethics and Recruitment. After obtaining approval from the Human Research Ethics Committee of Curtin University in Perth (Approval Number: HRE2016-0187), participants who signed up for the Residents in Action Trial (Thøgersen-Ntoumani et al., 2019)– a peer-led 16-week walking intervention- were purposively recruited from retirement villages in and around Perth. Further details of the intervention and recruitment procedures (of new walkers and peer leaders) are published elsewhere (Thøgersen-Ntoumani et al., 2019). In brief, the peer leader role entailed leading a walking group three times per week, without pay. The researcher invited residents who were interested in the peer leader role ($n = 36$) for an interview and provided them with an information sheet. After obtaining written consent, participants were asked to complete a brief questionnaire, and were individually interviewed at two-time points: at baseline (pre-intervention) and at Week 16 (post-intervention). The interviews were conducted via phone or in a quiet place chosen by the participants (e.g., the village community hall), and ranged from 50 to 138

minutes. All interviews were audio-recorded and transcribed verbatim by the researcher. Participant names mentioned in the results represent pseudonyms.

Participants. A total of 23 interested participants agreed to be interviewed at pre-intervention. Eight participants were excluded from the analysis, as they were unavailable for a second interview at T2. However, they provided information on their reasons for dropout, which are presented in Table 7.2 in Appendix C. I was interested in tracking the motivational processes of volunteers who led a walking group. I, therefore, excluded participants who did not attempt to lead a group due to lack of interest ($n = 2$) or poor health ($n = 2$) (i.e., Non-engagers). Further details on non-engagers are provided in Table 7.3 in Appendix C. To be included individuals needed to have agreed to be interviewed at two time-points and have attempted to lead a group and maintained in good health ($n = 1$ male; $n = 10$ females). Four participants discontinued as a volunteer after starting to lead a group, seven participants completed the program as a volunteer walk leader. Three intended to continue in their role, of whom two were still active walk leaders after six months.

Measures.

An overview of measures administered at each time-point and the interview schedule is provided in Appendix C, Table 7.4.

Questionnaires. At pre-intervention, participants were provided with a questionnaire measuring demographics, self-perceived leadership traits, leadership confidence, motivation to walk, volunteer motivation, and physical activity levels in the preceding week. At post-intervention, participants were asked to indicate the likelihood of continuing their role as a volunteer walk leader. At post-intervention, participants were asked to indicate, "*What is the likelihood that you will continue to volunteer as a walk leader?*" ($1 = $ *Very unlikely, to* $5 = $ *Very likely)*. Questionnaire

data were used solely for descriptive purposes. For further information on questionnaires and on the calculation of scale scores please see Appendix F.

Interviews. Semi-structured interview schedules were developed and included broad, open-ended questions for each time-point. Questions at pre-intervention asked about past experience, current physical activity levels, motives to volunteer, motives to walk, anticipated challenges, facilitators and barriers to being peer walk leaders. Questions included, for example: "*How active are you at the moment? or "Why do you want to volunteer as a walk leader?"*. At post-intervention, participants were asked questions about facilitators, barriers to volunteering, challenges and successes, intention, and motives to continue volunteering and associated barriers/facilitators to continue. Questions included, for example, "*What helped you continue in your role as a walk leader?*" or "*Why did you stop volunteering as a walk leader?*". Follow-up prompts asked participants to provide examples and details, to obtain greater insight into challenges, perceived resources, and coping strategies.

Analysis.

The researcher created longitudinal case studies/profiles based on the interviews and to compare volunteers who dropped out of the program, those who completed the program, and those intending to continue beyond the program. Using SDT as a guiding framework, the motivational processes pertaining to each profile were analysed. Abductive thematic analysis (with NVivo) was conducted to identify the antecedents and outcomes of motivational processes underlying volunteering behaviour (Braun et al., 2014).The researcher identified patterns of meaning within the data by following Braun et al. 6-phase approach to thematic analysis (i.e., familiarization, initial coding, generation of themes, reviewing of themes, and

naming of themes, producing the report). Further details on the researcher, who conducted, transcribed and analysed the interviews, can be found in Appendix A. All themes and analytical decisions were discussed with the research team during each phase.

Grounded in SDT, motives to volunteer were categorised as autonomous or controlled types and barriers/facilitators as being either competence, relatedness or autonomy-supportive/undermining. However, the generation of additional themes that did not fit neatly into these categories, was allowed. Questionnaire data were used to describe personal characteristics and motives within each profile at pre-intervention, and to determine their intention to continue volunteering post-intervention.

One case is presented for each Profile, employing a previously used approach (Faulkner & Biddle, 2004; Kinnafick et al., 2014). Presented cases were chosen based on their clarity, depth, and breadth at representing all of the major themes that were identified within each profile (Kinnafick et al., 2014). To increase transparency (Eisenhardt & Graebner, 2007), comprehensive tables providing additional information on all profiles are provided in Appendix C (See Tables 7.6-7.8).

Results

Participant Characteristics and Profiles.

All participants (1 Male, 10 Females, Mdn_{Age} = 75.00 (IQR = 8), age-range 66 – 83 years) were retired and new to the role of the walk leader. The majority (8/11) of volunteers self-reported high physical activity levels (i.e. were classified as "Active"), at the time of recruitment. Among those classified as physically active, popular activities were walking, attending fitness classes and doing weights at the

gym. Perceiving walking "*as part of a lifestyle*" were examples of phrases used to describe autonomous forms of motivation to walk. In contrast, controlled forms of regulation for walking were articulated using phrases such as "*the doctor told me I should be walking more*" to describe their motivation. Levels of volunteer motivation varied, with some volunteers expressing controlled forms of regulation (e.g., Introjection: "*I volunteered because as a committee member I feel responsible. I try to encourage things that are happening, so it's not a good look if I brush it off sort of thing*") and some expressing more autonomous forms of regulation (e.g., intrinsic motivation: "*I enjoy volunteering. I find it very satisfying*"). With regard to self-perceived leadership traits, volunteers were most likely to perceive themselves as friendly, dependable and sensitive and least likely as self-assured and determined.

Three profiles were identified: those who dropped out before the end of the program (Program Dropouts, $n = 4$), those who adhered to the program but discontinued after 16 weeks (Program Completers, $n = 4$), and those who intended to continue as a volunteer after the program (Maintainers, $n = 3$). Participant characteristics and themes that were identified to affect motivational processes to volunteer as a walk leader, within each profile, are presented in Table 3.1. Further details on profiles and participant characteristics are presented in Table 7.5 in Appendix C. Motivational processes pertaining to each profile are described below.

Table 3.1

Participant Profiles and Themes Derived from Thematic Analysis of Interviews with Volunteer Walk Leaders.

Characteristics of Profile Members	Key Themes Identified Within Each Profile
Profile 1: Program Dropout	
• 4 females • 66 -75 years old High levels of controlled volunteer motivation at pre-intervention. [1]	1. Focus on self-orientated goals throughout the program (e.g., social rewards and increasing own physical activity levels). 2. Perceived lack of support/resources to meet role demands. 3. Basic psychological needs not satisfied. 4. Lack of internalization of motives throughout the program.
Profile 2: Program Completer	
• 3 females, 1 male • 75 - 83 years old High levels of controlled motivation and high levels of autonomous volunteer motivation at pre-intervention. [1]	1. Dominance of obligation and guilt throughout the program 2. Temporary satisfaction of psychological needs (mainly relatedness and competence). 3. Unsustainable helping strategies reducing perceived autonomy. 4. Inability to provide the desired help reducing perceived competence. 5. Motives to volunteer as a walk leader not fully internalized.
Profile 3: Maintainer	
• 3 females • 70 -78 years old High levels of autonomous volunteer motivation at pre-intervention. [1]	1. Dominance of altruistic desires throughout the program. 2. Use of effective and sustainable helping strategies. 3. Use of social support to meet role demands. 4. Satisfaction of all basic psychological needs. 5. Enjoyment and optimism.

Note. Further details on participant characteristics and profiles are presented in Appendix C, Tables 7.6 – 7.8. 1= Labels were determined from of scores computed from responses to the Volunteer Motivation Scale. Scores for controlled regulation and autonomous regulation ranged from 0 and 7, with scores of 0 – 3.50 being labelled as "low" and scores of 3.51 or higher being classified as "high".

Profile 1: Program Dropout.

Profile 1 represents four women, aged 66 - 78 years old who discontinued their role as a volunteer walk leader after four to six weeks. Members of this profile prioritized meeting self-orientated goals (e.g., increasing own physical activity levels) perceived a lack of support/resources, didn't experience satisfaction of basic psychological needs and failed to internalize their motivation for volunteering throughout the program. Four key themes were identified for this profile (See Table 3.1).

Focus on self-orientated goals throughout the program.

Judy, aged 75 years, who had lived in the village for eight years, was looking to be more active following her doctor's recommendation. At the pre-intervention interview, she articulated low levels of competence for walking: "*I think I am not a good walker…I am pretty hopeless. But no, I just think as a group we have to sort of survive together.*"

Judy explained that linking social interactions with walking is important for determining her motivation to walk to avoid feeling that walking is a chore:

> When you are walking with a friend … you don't even realize you are walking. As long as you can stop and have a cup of coffee. That makes it seem like an outing rather than a chore.

At pre-intervention, feelings of obligation, being asked by other residents or a sense of responsibility due to being part of the village committee, were prominent in this group, indicating high levels of introjected regulation. Judy was asked to be a walk leader by other residents and felt obliged to volunteer due to her past experience as a leader: "*I have been in many leadership positions all my life. I have encouraged people all my life. My past experience qualify me.*"

However, similar to other members of this profile, Judy focused on fulfilling self-orientated desires (i.e., to increase her own physical activity levels and wanting to make friends) throughout the program.

Basic psychological needs not satisfied.

Reasons for dropout primarily pertained to experiencing a lack of competence, relatedness, and autonomy. At post-intervention, Judy explained that, when she walked as part of a group, she did not feel the desired relatedness, due to experiencing environmental barriers which made communication with other walkers stressful:

> We had three people, and it didn't work. It wasn't a pleasant thing. One of us had to lag behind so that we just go along the pavement. Or somebody had to walk on the road, which is not ideal.

Further, adapting to a group setting undermined her need for autonomy during the walk:

> The people, they might walk too fast for me or not fast enough. I want to be able to stop, have a look at a garden, pinch a bit of something out of someone's garden, and. I want to be in control of myself. Waiting for some and some would go too fast. That just put me off.

Another reason for not enjoying her role as a volunteer was that she did not want to commit to a schedule: "*I don't want to say, 'I have to go at five o'clock every night.' I'm not a regimented person like that*."

Low levels of perceived competence were common among members of this profile and included being unable to organize or manage a group while meeting own needs.

Perceived lack of support/resources to meet role demands.

All members of Profile 1 described perceiving a lack of social support (e.g., lack of help with leading groups and encouraging walkers) or limited personal resources (e.g., inability to volunteer three times a week). At post-intervention, Judy indicated that she felt overwhelmed with the expected level of commitment (i.e., leading a group three times a week): "*It would have been really lovely if somebody else had taken on this walk leader role, and had sort of backed me up.*"

Lack of internalization of motives throughout the program.

When Judy was asked (at post-intervention) why she discontinued her role as a walk leader, she indicated low levels of autonomous volunteer motivation and an unwillingness to adapt:

> In the beginning, I thought, "Well, I'll give it a try." But it just got too hard for me because I'm not a group person. I prefer to be on my own, and I am my own person. But what made me say I'd be a leader, I probably could, but I wouldn't enjoy it.

When asked about the future likelihood of volunteering, Judy emphasised her need for autonomy and relatedness:

> Not group walking. Walking on my own, I enjoy, or I could go walking with someone I like. But not with someone I don't like. If I want to stop and look at something, they've got to put up with that sort of thing…I have to be able to have a conversation with that person.

However, she added that the program made her more physically active: "*I enjoy walking now. I didn't use to enjoy walking.*"

Summary. In summary, controlled motives (e.g., feeling obliged, due to being experienced as a leader, part of a committee or asked by other residents) and a

focus on self-orientated desires were prominent among members of this profile. However, basic psychological needs were not satisfied when volunteers in this profile attempted to lead a group and perceived a lack of social support. Low levels of perceived competence related to being unable to organize and manage a group while meeting own needs. All members of this profile indicated low levels of autonomy (i.e., not enjoying the group setting) as a group leader but continued to walk alone or with a partner. Members of the profile emphasized the need for role flexibility (e.g., in terms of walking pace and level of commitment) and outside support.

Profile 2: Program Completer.

Profile 2 represents four volunteers (Age range: 75-83), who completed the walking intervention, but decided to discontinue volunteering after the program. At pre-intervention, members of this profile reported both identified and introjected motives to volunteer as a walk leader. Key to persisting as a volunteer was social confidence and the satisfaction of relatedness. Barriers to continuing involvement included use of unsustainable helping strategies (e.g., that were perceived as emotionally exhausting), inability to provide the desired help, pessimism, and failure to fully internalize motives to be a walk leader. Five key themes were identified for this profile (See Table 3.1).

Dominance of obligation and guilt throughout the program.

Cindy, aged 80, had recently moved to a retirement village and was looking for opportunities to get socially involved in the village. Cindy explained that she had been physically active all her life: "*I played tennis, done athletics, played squash. Always walked, gone to the gym, I have been in several gym classes.*"

At pre-intervention, Cindy explained that she initially wanted to join the walking group as a walker to satisfy her need for relatedness: "*I just like a bit of company when I am walking.*"

In contrast to Profile 1, members of this profile also recognized the value of the peer leader role within their community, indicating identified regulation. Cindy articulated this during the pre-intervention interview:

> I feel that the older generation gets stuck in their ways, but if there is somewhere, one to just take them and just start on small walks, just round the block. I think it's good for them. It really is.

However, similar to Judy, Cindy showed signs of obligation (to volunteer) at pre-intervention, indicating high levels of introjected regulation: "*I was asked to be a walk leader. I used to work as a schoolteacher, and I sort of know how to motivate people.*"

At post-intervention, members of this profile perceived it as an obligation to help slower walkers and expressed feelings of guilt, suggesting high levels of introjected regulation. At post-intervention Cindy explained that walking with slower walkers "*felt like just another chore*". With regard to discontinuing her role as a volunteer she adds: "*I feel very guilty about it all and everything.*

Temporary satisfaction of psychological needs (mainly relatedness and competence).

Similar to Profile 1, members of this profile expressed a strong desire to meet self-orientated needs, which primarily pertained to the desire to make friends with other residents. In contrast to Profile 1, members of this profile experienced

relatedness with other walkers. At post-intervention, Cindy recalls that socialization was her main drive to persist as a volunteer:

> When I started it, I was fairly new in the village. Personally, it has helped me. I mean, I walk along, by myself, but I think walking with the company has been…I have enjoyed it, and getting to know a few more people, instead of staying by myself, because I will quite often stay by myself. So, it has made me come out.

Cindy described how she tried to attract walkers using role modelling and by emphasizing the social aspect of the walking group:

> We had decided that sociability is really important. They can see we are really happy doing it, and they can say 'Oh well I'll come along and I might be happy too.'"

While being unsuccessful with inexperienced walkers, Cindy's implementation of a social group was successful for attracting experienced walkers. Similar to Cindy, all members of this profile felt effective at attracting experienced walkers to join the group but struggled with getting "new walkers" and "those who need help" to commit to the program. At post-intervention Cindy explained that the group helped experienced walkers connect with each other:

> We sort of have come to the conclusion that we enjoy walking together, exploring the neighbourhood- so we kept it going as a social group more than anything. But, those of us who are left are walkers anyway. We walk regardless whether there is a program going or not.

Unsustainable helping strategies reducing perceived autonomy.

At the pre-intervention interview, Cindy highlighted the importance of segregating walkers based on their abilities:

I mean if there are people with walkers, well they obviously need to be in a group on their own. A wandering group. People who really want to walk, they don't want to say, 'Oh I got to wait for these people to catch up sort of thing'.

All members of this profile segregated slower walkers from faster walkers to overcome the challenge of leading walkers with diverse capabilities, often leading to slower walker dropout. At the post-intervention interview, Cindy described how she offered individual support to inexperienced walkers:

The other walk leader and I had sort of worked it out between us. I'll take one group and go with them, while she [the other volunteer walk leader] will take a slower peer, and then we'd alternate. "

However, Cindy then explained how having to adapt to the time-schedule and needs of individual walkers undermined her need for autonomy:

You got to fit in with them. They can't fit in with you. And it's very exhausting in that respect. If you say 10 o'clock, somebody will say 'Oh look I can't come today, can you come another time?' …. well it makes it very difficult. Also, I haven't got 24 hours a day to say, 'Oh I'll fit in with you'.

She further articulated the above experience as "*emotionally exhausting*," which suggests that it had reduced her autonomous motivation as a volunteer.

Inability to provide the desired help reducing perceived competence.

Members of this profile felt unsuccessful at helping those who needed help which led to a reduction in perceived competence as a walk leader. Cindy explained how she felt frustrated with inexperienced walkers not attending individualised walks:

It's just almost impossible to encourage people to attend. They always have got an excuse "Oh it's too hot or it's too wet". You know little things like 'I got no time' or 'I got a doctor's appointment.' She (slow peer) comes when she's feeling ok, but there are quite a lot of times when she really doesn't, doesn't want to walk. I think, well it's the same as saying 'you can give a horse water, but you can't make it drink'… they have to take it up themselves, you can't force them into anything.

The above account suggests that at this point, Cindy lacked a sense of competence for motivating less experienced walkers.

Motives to volunteer as a walk leader not fully internalized.

Members of this profile indicated low levels of autonomous motivation for helping those who "need help", due to them (leaders) experiencing a lack of competence and autonomy. At post-intervention, members of this profile were pessimistic about helping inexperienced walkers walk more, as explained by Cindy:

To be successful, you got to have a group of people who are good walkers and want to walk together and have a social chitchat while they are walking and to really have a cardiac walk. Around here there are a lot of hills and a lot of very steep hills. You just can't take new walkers on that sort of path.

Suggestions to continue pertained to volunteers having choice as to whether they lead a slow or faster group. Further assistance could be provided by offering shared role responsibilities (e.g., at least two walk leaders per group) that prevented walk leaders from feeling overwhelmed with the role and provided them with opportunities to connect with other walk leaders to exchange experiences and provide support to each other.

Summary. Similar to Profile 1, controlled and self-orientated motives (in particular the desire for socialization) to volunteer were prominent among members of this profile. At pre-intervention members of this profile also articulated identified motives to volunteer as a walk leader. Use of unsustainable helping strategies led to emotional exhaustion, reducing autonomy as a walk leader. The inability to provide the desired help, inhibited the perception of competence, and increased feelings of guilt, further reducing autonomous motivation. High levels of introjection (obligation and guilt) and relatedness satisfaction (socialization) motivated members of this profile to complete the program, but their motivation was not sufficiently autonomous to help them maintain their volunteer role beyond the program. Similar to Profile 1, role flexibility and additional training (e.g., social skills) may have helped members of this profile to maintain their role post-intervention.

Profile 3: Maintainer.

Three female volunteers (Age range: 70-78) matched this profile, all of whom stated that they intended to continue volunteering as a walk leader after the intervention. Key to persisting as a volunteer, for all members of this profile, was the desire to help, having social skills, using sustainable helping strategies, the satisfaction of the three basic psychological needs, optimism and enjoyment. Five key themes were identified for this profile (See Table 3.1).

Dominance of altruistic desires throughout the program.

When the role of a walk leader was advertised in her village, Nancy, aged 70, was the first to volunteer. She had been living with her husband there for three years and was the social president of the village. Like Cindy, Nancy indicated being very passionate about being physically active, going to the gym, and walking every day. However, when asked about her motives to volunteer as a walk leader, she

predominantly emphasized altruistic motives, which she articulated as "*I am interested in people and I like helping people*".

In contrast to Judy and Cindy, Nancy was motivated by the desire to help and focused on meeting altruistic desires. She did not rely on the group walks for fulfilling a social need (like Cindy) or for meeting physical activity goals (like Judy). For her own fitness she engaged in separate walks:

> Well, I still walk every morning with my husband. We do 6 km every day. But the other walk is good for me because I enjoy walking and I think the sense of being able to help people, makes me feel good. It made me feel good that I could do that.

Prioritizing helping over meeting self-orientated goals was common among all members of this profile.

Use of effective and sustainable helping strategies.

In contrast to other profiles, all members of this profile followed an inclusive group management approach, indicating high levels of compassion. Instead of segregating slower walkers from faster walkers, everybody stayed in one group, with the volunteer walk leader adapting to slower walkers. Nancy led a group of six walkers, including walkers who used assistive devices. She followed an inclusive approach to make her group accessible to all kinds of walkers: "*I just found its best to go to the front once, talk to them for a while, then come back and talk to the ones that are going slower.*"

Nancy emphasised the importance of helping slow walkers feel good at their pace:

> I adjust my walking to their walking. I don't go bouncing off ahead of them or anything. They might say they were sorry for not being able to

walk too fast, and you just have to tell them that that's the whole point of it -we walk at the slowest pace. If the other ones want to race ahead that's fine.

Other strategies mentioned by members of this profile were to encourage struggling walkers to take a rest and then pick them up on the way back and include them in the subsequent social event (e.g., drinking coffee together). Contrary to Cindy, Nancy stuck to a clear time-schedule but remained flexible, optimistic, and understanding with attendance:

I feel confident that if they can't make it, they can't make it for a reason. They are not just saying 'Ok look I can't make it next Wednesday'. They always say because they have an appointment. Or some of them do voluntary work. No one has showed displeasure of coming. They seem to be hanging in there.

Use of social support to meet role demands.

All members of this profile were successful at sharing responsibilities (e.g., having other group members check on slower walkers during the walk) and achieved group cohesion among members, indicating good social skills. Nancy explained that her sense of autonomy was supported by experiencing role flexibility- walkers taking over her role when she was unable to walk with the group: *" He (peer walker) took over on two occasions when I couldn't be there. That made it easy for me.*"

Satisfaction of all basic psychological needs.

At the pre-intervention interview, Nancy explained that she felt confident as a group leader due to her experience as a physical activity instructor ("*I used to work as an aerobics instructor for adults and teenagers."*). Nancy explained that her

experience and her personality, which she described as outgoing, positive and caring, enhanced her confidence as a walk leader:

> I think you know, taking the role of a walk leader, you really have to be a certain type of person who can lease with people and understand them. I think it's no good if you are a very serious, regimented person. I have always done quite a bit of instructing. And my role here at the village is a very social role. And I know a lot of people. So, I don't find to do it difficult in any way to do something like that whereas some people might.

At the post-intervention interview she explained how observing positive changes in walkers increased her perception of competence:

> I have learned to be able to gage their abilities to walking. You know some of them probably like to walk a bit faster at the front. Others... I think you need to be able to understand their capabilities. Like (slow walker)- she walks at her own pace but when we first started walking, she was sort of puffing a little bit and then now she seems so much better.

All members of this profile described feeling successful at establishing a sense relatedness with the walkers, which was facilitated by including walkers in decisions, showing interest in walkers' lives, being inclusive and positive. At post-intervention Nancy indicated that a sense of relatedness with walkers helped her keep walkers engaged during the walk:

> I am very lucky. I have got a good group. I have got people whom all like to chat and talk. You know, I had long chats on the walks with a couple of ladies, and they told me what they have done in their lives…you know walking along half an hour or 40 minutes are just gone before they know it.

Nancy further indicated a sense of autonomy by explaining her initiative of making the walks interesting and using her skills:

> As people get older, they lose their balance and fall over. So, we do balance exercises. They got to stand on one leg, and we rotate our ankles one way and the other way and turn those up and down, heels and toes. If they can't stand freely, they hold their hand against the wall and then they take it away and focus on a point on the floor, and they concentrate, and I count to five.

She also provided walkers with advice on exercises to do after the walk, suggesting that she felt confident in her role.

Enjoyment and optimism.

Nancy articulated satisfaction with her role as a volunteer walk leader which she attributed to her positive experiences with the walkers and feeling competent in her position: *"I sort of feel that everything is going as I expected it to be and the group seems to be good, they are happy. It's the people here."*

At post-intervention, autonomous motivation was apparent and supported by accounts describing success at helping others walk more and the intention to continue. Nancy explained:

> I found it was really great that the people joined, especially a couple of them that probably wouldn't have walked or socialized very much. Really, I found that advantageous to them. I feel that the feedback I get from the people in my group is very good. They are very bright and happy and cheery. I found that very rewarding for myself. that you know they were very happy.

The above account highlights that positive walker feedback/seeing improvements was important for satisfaction as a volunteer. Enjoyment and feeling positive about the success of walking group motivated members of this profile to

adhere to their role. Similar to other members of this profile, Nancy explained that she intends to continue her role as a volunteer walk leader: "I'd *be happy to continue a walking group. I just feel very happy things are going well.*"

Summary. Maintainers indicated high levels of altruistic motives and autonomous motivation at pre-intervention. Social skills, compassion and optimism were apparent among members of this profile. Initial challenges were similar to those experienced by other profiles. However, all members of this profile enjoyed helping others, focused on meeting altruistic desires (i.e., were willing to adapt to walkers' needs), were effective at overcoming difficulties, and used strategies that facilitated psychological need satisfaction, which helped them maintain their role as a volunteer. In contrast to other profiles, maintainers experienced psychological need satisfaction and autonomous motivation *throughout* the program.

Discussion

The aim of the present study was to examine the motivational processes implicated in differential levels of volunteer persistence among novice older walk leaders. Program dropouts primarily volunteered for controlled and self-orientated reasons, failed to experience the satisfaction of basic psychological needs and perceived a lack of support. Program completers indicated high levels of guilt and obligation for helping, used unsustainable helping strategies leading to emotional exhaustion, achieved socialization with active walkers but felt ineffective at motivating inexperienced walkers. Maintainers were altruistically and autonomously motivated volunteers, focused on helping those who needed help, used inclusive helping strategies, experienced psychological need satisfaction, were optimistic and

compassionate, received social support from group members with meeting role demands, and enjoyed their role as volunteer.

In line with past research, the involvement of participants who volunteered for controlled reasons was motivated by self-orientated needs and introjected regulation (Guntert et al., 2016). In line with SDT, it was found that need satisfaction and the quality of motivation was crucial for facilitating volunteer retention after program completion (Ryan & Deci, 2017). The present findings confirm research suggesting that not being able to help as desired leads to exhaustion and dropout among older volunteers (Gabard, 1997; Haski-Leventhal & Bargai, 2008; Morrow-Howell & Mui, 1989).

Results of the present study highlight the need for feelings of autonomy among older volunteers, in particular, those who volunteer for controlled reasons. Consistent with research emphasizing the importance of role flexibility among older volunteers, the present findings add that feeling autonomous in terms of walking pace, schedule and level of commitment was important for maintaining involvement after program completion (Sellon, 2014).

The present findings are consistent with research suggesting that volunteers who express altruistic (Convey et al., 2010; Stukas et al., 2016) and autonomous motivation (Grano et al., 2008; Weinstein & Ryan, 2010) are more likely to enjoy and maintain their role. The findings of the present study further suggest that autonomously motivated volunteers may intuitively use helping strategies that facilitate the satisfaction of needs, prevent emotional exhaustion, and lead to sustained volunteering behaviour. These findings may explain research that has shown health benefits to be associated with autonomous (Weinstein & Ryan, 2010; Wu & Chunxiao, 2019) and altruistic (Konrath et al., 2012) volunteering motives.

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The present findings further align with research linking autonomous motivation to receiving social support, devoting work effort, optimism, and resilience (Bidee et al., 2013; Grano et al., 2008; Wu & Chunxiao, 2019). The characteristics of program maintainers align with past research suggesting that attributes of effective leaders include optimism and compassion (Goleman et al., 2004). The present results further highlight the importance of inclusive behaviours among autonomously motivated volunteers who maintained their role. In contrast to cross-sectional research with older volunteers (Grano et al., 2008), the present findings suggest that intrinsic motivation (i.e., enjoying the act of helping) is important for the intention to continue volunteering as a walk leader. This discrepancy may be explained by increasing levels of competence and role satisfaction (and optimism) among role maintainers (but not program completers). While competence has been shown to facilitate intrinsic motivation, role satisfaction has been found to mediate the relationship between intrinsic motivation and intention to continue volunteering (Wu et al., 2016).

Strengths and Limitations.

To my knowledge, this is the first study to examine qualitatively and longitudinally the motivational processes implicated in the volunteering of older novice walk leaders. The design allowed me to explore both the determinants (e.g., volunteer characteristics, perceived support), cognitive outcomes (e.g., emotional exhaustion), and behavioural outcomes (e.g., engaging in helping strategies) of motivational processes experienced by older walk leaders. Another strength includes the use quantitative and qualitative measures to assess volunteer characteristics, volunteer motivation, and physical activity levels at pre-intervention. Using SDT, I offer only one perspective regarding the interpretation of the findings. The present

findings may be limited by a bias towards older retired white women residing in retirement villages. Furthermore, I did not assess motivational processes beyond the program, which provides an exciting avenue for forthcoming studies. Future studies could use quantitative methods to track the motivational processes of older peer leaders over an extended period. (i.e., six months or 12 months).

Implications.

The present findings suggest that the quality of motivation for volunteering may determine helping strategies and satisfaction of psychological needs among older walk leaders. Findings extend the existing literature by describing how individual attributes and motives to volunteer may trigger behaviours and processes that determine persistence and dropout of older peer walk leaders. Findings can inform how future older peer leaders may be selected and trained.

Volunteer selection. Our findings align with research suggesting that individuals who have specific characteristics may be more likely to experience need satisfaction and engage in supportive helping strategies (Ryan et al., 2019). Results further suggest that people who primarily volunteer to increase own physical activity levels may benefit from initially joining as a walker or supporting smaller groups/a walking partner. Peers who are physically active and primarily volunteer to meet their own social needs may be ideal for leading a group of experienced walkers. Conversely, volunteers who volunteer for altruistic reasons, are optimistic, compassionate and inclusive may ideal for helping those who need help.

Volunteer training and support. In line with research conducted in other settings the present findings highlight the importance of providing volunteers with training and autonomy support to facilitate the internalization of motives to volunteer (van Schie et al., 2015; Withall et al., 2016). In particular seniors who lack social

skills and/or volunteer for controlled reasons may benefit from receiving support to help them meet basic psychological needs, succeed at helping, and avoid emotional exhaustion. For example, autonomous motivation may be facilitated by providing training in helping strategies that prevent volunteer exhaustion and embrace available social support. Additional support may be provided through programs that are flexible in terms of the level of commitment, provide social support for volunteers and promote a sense of leadership identity (e.g., opportunities to meet other volunteers and exchange experiences). Overall, key suggestions for volunteer recruitment pertain to ensuring a clear role specification, an emphasis on the social aspects of the role, and selecting volunteers with a positive attitude and altruistic motives. I further recommend training volunteers in sustainable helping strategies and social skills to encourage motivational processes leading to future volunteering behaviour. Further recommendations for volunteer support are presented in Appendix C (Table 7.9).

Future research could determine whether physical activity interventions that support the autonomous motives of older volunteers are effective at helping them maintain their role as peer leaders. To further advance understanding on how to best select and train peer leaders, the role of volunteer attributes such compassion (Goleman et al., 2004) and self-esteem (Ryan et al., 2019), for facilitating the use of effective helping strategies is worth further exploration.

CHAPTER 4 – STUDY 3

Effective Peer Leader Attributes for

the Promotion of Walking in Older Adults

Note: The following chapter has been accepted for publication

in "The Gerontologist".

See Kritz et al. (2020)

Introduction

Walking is an effective way for older adults to meet physical activity recommendations (Tudor-Locke et al., 2011). Older adults who engage in regular walking have better physical, functional, and mental health and lower mortality risk than their physically inactive peers (Lee et al., 2019). It has been recommended that to obtain health benefits, and depending on their health condition, older adults should walk 4400–11000 steps a day (Lee et al., 2019; Tudor-Locke et al., 2011). A recent prospective cohort study using device-based physical activity assessment with 16,741 older women (M_{age} = 72 years) found that, regardless of intensity, as few as 4400 steps per day were related to lower mortality (Lee et al., 2019). Despite awareness of the health benefits of physical activity (Franco et al., 2015), older adults do not engage in sufficient levels to confer health benefits (Guthold et al., 2018).

Qualitative suggests that lack of a companion can stop older adults from engaging in physical activity (Chong et al., 2014). Findings from Study 1 suggest that older adults who regularly walk with peers may benefit more in terms of motivation, self-efficacy, and health as compared to those who only walk alone. Peer volunteers offer a cost-effective opportunity to promote physical activity behaviour and wellbeing in older adults (Wurzer et al., 2017). In-group peer volunteers taking on a leadership role can serve as relatable role models and might be able to better connect and empathize with similarly aged individuals, compared to out-group peer leaders (Ginis et al., 2013; Thøgersen-Ntoumani et al., 2019).

Results from Study 2 described factors that may determine the retention of peers who volunteer as walk leaders. However, researchers have noted that it is unclear how to motivate older adults best to increase and sustain their physical

activity levels (Kalisch, 2019). Research on the impact of the older peer leader on physical activity behaviour and health outcomes is mixed, which in part may be due to individual differences of peer leaders delivering such interventions (Hawley-Hague et al., 2014). Understanding what makes a peer leader effective at promoting physical activity may, therefore, be critical for improving the effectiveness of such interventions.

Modern trait theories of leadership have proposed that the characteristics of effective leaders include a combination of personality traits, motivational attributes, cognitive capacities, expertise, and skills (Zaccaro, 2007). Northouse (2018) reviewed existing leadership literature and highlighted the overall importance of intelligence, self-confidence, determination, integrity, and sociability. Additional evidence from the general leadership literature suggests that extraversion (Judge et al., 2002) and emotional intelligence are key attributes of effective leaders (Goleman, 2004; Prezerakos, 2018)

Research on effective leader attributes in physical activity settings is limited, and findings are inconclusive. In a younger population (aged 16-34), athletes volunteering as peer leaders received the highest scores on extraversion and athletic ability, among their peers (Rylander et al., 2014). However, higher levels of extraversion, agreeableness, and perceived intellect of professional physical activity instructors predicted low attendance rates among older adults (Hawley-Hague et al., 2014). A qualitative study including 23, healthy, community-dwelling older adults (M_{age} = 78.5) found that perceived leadership skill, charisma, being able to bond with group members and having a positive attitude were perceived to be the effective attributes of a professional physical activity group leader (Estabrooks et al., 2004). In brief, there is evidence in the literature to suggest the importance of a socially skilled

physical activity leader (Estabrooks et al., 2004; Stathi et al., 2010) while there are inconsistencies on the importance of extraversion (Hawley-Hague et al., 2014; Rylander et al., 2014) and perceived leadership competence (Estabrooks et al., 2004; Hawley-Hague et al., 2014).

Study Rationale and Objectives.

Recent attention has been devoted to the development of peer-led walking group interventions for adults aged 60 years and above (Thøgersen-Ntoumani et al., 2019). To date, however, no studies have identified effective attributes of older peer leaders of such groups. Current understanding of effective older peer leader attributes has therefore been generalized from studies examining attributes of professional physical activity instructors and younger peer leaders. Attributes expected of professional instructors may not always apply to volunteer peer leaders who interact with individuals of equal status and similar age, background, and abilities (Ramis et al., 2015). Other research examining peer leader attributes has been conducted outside the physical activity domain, for example, exploring attributes of peer mentors for cancer survivors (Pomery et al., 2016). However, it is unclear to what extent these findings apply to peer walk leaders interacting with healthy older adults. Second, existing leadership scales such as the leadership traits questionnaire (Northouse, 2013) have solely been developed for and used with younger populations (e.g., Jevtic, 2012) and may not be relevant to older peer leaders. It is, therefore, unclear to what extent existing questionnaires capture peer leadership characteristics perceived to be important by older people to promote walking. A comprehensive understanding of older peer leader attributes is, therefore, needed to help advance programs using peers to promote physical activity in an older population (Thøgersen-Ntoumani et al., 2019; Yan et al., 2009). Hence, the first aim

of the study was to identify effective older peer leader attributes, using a mixed-methods approach.

Past research on older physical activity leaders (e.g., Estabrooks et al., 2004) has examined highly heterogeneous samples in terms of physical activity levels, functional capability (Aoun et al., 2017), and motivation for engaging in physical activity (Dacey et al., 2008; Thøgersen-Ntoumani et al., 2008). Individual differences in physical capability (and degree of physical independence) may determine the level of support walkers expect from a leader. Further, differences in physical activity experience and self-efficacy (Wilcox et al., 2015) might affect what leaders perceive as effective peer leader attributes. For example, a leader who has been active all their life may not intuitively understand why a similar aged novice walker might require multiple breaks and a safe walking path. It is currently unknown whether perceptions of effective leadership attributes vary as a function of current levels of physical activity and leadership experience. The second aim of the study was, therefore, to compare the perceptions of effective leadership attributes as perceived by inexperienced walkers, experienced walkers, inexperienced peer leaders, and experienced peer leaders.

Methods

Research Design.

A concurrent, convergent mixed methods triangulation design was used (Creswell, 2018). Concurrent triangulation refers to collecting and analysing quantitative and qualitative data during the same phase of the research (Creswell, 2018). The convergent design allowed us to analyse quantitative and qualitative data independently, and then merge them during interpretation (Creswell, 2018). The

design enables a comprehensive understanding of complex personal and social phenomena and helps to identify and elaborate on peer leader characteristics that may have not been captured previously (Creswell et al., 2011; Hsieh & Shannon, 2005). Our study was qualitatively driven, with quantitative components adding perceptions of importance. Qualitative data were obtained from semi-structured interviews and open-ended questionnaire responses. Quantitative data was obtained from responses to the leadership traits questionnaire (Northouse, 2013) and an emotional intelligence questionnaire (Goleman, 2004). Device-derived physical activity data and questionnaire responses on participant characteristics (demographics, leadership experience, and group walking experience) allowed us to quantitatively compare different participant groups.

Procedure.

Ethical Statement.

Ethical approval was obtained from Curtin University's Human Research Ethics Committee. Participants were eligible to take part if they did not have any known major illnesses that affected their ability to complete questionnaires and were at least 60 years old. Interested participants were provided with an information sheet and were asked to sign a written informed consent form.

Recruitment and Inclusion Criteria.

Purposive snowball sampling techniques were used (Palinkas et al., 2015) to sample four different groups of older adults: older adults who were already active walkers in a peer-led walking group (experienced walkers), older adults already acting as peer leaders of a walking group (experienced peer leaders), older adults interested in becoming peer leaders of a walking group (inexperienced peer leaders),

and older adults who expressed interest in joining a walking group as a walker (inexperienced walkers).

Experienced peer leaders needed to have acted as a peer leader of a walking group for at least six months. Experienced walkers were required to have participated as regular (at least once/week) walkers in a peer-led walking group for at least six months. Experienced walkers and experienced peer leaders were recruited from four peer-led mall walking groups. Mall walks have been shown to provide a safe, accessible, and affordable exercise environment for older adults (Farren et al., 2015). Peer leaders served as event organizers, offered guidance, and demonstrated stretching exercises before and after the walk. To recruit experienced walkers and leaders, flyers were emailed to organizers of five mall walking groups; the researcher attended invited mall walks, and obtained help with recruitment from peer leaders (Palinkas et al., 2015).

Inexperienced group walkers and peer leaders needed to have no recent (last twelve months) experience in being part of a walking group and were recruited from 14 retirement villages in and around Perth, Western Australia, as part of a larger peer led trial (the Residents in Action trial; Thøgersen-Ntoumani, Wright, et al., 2017). To recruit residents, the researcher disseminated flyers and invitation letters, and approached residents at the retirement villages during organised coffee mornings.

Upon completion of an interview, willing participants were provided with an ActivPAL device and given the questionnaire pack, both of which were collected by the researcher one week later. All participants received a $20 shopping or restaurant voucher in appreciation of their time.

Participants and Measures.

Participant Characteristics.

Socio-demographic measures. Demographic data, group walking, and leadership experience were collected via the questionnaires administered. Experienced walkers were asked to indicate for how long they had been participating in group walks. Experienced and inexperienced peer leaders were asked to list and provide details on previous and current general leadership roles.

Physical activity engagement. Physical activity behaviour was measured using an ActivPAL micro 3 device (PAL Technologies, Glasgow, UK), a triaxial accelerometer which classifies activity into periods spent sitting or lying, standing, and stepping (Dahlgren et al., 2010). The ActivPAL has been validated for walking in older adults and has good accuracy and adequate test-retest reliability (Dahlgren et al., 2010; Reid et al., 2013). Devices were waterproofed using a nitrile sleeve and attached (by a researcher) on the midline anterior aspect of the right thigh of each participant, using adhesive medical dressing. Participants were asked to wear the device 24 hours a day, continuously for seven consecutive days, complete a log of sleep and wake times, and make a note if they removed the device. The time-stamped events XYZ.csv files from the ActivPAL software (version 7.2.38) were processed using a validated algorithm in STATA (StataCorp) to calculate outcomes for the waking day (Edwardson et al., 2017). Additional information on administration of the ActivPal and the calculation of physical activity outcomes is provided in Appendix D).

Quantitative Measures on Peer Leader Attributes.

Perceived attributes of effective peer walk leaders. An adapted version of the leadership traits questionnaire (Northouse, 2013), and five additional items capturing

dimensions of emotional intelligence, as defined by Goleman (2004), were administered to experienced walkers (Details on all Items are presented in Appendix F, Table 7.28). This scale has been found to be reliable and valid in capturing peer leadership traits and emotional intelligence in younger populations (Jetvic, 2012). We asked experienced walkers to indicate the extent to which they agreed that a peer leader they consider most effective exhibited each of the traits (e.g., being "Conscientious: thorough, organized and controlled") using a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Important attributes of prospective peer walk leaders. The same items presented to experienced walkers were given to inexperienced walkers who were asked to indicate the extent to which they perceived the traits as being important for an effective peer leader of a walking group, using a scale ranging from 1 (*not at all important*) to 5 (*very important*).

Qualitative Measures on Peer Leader Attributes.

Desired attributes of an effective peer walk leader. An interview schedule was developed and adapted, following pilot interviews with two participants from each subgroup. Semi-structured face-to-face interviews were conducted by the researcher, a female PhD student with previous training in qualitative research (for further details see Appendix A) and lasted between 19 and 28 minutes and were audio-recorded. To obtain responses on desired peer leader attributes, all participants were asked "*What do you think are key traits, skills, and behaviours of a peer leader who is effective at leading a walking group for older adults?*". Interviews of experienced walkers/leaders were conducted after mall walks in a coffee shop in a quiet area of the mall. Interviews with inexperienced walkers/leaders took place in retirement villages, either in the residents' home or a quiet part of the shared community village

hall. The majority of the interviews (60/68) were conducted on an individual face-to-face basis. Eight participants, all of whom were inexperienced walkers living in retirement villages, were interviewed in a group setting. Additional qualitative measures included open-ended questionnaire responses on effective leadership traits, skills, and behaviours.

Analysis.

Quantitative Analyses. All quantitative analyses were conducted using SPSS for Mac (Version 25). Data normality was determined using a Shapiro-Wilk Test. Normally distributed data are reported using means (*M*) and standard deviations (*SD*) and non-normally distributed data are reported using medians (*Mdn*) and Interquartile range (*IQR*). Independent t-tests (for normal data), Mann-Whitney U tests (non-normal data and ordinal data) and Chi-square tests of independence (for nominal data) were used to determine differences across different participant groups.

Qualitative Analyses. Interviews and open-ended questionnaire responses were transcribed verbatim by the researcher. Inductive conventional content analysis was used to analyse the qualitative data from both interviews and open-ended questions to identify perceptions of an effective peer leader (Elo & Kyngas, 2008; Hsieh & Shannon, 2005). NVivo 12 was used to identify frequent terms in transcripts, which assisted with the initial coding procedure. All text or code that represented or described attributes was divided into meaning units. Attributes were defined as being a "skill or a characteristic that is inherent or can be modified". Meaning units ranged from single words (e.g., "outgoing") to sentences depicting similar meanings (e.g., "has to be someone who loves communicating with people, a people's person"). Meaning units were then organized into 19 distinct codes, which consisted of words and concepts with similar meanings (e.g., "kind" and "nice" were

coded as "friendly"). Codes were then grouped into nine categories, which were assigned to three overarching themes. Further details on the coding process are provided in Appendix D. Wordle, a web-based text visualization tool (www. wordle.com), was used to create an overall word cloud representation of mentioned codes, and to enable visual comparisons of mentioned categories across participant groups (Viegas et al., 2009). Word clouds have previously been used to present data from content analysis (Douma et al., 2017; McNaught & Lam, 2010).

Results

Participant Characteristics.

Demographics.

A total of 101 participants completed the survey, of whom 68 were also interviewed. Demographic characteristics are presented in Table 4.1.

Table 4.1

Demographic Characteristics of Overall Sample.

	All		Interviewed	
	N	% unless stated otherwise	*N*	*%* unless stated otherwise
Age, years	101	*M* = 75.36	68	*M* = 74.68
		SD = 7.59		*SD* = 7.78
		Range = 60-93		Range = 60-93
Gender (Female)	80	79.0	57	83.8
Ethnicity (White)	96	95.0	63	92.6
Australian born	67	66.3	37	54.4
Living alone	60	59.4	47	69.1
Marital status				
Married	40	39.6	21	30.9
Widowed	35	34.7	24	35.3
Separated	18	17.8	17	25.0
Never married	8	7.9	6	8.8
Highest level of education				
Secondary education	53	51.5	34	50.0
Vocational training	22	21.8	15	22.1
College or university	26	25.7	19	27.9
Employment				
Employed	8	7.9	7	10.3
Retired	93	92.0	61	89.7
Health				
Use of assistive device	19	18.8	13	19.1
Current health issue	44	43.6	27	39.7
Major life event, last 6 months	46	45.5	28	41.2

Note: *M* = mean, *SD* = standard deviation

Participants who were interviewed were more likely to live alone than the remaining sample (69% vs. 39%, X^2 (1) = 8.14, *p* < .01), but did not differ on any other socio-demographic characteristics. Overall, peer leaders were younger (*M* = 73 years, *SD* = 5.86, range = 63-88 vs. *M* = 77 years, *SD* = 8.17, range= 60-93, t (98) = -2.97, *p* < .05) than walkers, but did not differ on any other socio-demographic variables.

Physical Activity Engagement.

Two participants were excluded from the ActivPAL analysis due to an invalid device output and a wear time of less than three days. Participants wore the ActivPAL monitor for an average of 16 hr/day (*IQR* = 1.70 and for 7 valid days; *IQR* = 1, range 3-14 days). Overall average step count (*Mdn* = 3433 steps day, *IQR* =1,992) was below recommended levels for older adults (Lee et al., 2019). Peer leaders spent a longer time engaged in MVPA than walkers (*U* = 885, p = .035) and achieved a higher step count (*M* = 3,829 steps/day, *SD* = 1,445, *N* = 40) than walkers (*M* = 3,165 steps/day, *SD* = 1,328, *N* = 59), t (97) = 664, p = .025; confidence interval (CI) = 105 – 1,223). Experienced walkers were more active (higher step count, longer time in MVPA, less time standing, longer time stepping) than inexperienced walkers, who represented the least active group (Appendix D, Table 7.12). Experienced peer leaders represented the most active group and spent a longer time stepping than inexperienced peer leaders (Appendix D, Table 7.13).

Quantitative Questionnaire Data on Leadership Traits and Emotional Intelligence.

Perceived Attributes of Effective Peer Leaders.

Experienced walkers perceived effective peer leaders to be outgoing, friendly, articulate, dependable, socially skilled, and empathic with low levels of self-assurance (Table 4.2).

Table 4.2

Peer Leader Attributes Exhibited by Walk Leaders Perceived as Effective by Experienced Walkers.

Leadership Traits Questionnaire Items	M (SD) 5 = Strongly Agree and 1 = Not at all agree [1]	% Agree/Strongly Agree
Outgoing	4.72 (0.57)	94.4
Friendly	4.67 (0.59)	94.4
Articulate	4.67 (0.97)	94.4
Dependable	4.67 (0.59)	94.0
Conscientious	4.61 (0.61)	94.4
Sensitive	4.56 (0.70)	88.9
Trustworthy	4.50 (0.71)	88.9
Determined	4.44 (0.62)	94.4
Self-confident	4.06 (1.21)	83.3
Perceptive	4.11 (1.28)	83.3
Persistent	4.11 (0.68)	83.3
Self-assured	3.89 (0.68)	72.2
Emotional Intelligence Questionnaire Items	*M (SD)*	*%*
Social skill	4.33 (0.69)	88.9
Empathy	4.28 (0.67)	88.9
Motivation	4.28 (0.75)	83.3
Self-regulation	4.06 (0.64)	83.3

Note. SD = standard deviation, *N* =18
[1] = Experienced walkers' responses to: *To what extent does your most effective peer walk leader exhibit the following traits?*

Perceived Importance of Attributes for Prospective Peer Leaders.

Inexperienced walkers rated friendliness and dependability as the most important attributes of peer walk leaders. Being persistent and self-assured were rated as least important (Table 4.3).

Table 4.3

Peer Leader Attributes Perceived as Important by Inexperienced Walkers.

Leadership Traits Questionnaire Items	M (SD) 5 = Very important and 1 = Not at all important [1]	% Important/ Very important
Friendly	4.44 (0.59)	95.3
Dependable	4.42 (0.54)	97.7
Outgoing	4.33 (0.64)	90.7
Articulate	4.21 (0.60)	90.7
Sensitive	4.23 (0.65)	88.4
Trustworthy	4.12 (0.79)	79.1
Conscientious	4.02 (0.77)	76.7
Determined	3.88 (0.85)	79.1
Self-confident	3.93 (0.74)	81.4
Perceptive	3.86 (0.80)	72.1
Persistent	3.70 (0.77)	65.1
Self-assured	3.70 (0.74)	62.8
Emotional Intelligence Questionnaire Items	*M (SD)*	*%*
Self-Awareness	4.14 (0.71)	86.0
Social skill	4.07 (0.86)	72.1
Empathy	4.07 (0.80)	81.4
Motivation	4.02 (0.94)	79.1
Self-regulation	4.07 (0.91)	86.0

Note. SD = standard deviation, *N* = 43 1 = Inexperienced walkers' responses to: *How important is it for a prospective peer walk leader to have the following traits?*

Qualitative Interview Data on Desired Attributes of an Effective Peer Walk leader.

Overall Sample.

The researcher identified 440 meaning units. Details on the organization of identified themes, categories, and codes are illustrated in Appendix D (Figure 7.7). Across the whole sample, the most frequently mentioned attributes of a peer leader were being optimistic (55%), friendly (42%), and compassionate (39%). Figure 4.1 illustrates the frequency of mentioned codes across the whole sample.

Figure 4.1

Representation of Overall Frequencies of Codes Across the Whole Sample.

Note. $N = 101$, Larger words represent higher frequencies.

Frequencies and examples of each theme and category are presented in Table 4.4. Further information on the frequencies and examples of individual codes are presented in Appendix D (Tables 7.14 - 7.16).

Table 4.4

Illustrative Quotes of Identified Categories and Percentage of Participants Mentioning each Category and Theme.

Themes and Categories	Example Quotes	%
Theme 1: Credible		67
Category 1: Competent Code 1: Confident Code 2: Articulate Code 3: Authentic	"If you are not very good at doing something and the person showing you isn't very good, you think you are ok. So, if you're walking is bad, you need an upright, athletic person. To say, 'Come on' and say, 'Oh yes, she has got a straight back, I must straighten my back'. See what I mean? You have got to have something to follow." IGW	35
Category 2: Adaptable Code 4: Democratic Code 5: Problem solving skills	"I know some people can walk quite slowly and then somebody else isn't getting any benefit. I guess it's a matter of being able to manage the group in a way that would suit everybody." IPL	34
Category 3: Dependable Code 6: Trustworthy Code 7: Organized	"You need a definite personality to be sure you'll know that they are sure they are doing everything properly and looking after you and then you have got confidence in that person." IGW	31
Theme 2: Motivating		84
Category 4: Entertaining Code 8: Fun Code 9: Stimulating	"I think these leaders definitely have to have a sense of humour. There is humour in everything. You got to look for it and know how to deliver it. And you get people laughing and they'll say, 'Oh wasn't that fun' because they go home happy." IGW	36
Category 5: Encouraging Code 10: Optimistic Code 11: Enthusiastic	"You need a personality that is going to encourage them and boost them up a bit. More than "Come on, you be there at 5 o clock in the morning". Someone who is positive." IPL	57
Category 6: Sociable Code 12: Outgoing Code 13: Social skills	Can communicate and can listen. Somebody who can speak from up this level to down that level because some people are rather up market. Can communicate on all levels." IPL	34
Theme 3: Likable		70
Category 7: Inclusive Code 14: Friendly Code 15: Welcoming	"Friendly and welcoming. I was a complete stranger. And they welcomed me like they had known me for years." EGW	51
Category 8: Sensitive Code 16: Compassionate Code 17: Non-demanding	"You have got to have patience and understanding. Because some people will be walking really slowly or something or complaining or something like that." IGW	45
Category 9: Caring Code 18: Interested Code 19: Helpful	"They need to be responsive to people's needs. For example, if she is struggling.? Say, 'Go sit down on your walker for a minute.'" IGW	24

Note. IGW = Inexperienced group walker, IPL= Inexperienced peer walk leader
EGW = Experienced group walker, EPL = Experienced peer walk leader, *N* = 101.

Overall Comparison Across Sub-groups.

Similarities and differences in perceptions on what constitutes an effective older peer leader were analysed across the four groups of older adults for each category. Figure 4.2 illustrates the frequency of qualitative responses (categories) on effective leadership attributes for each participant group.

Figure 4.2

Frequencies of Categories Mentioned Across Different Subgroups of Participants.
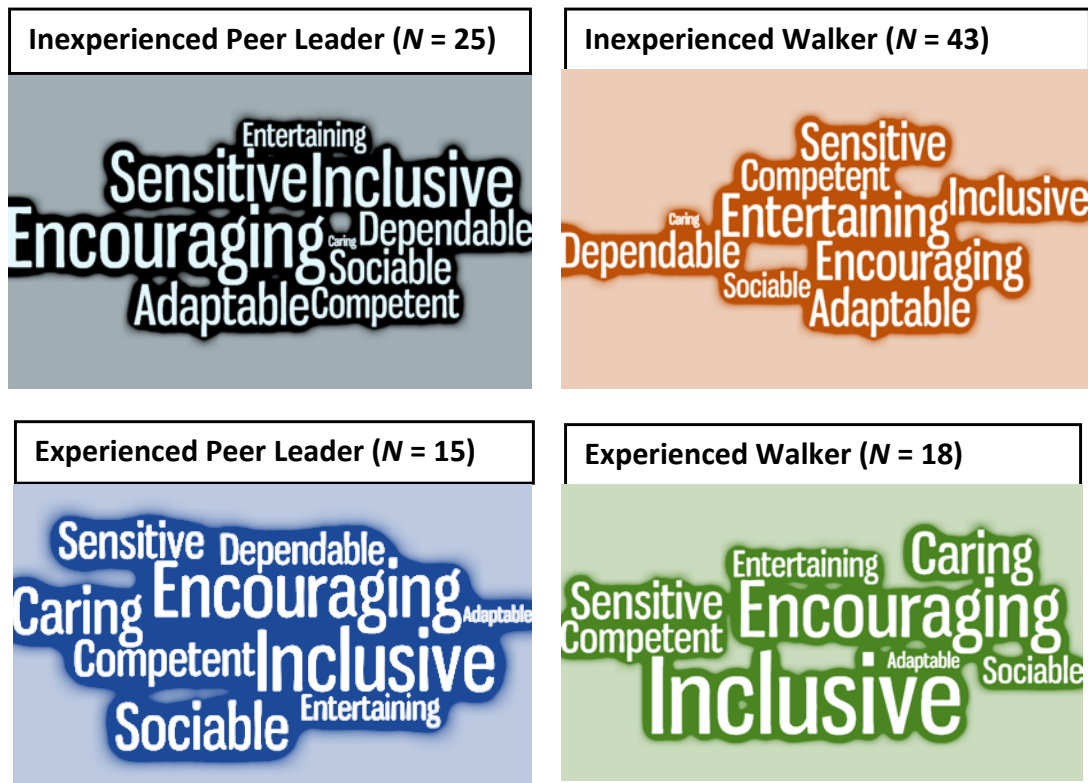
Note. Larger words represent higher frequencies.

Theme 1: Motivating.

The majority of experienced and inexperienced leaders (90%) and a large proportion of experienced and inexperienced walkers (79%) emphasized attributes pertaining to being a motivating peer leader. This theme referred to the peer leader engaging in social interaction (sociable), providing positive encouragement (encouraging), and creating a fun experience (entertaining).

Sociable. The category "sociable" included the peer leaders' desire (i.e., being outgoing) and ability (i.e., social skills) to form social relationships. The code "outgoing" was linked to the leader being socially confident, often described as being a "*people's person*", enjoying the company of others, and being talkative. Associated behaviours included the leader proactively interacting with walkers during the walk and associated social events (e.g., arranging coffee following walks). Social skills were described as the leader listening and effectively communicating with different types of people and having an ability to manage group conflicts.

Only a small proportion of experienced and inexperienced walkers mentioned social skills (18%) and outgoing (12%) as important attributes during interviews. However, when presented with the leadership traits questionnaire, most walkers perceived it as important for the peer leader to be socially skilled (72%) and outgoing (getting along with others, 91%). During interviews, the majority of participants likened getting along with others to being friendly but not necessarily outgoing. We, therefore, coded "*getting along with others*" as friendly.

Encouraging. The category "encouraging" entailed the leader being able to encourage walkers with enthusiasm and optimism. Several participants emphasized the importance of a positive mindset that looks beyond the challenges of older age and focuses on "bringing the best out in people", as suggested by one inexperienced

group walker. Being "positive" was frequently linked to having a happy, encouraging, and uplifting personality that has the potential to distract people from their problems. Enthusiastic was described as being "*motivated*" and enjoying the role as a leader, and exhibiting "*infectious enthusiasm* ", as noted by one of the inexperienced walkers.

   Entertaining. The category "entertaining" encompassed the leader being fun (e.g., having a sense of humour) and interesting (e.g., engaging in stimulating conversations). Several participants perceived this attribute as the ability to make others laugh and get mental stimulation during their walk. Participants mentioned that they would be motivated to join a walk, which was interesting and where "not all was about walking but about a designated goal and theme". For example, a trip to an interesting place where the entertainment was the focus and not the walking per se, often had more appeal and potential to reduce the fear of not being competent enough to participate in the activity. For several walkers, "entertainment" helped them feel distracted from barriers, such as pain and lack of motivation.

   Comparison Across Sub-groups.

   Leaders. Overall, peer leaders mentioned motivating attributes relating to optimism (70% vs. 44%, $p < .01$, $U = 906$) and sociability (45% vs. 26%, $p = .052$, $U = 991$), in particular being outgoing, more frequently than walkers. In particular, experienced peer leaders were most likely to perceive it important for the peer leader to be motivating through being sociable (53%).

   Walkers. A large proportion of inexperienced walkers (72%) and most (87%) experienced group walkers mentioned attributes relating to the leader being motivating. The majority of experienced walkers mentioned the importance of an optimistic leader (61%). Inexperienced walkers perceived as most important for the

leader to be motivating using entertainment (48%). In particular, walkers who were older (over 75 years, $n = 52$) frequently mentioned the need for a fun or stimulating peer leader.

Theme 2: Likable.

Attributes relating to likability pertained to the peer leader being inclusive, sensitive, and caring, and was primarily mentioned by participants with recent group walking experience (79%).

Inclusive. Many walkers (42%) highlighted the importance of being friendly, which was described as a person who can make walkers feel comfortable and who gets along with others. Twenty-nine percent of the participants emphasized the need for a peer leader who is welcoming. Related behaviours included introducing new walkers, remembering names, and treating everybody the same regardless of their capability. An effective peer leader was frequently perceived as the person helping people to connect with others during the walk.

Sensitive. The category "sensitive" included being compassionate and non-demanding. Compassion was frequently (39%) mentioned and entailed being patient, tactful, tolerant, empathic, and understanding. Being tolerant and patient was often linked to the peer leader accepting and waiting for slower walkers. Several participants emphasized the need for the peer leader to understand that some walkers might be slower due to their physical limitations. Tact referred to the peer leader being non-judgmental and ensuring that walkers retained their "face" despite their limited capabilities. Fifteen percent of participants emphasized the importance of the peer leader being non-demanding, that is, not exercising any pressure and prioritizing safety over achievement.

Caring. The majority of the interviewees (85%) stated that "feeling confident at walking" (i.e., self-efficacy) was important to them when walking as part of a group. Several participants mentioned a lack of confidence, fears of falling, big variations in pace among residents, and reliance on walking aids. Being caring entailed showing genuine interest in others, such as the willingness to create a meaningful connection with walkers by, for example, taking time to interact with walkers and asking them about their wellbeing. Eighteen percent of participants emphasized that an effective peer leader would need to be proactively helpful. This included being observant and, when noticing a walker struggling, to ensure they keep within their limitations, feel cared for, and remain safe. Other behaviours included helping walkers remember days that the walks take place and helping them feel confident.

Comparison Across Sub-groups.

Leaders. Experienced peer leaders perceived it most important for the peer leader to be inclusive (73%), and mentioned attributes relating to the category caring (53% vs. 12%, $p < .01$, $U = 110$) and welcoming (73% vs. 16%, p < .01, $U = 80$) more frequently than inexperienced peer leaders.

Walkers. Experienced walkers perceived it important for the peer leader to be likable (94%) by being inclusive (83%). Inexperienced walkers emphasized the importance of sensitivity (41%) but mentioned attributes relating to being inclusive less frequently (31% vs. 83%, $p = .01$, $U = 269$) than experienced walkers. Attributes pertaining to leader likability received least attention among inexperienced walkers aged 75 years and older.

Theme 3: Credible.

The theme "Credible" pertained to the categories of leadership competence, adaptability, and dependability and was primarily mentioned by interviewees without recent group walking experience (75%).

Competent. The category competent included being articulate, confident, and authentic. Being articulate (mentioned by five participants) described the ability to convey information effectively (e.g., give instructions and guidance) and demonstrate public speaking skills. Several participants emphasized the importance of the leader speaking loud, clear, and repeating instructions. The need for a confident leader was frequently mentioned (27%) and related to the leader being proactive, charismatic, experienced, and showing leadership skills. For example, the leader was expected to be skilled at making decisions, setting the pace, and initiating the walk. Sixteen percent of the participants mentioned attributes relating to authenticity, which involved being a role model, leading by example, being fit, skilled at walking, and knowledgeable about physical activity (e.g., able to demonstrate stretching exercises).

Adaptable. The category adaptable was perceived as important by many participants and referred to the leader needing to be someone who can adapt to different levels of physical ability within the group and at the same time, manage to keep the group together. Related codes were eliciting and considering feedback from walkers (democratic mentioned by 27%), and ensuring that challenges (e.g., different paces) are adequately addressed while keeping the group together (problem-solving skills mentioned by 13%).

Dependable. Many participants emphasized the importance of a dependable peer leader during interviews. The associated code "trustworthy" entailed the leader

being reliable and responsible- someone walkers can rely on and trust with their health. A critical aspect of this code was that the leader needed to convey confidence in walkers or help them feel safe in their company. Conveying confidence entailed the leader having theoretical know-how (i.e., answer questions about all aspects of the walk), practical know-how (e.g., know what to do in emergency situations), physical competence (e.g., looking sufficiently healthy to be in charge), and having a responsible personality (e.g., being able to take charge in emergency situations, ensuring that the walk is safe, and nobody is left behind). Being "organized" included the leader being prepared and demonstrating organizational skills. As an example, the leader was expected to ensure that they check the weather beforehand and have a plan on walk duration and route. Many suggested that the leader should provide a program that specified all details of the walk.

Comparison Across Sub- groups.

Leaders. Most inexperienced peer leaders perceived credibility as important (in particular, leadership competence, 52%). For experienced peer leaders, categories relating to credibility (in particular being organized) were less salient. Inexperienced peer leaders mentioned attributes pertaining to adaptability more frequently than experienced leaders (48% vs. 13%, $p = .028$, $U = 123$).

Walkers. Similar to inexperienced peer leaders, credibility as a leader was emphasized by inexperienced walkers (71%), with over a third describing the importance of dependability (38%). Inexperienced walkers mentioned dependability (38% vs. 0%, $p < .01$, $U = 243$) more frequently than experienced walkers. Several older and less confident adults reported being afraid to walk by themselves and stated that an organized walk with entertainment would be appealing, as it allowed them to experience a change of scenery in a safe environment. Attributes pertaining to

leadership credibility were less frequently mentioned among experienced walkers (39%), in particular, dependability (0%).

Discussion

The aim of the present study was to identify perceptions of effective walk peer leader attributes in different groups of older adults. It was found that, overall, older adults perceived it most important for a peer leader to be optimistic, inclusive, and compassionate. Two important attributes not addressed in the leadership literature (i.e., entertaining and adaptable) were identified via our interviews. Additional attributes (i.e., caring, encouraging, inclusive) identified in the present study are not captured by existing leadership questionnaires.

The overall importance of a likable peer leader (friendly, inclusive, compassionate) is in line with meta-analytical research examining peer mentors for cancer survivors (Pomery et al., 2016). The finding that a peer leader needs to be optimistic aligns with past research on the importance of older physical activity leaders having a positive attitude (Estabrooks et al., 2004). Optimism was not captured in the leadership traits questionnaire (Northouse, 2013) but has been argued to be a component of emotional intelligence (Goleman et al., 2004). Emotional intelligence has been associated with transformational leadership behaviours (Kim & Kim, 2017; Webb, 2009), which, when enacted by peer mentors, have been associated with positive outcomes in older adults (Beauchamp et al., 2016).

The results of the present study suggest that different groups of older adults have different expectations from an older peer leader, and support past research highlighting older adult heterogeneity (Thøgersen-Ntoumani et al., 2008). Both inexperienced peer leaders and inexperienced walkers emphasized the importance of

credibility. Inexperienced walkers perceived it most important for a prospective peer walk leader to be dependable, while inexperienced peer leaders emphasized adaptability. Previous physical activity leader research with older adults supports the importance of a dependable leader, that is one who conveys confidence (Aoun et al., 2017; Schneider et al., 2003) and is conscientious (Hawley-Hague et al., 2014). We add the insight that dependability may be more important for inexperienced walkers than for experienced walkers. A possible reason may be that experienced walkers exhibited higher levels of self-efficacy for walking, due to already being physically active, while inexperienced walkers may join a group walk to help them build confidence for walking and exercise in a safe environment.

Peer leaders perceived as effective by active walkers presented themselves as outgoing, which aligns with the importance of extraversion in the general leadership literature (Judge et al., 2002). The literature is inconsistent as to whether older adults perceive being outgoing or sociable as a desirable (Estabrooks et al., 2004) or undesirable (e.g., Hawley-Hague et al., 2014) attribute of a physical activity leader. It was found that sociability was perceived to be most important for participants who were physically active but less important for older, physically inactive participants and inexperienced walkers. A possible reason may be that the older adults who are sufficiently confident to walk on their own would prefer to join a group to increase social interaction (Bethancourt et al., 2014; Kassavou et al., 2015), and hence might be looking for a peer leader who is highly sociable.

The dominant role of an entertaining (e.g., humorous) leader among older and inexperienced walkers is consistent with previous research highlighting the importance of fun in physical activity interventions for older people (Devereux-Fitzgerald et al., 2016). Qualitative research suggests that older adults who decline

participation in physical activity interventions enjoy physical activity less than those who participate (Schneider et al., 2003). A walk leader who is perceived as fun and entertaining may increase the intrinsic motivation of such individuals to participate. Enjoyment and social/emotional benefits while exercising have both been linked to higher levels of physical activity in older adults (Dacey et al., 2008).

Strengths and Limitations.

This is the first study to compare perceptions of effective peer leadership attributes between active and less active older adults, and between active peer leaders and non-leaders. The strength of this study lies in its mixed-methods design which allowed me to determine the perceived importance of previously identified attributes for peer leadership, while allowing me to identify new attributes that would not have been detected if I had used a solely quantitative methodology. The design also allowed me to compare different perspectives on leadership effectiveness as a function of prior leadership experience, walking group status, age, and physical activity levels. Further, I recruited a relatively high proportion of participants older than 75 years, an under researched age group (Brunet & Sabiston, 2011). This allowed me to gain important insight on the perceptions of the type of peer leader that can motivate this age group to increase physical activity.

The present study may be limited by the use of a cross-sectional design, and a bias towards older, white women and those who are interested in group walking. Future researchers may choose to examine male populations, other ethnicities, and target individuals who are not interested in group walking. Second, two of the groups are smaller ($n = 15$ and $n = 18$) than the other groups, which suggests the need for larger quantitative analysis to replicate the present findings. Future research could also use a longitudinal design to examine within-person changes in perceptions of

what is considered an effective leader, by both walkers and leaders as they become more experienced. Further research is needed to confirm the actual importance of the suggested traits by measuring their impact on behaviour maintenance and health outcomes.

Implications.

The results of this study can inform the selection and training of peer leaders in future physical activity interventions. The range of identified attributes could be included in future peer leader scales. The findings can also help organisers of community-based walking programs to identify the presence/absence of skills necessary to act as an effective peer leader for different groups of older adults. Older peer volunteers could then be supported to develop desired attributes through being offered training in relevant skills, in particular, in the attributes that are modifiable rather than fixed. While innate traits such as being outgoing may not be trainable, social skills can be taught to those lacking social confidence (Goleman et al., 2004). Similarly, an individual who has had a leadership role in a different context could be trained to understand the requirements of the older age group (e.g., dependability and emphasis on safety) to avoid intuitively using habitual strategies (e.g., emphasis on competition) that are not suitable in this specific context. Further recommendations of trainable skills for each attribute are presented in Table 7.17 (Appendix D). An awareness of the diversity of needs of different groups of older adults may help understand how to better reach older adults and understand why socially oriented walking interventions primarily reach active walkers.

In future, it would be interesting to examine if the identified attributes generalize to older peer leaders beyond physical activity settings such as to choir leaders or crafts instructors. The identified traits can also inform future research such

as the development of questionnaires designed to identify effective older peer

leaders.

CHAPTER 5 - STUDY 4

How Can Older Peer Leaders Best Support Self-Determined Motivation for Walking in Physically Inactive Older Adults? A Self-Determination Theory Perspective

Note: The following chapter has been written up for publication and is currently under review by "*Psychology and Health*".

The submitted abstract is provided in Appendix G.

Introduction

Walking is popular among older adults and is an effective and safe way to meet physical activity recommendations (Ainsworth et al., 2000; Amireault et al., 2019). Older adults who engage in regular walking have better physical health and more social contact in comparison with their physically inactive peers (Diehr & Hirsch, 2010; Ji et al., 2017; Nathan et al., 2014). However, it is still unclear how older people can be best supported to increase and sustain their physical activity behaviour.

Older adults who fail to be sufficiently active often lack the interest, social support or confidence to be physically active (Gellert et al., 2015; Kosteli et al., 2016; Ory et al., 2016). Many older adults prefer doing physical activity in a group setting (Chong et al., 2014) or benefit from an exercise partner (Zubala et al., 2017). Group walks offer a safe environment for older adults to become physically active (Morris et al., 2019), socially integrated (Farrance et al., 2015) and improve their health (Hanson & Jones, 2015). However, many seniors fail to take part, or sustain the behaviour in such programs (Stiggelbout et al., 2006; Thøgersen-Ntoumani et al., 2019). Findings from Study 3 (presented in the previous chapter) highlight the importance of a motivating older peer walk leader. Building on these findings it is important to enhance understanding of *how* to effectively motivate and encourage older adults to join and maintain involvement in group walks.

Self-Determination Theory (SDT; Ryan & Deci, 2017) provides a useful framework to understand adoption and sustained engagement in health-promoting activities such as group walks (Ntoumanis et al., 2020). According to SDT, human behaviour is determined by the extent to which an individual exhibits self-determined motivation towards the behaviour, in other words, engages in a behaviour because it

is fun, useful, or an integral part of one's identity. The theory proposes that self-determined motivation requires the satisfaction of three basic psychological needs, those for competence, relatedness, and autonomy (Deci & Ryan, 1987; Ryan & Deci, 2000). The need for competence refers to an individual's need to feel capable of achieving the desired outcome. In the context of walking groups, examples include feeling able to keep up with the group and confident in completing the full walk. The need for relatedness captures an individual's desire to experience a sense of belonging and connectedness with others (Ryan & Deci, 2000). In a walking group, this may involve the desire to feel part of the group and experience meaningful relations with other members of the group. The need for autonomy pertains to an individual's desire to experience a sense of choice and feel in control of their behaviour. For example, an individual may wish to be able to walk at their own pace and have the opportunity to stop/take a break when feeling tired. The satisfaction of basic psychological needs has been associated with self-determined motivation and higher levels of physical activity behaviour across the lifespan. (Dacey et al., 2008; Ntoumanis et al., 2020).

SDT suggests that by engaging in a need-supportive communication style, individuals in positions of authority (e.g., teachers, exercise professionals), can foster the satisfaction of these three basic psychological needs in an individual, thereby promoting the individual's self-determined motivation (Ntoumanis et al., 2018; Teixeira et al., 2020). Autonomy can be supported by acknowledging the feelings and perspectives of group members, providing individual choice, and minimizing pressure (Reeve et al., 2004). Relatedness can be supported by providing group members with unconditional positive regard, affection, and warmth (Ng et al., 2012; Ntoumanis et al., 2020). Competence can be supported by the provision of structure,

clear guidance and realistic goals, as well as timely and informative feedback (Hancox, 2015; Reeve et al., 2004). In contrast, a leader who tries to induce behavioural compliance by applying pressure or using extrinsic contingencies (e.g., rewards) is considered to be need thwarting.

In the physical activity domain, there is evidence to suggest that exercise instructors can be trained to be need-supportive, and that this can be effective in promoting self-determined motivation and behavioural engagement (Ntoumanis et al., 2017; Perez-Gonzalez et al., 2019). Research suggests that volunteer peer leaders- individuals who share similar age and circumstances and choose to take on a leadership role without formal qualifications- offer a low-cost alternative to professional instructors for delivering such programs (Ginis et al., 2013). Two recent intervention studies, therefore, have trained volunteer peers in need-supportive communication strategies to promote physical activity behaviour in older adults (Stathi et al., 2019; Thøgersen-Ntoumani et al., 2019). Such research has shown that peer-led walking programs provide an opportunity to use need-supportive social interaction to increase self-determined motivation, promote physical activity and encourage sustained behaviour change in older adults (Thøgersen-Ntoumani et al., 2019).

Intervention studies have relied on training volunteers in need-supportive strategies that were largely defined from research conducted with younger adults and professional instructors (e.g., Perez-Gonzales et al, 2019). However, evidence suggests that older adults are likely to differ from younger adults in how they respond to interventions (French et al., 2014), and, therefore, may have age-specific requirements not addressed by previously defined strategies. Only one study has specifically explored perceptions of an autonomy-supportive environment for older

adults (Souesme & Ferrand, 2019). Souesme and colleagues (2019) found that health professionals working in a geriatric setting, perceived trust-building, encouraging older adults to express themselves, and supporting their treatment progress, as detrimental to an autonomy-supportive environment. However, these findings did not provide information on the perceptions of the older adults and may not generalize to a peer-led physical activity setting.

In a recent review, researchers concluded that future studies could advance the delivery and effectiveness of peer-led interventions by identifying salient behaviours/strategies that can be used by peer leaders to promote behaviour change in the specific target population (Hulteen et al., 2019). SDT offers a useful framework for identifying such behaviours as it conceptualizes how different dimensions of support can affect motivation, physical activity and health behaviour. Among the few studies that have applied the concept of autonomy support to an older population, none have explored what older walkers and peer leaders perceive to be autonomy-supportive strategies. One study described the use and efficacy of previously defined strategies to an older walking cohort but did not explore additional age-specific strategies that can be provided by peer leaders (Thøgersen-Ntoumani et al., 2019).

The aim of the present study was to identify specific peer leader behaviours that can help older adults feel connected, autonomous, and confident when engaging in group walks. To achieve this, I examined perceptions of need-supportive peer leader behaviours, as reported by a heterogeneous sample of older adults (peer leaders and walkers with varying levels of group walking experience). The findings of this study can help understand how self-determination theory can be best put into

practice in interventions using peer leaders to motivate older adults to adopt and sustain walking.

Methods

Research Design.

Semi-structured interviews were conducted to obtain an in-depth understanding of the behaviours perceived important for supporting relatedness, competence, and autonomy in an older population. I used framework analysis to analyse the data, as it is comprehensive, flexible, and at the same time, allowed me to explore thematic categories that are shaped by the dimensions of the Self Determination Theory (Gale et al., 2013). Rather than being purely descriptive, the framework approach enables a conceptual explanation of the data (Furber, 2013). Another advantage of this method is that it allowed me to analyse a large, heterogenous (i.e., leaders and walkers) sample, and to balance breadth with depth (Ritchie & Spencer, 1994).

Participants.

The participants for this study were derived from study three described in the previous chapter (Kritz et al., 2020). In brief, 101 (walkers, $n = 61$; peer leaders, $n = 40$) participants, aged between 60 and 93 years, were purposively recruited from mall walking groups and retirement villages in and around Perth, Western Australia, using snowball sampling. All participants had to be at least 60 years old and show interest or experience in group walking either as a walker or as a peer leader. Experienced peer leaders and experienced group walkers, who had participated in a regular group walk (at least once per week) for a minimum of six months, were recruited from mall walking groups in Perth. Physically inactive retirement village residents (i.e.,

inexperienced group walkers) and inexperienced peer walk leaders (i.e., who never led a walking group before), who had expressed interest in being part of a walking group, either as a group leader or as a walker were recruited as part of the Residents in Action trial (RiAT). RiAT was a quasi-experimental trial that explored the feasibility and efficacy of a physical activity intervention to promote walking behaviour in older adults living in retirement villages (Thøgersen-Ntoumani et al., 2017; Thøgersen-Ntoumani et al., 2019).

Measures and Procedure

The study received ethical approval by the Human Research Ethics Committee of Curtin University (See Appendix H). All participants were informed about the nature of the study. Written informed consent was obtained prior to all interviews. Semi-structured interviews were conducted by the researcher and lasted 19-28 minutes. Participants were then provided with a questionnaire measuring demographic characteristics. Further details on the researcher are provided in Appendix A.

The interview guide was informed by principles of SDT to identify which specific behaviours were perceived effective in supporting feelings of relatedness, competence, and autonomy (Ryan & Deci, 2017). Each need was first explained to the participants. For example, relatedness was explained as the "the desire to feel part of the group and connect with other members of the group". Initial questions then asked about the role of the peer leader in promoting these psychological needs. For example, participants were asked to describe the importance of the need in determining their motivation to join and sustain a walking group, as well as the extent to which they thought a peer leader could support the respective need. To obtain responses on need-supportive behaviours, participants were then asked to list

peer leader behaviours that they believed were important in supporting each of the respective needs. For example, for relatedness, participants were asked: "Can you provide examples of things that a peer leader could say or do to help you feel connected or part of the group?". The complete interview schedule is provided in Appendix D (Table 7.11). The researcher conducted all the interviews and recorded initial reflections after each interview. Most of the interviews (60/68) were conducted on an individual, face-to-face basis. Eight participants, all of whom were inexperienced walkers living in retirement villages, were interviewed in a group setting. All interviews were audio-recorded using a voice recorder, transcribed verbatim by the researcher, and stored using pseudonyms to ensure anonymity.

Analysis.

Socio-demographic data were analysed using SPSS for Mac (Version 25) and presented as means and standard deviations (*M, SD*). Transcribed text was analysed using NVivo for Mac (Version 11.4.2). Data were extracted and synthesized. Using a predetermined thematic framework, we identified which need-supportive behaviours belonged to relevant needs defined by SDT. We followed the five stages of framework analysis as outlined in previous papers (Gale et al., 2013). During the familiarisation stage, the researcher reviewed a subsample (22/68 interviews) of the raw data in detail, read transcripts several times, and took notes of emerging patterns. In the second stage, notes were used to identify key issues, concepts and themes and to develop the pre-existing thematic framework (Ritchie & Spencer, 1994). Some codes were imposed upon the data based on the aims of the study (and the SDT framework), and some codes were generated based on themes emerging from the data itself. The resulting structure was then assessed, discussed, and agreed upon within the research team. Subsequently, the researcher used NVivo to index the

remaining data, which involved identifying which sections of the data corresponded to identified themes. After this, the thematic framework was reviewed again, sub-themes were identified, and a hierarchy of themes was established (charting). This was achieved by rearranging summaries of the data according to the thematic framework. To increase the trustworthiness of the findings, identified themes were discussed with the research team and revised if necessary. In the final stage, "mapping and interpretation", key characteristics as laid out in the chart were analysed and a schematic diagram of identified need-supportive behaviours was created. This process has been recommended to help guide the interpretation of the data (Srivastava & Thomson, 2009). To maintain analytical transparency, and ensure rigour, the researcher, recorded all methodological decisions, and their reasons, and reflected on potential biases during the interpretation process (Barry et al., 1999).

Results

Participant Characteristics.

Socio-demographic characteristics of all study participants are illustrated in Table 5.1. Thirty-one volunteer peer leaders and 37 walkers were interviewed and included in the overall analysis. Participants were predominantly white, Australian-born, female, retirees in their 70s (36/68) and almost a quarter (15/68) were aged 80 and above.

Table 5.1

Demographic Characteristics of Overall Sample.

	N	% unless stated otherwise
Age, years	68	*M* = 74.68, *SD* = 7.78, Range = 60-93
Gender (Female)	57	84
Ethnicity (White)	63	93
Australian born	37	54
Living alone	47	69
Marital Status		
Married	21	31
Widowed	24	36
Separated	17	25
Never married	6	9
Highest level of education		
Secondary education	34	50
Vocational training	15	22
College or University	19	28
Employment		
Employed	7	10
Retired	61	90
Health		
Use of assistive device	13	19
Current health issue	27	40
Major life event, last 6 months	28	41

Note. M = mean, *SD* = standard deviation

Need-supportive Behaviours.

Nine themes and nineteen sub-themes of need-supportive peer leader behaviours were identified. The organisation of themes and sub-themes is illustrated in Figure 7.8 in Appendix E. Illustrative quotes for each theme, and descriptions that are more detailed are provided in Table 5.2. Illustrative quotes for each sub-theme are provided in Appendix E, Tables 7.18-7.20.

Table 5.2

Themes, Sub-themes and Example Quotes.

Themes and Description	Subthemes	Example Quotes
Theme 1: Attracting interest. Provides walkers with a meaningful reason to walk as part of a group. Emphasises fun, variety, positive stimulation.	Describes intrinsic benefits. Combines walking with fun. Ensures variety.	"To want to come again, they have to feel good after they have done their walk. Say 'This was a good…what a great half an hour have we done.' and laugh. Needs to be fun, not just all hard work." (IGW)
Theme 2: Acknowledging feelings and perceptions of walkers. Elicits input, preferences, and requirements from walkers.	Elicits individual input. Consensus-driven leadership style.	"You need to get them to voice what they want. 'Out of this group where is it that you want to go? How long do you want to go?'" (IPL)
Theme 3: Adapting to walkers' requirements. Accommodates walker's needs.	Provides choice and structure. Supports self-initiative and exploration.	"Let them know, that you are prepared to do it at their pace or their choice. To me that's important. A lot of older people that aren't as fit are losing choices." (IGW)
Theme 4: Safeguarding walkers. Ensures that walkers are prepared and feel safe.	Ensures a safe walking environment. Ensures preparedness.	"You need to explain to them "Watch where you are walking". Constantly saying 'Watch where you place your feet, so you don't fall.' (IPL)
Theme 5: Supporting walker confidence. Helps walkers feel confident during the walk.	Distracts from psychological barriers. Provides positive encouragement.	"If someone was very fearful, I tend to walk near them. So sometimes if you are with a more confident person, it gives you confidence." (EPL)
Theme 6: Success promoting. Helps walkers feel effective and successful.	Supports individual success using achievable goals. Provides specific and non-conditional praise.	"Walking with them and saying, 'Oh you did well this week' and 'Today you are doing a lot better than you did last week'. I think just mainly praise and making them positive at their pace." (EPL)
Theme 7: Comforting. Shows warmth and ensures walkers feel comfortable and accepted.	Welcomes and informs. Includes all walkers.	"Keep saying 'You are welcome. You are welcome to join any time you want.' You are not excluded if you don't come to one class." (IGW)
Theme 8: Connecting. Helps walkers experience meaningful connection.	Socializes with walkers. Helps group members connect.	"If we see somebody alone, we say 'ok, talk to her, talk to her'. We match-make. Because it's nice to talk to somebody." (EPL)
Theme 9: Caring. Ensures walkers feel understood and cared for.	Listens and shows compassion. Checks on walker's wellbeing.	"If I get breathless, I just stop, or I sit down. Sometimes I didn't feel good or my knee hurt, or my foot hurt or my back hurt. And then I can just sit down. And then I like when people come and say, 'Are you ok?'" (EGW)

Note. IGW = Inexperienced group walker, IPL = Inexperienced peer walk leader
EPL = Experienced peer walk leader, EGW = Experienced group walker

Autonomy-Supportive Behaviours.

The majority (61/68) of participants said that it was important for a peer leader to support autonomy among their group members. Participants suggested that volunteer peer leaders could offer opportunities perceived as meaningful and stimulating (attracting interest from walkers), enquire about individual requirements and preferences (acknowledging requirements and perceptions of walkers), and provide group members with choice and a structure that allows self-initiative (adapting to walker's requirements).

Theme 1: Attracting Interest.

Emphasises intrinsic benefits. Fifteen participants described behaviours that pertained to the peer leader providing a meaningful rationale for walking as part of a group. This included emphasising benefits of walking (e.g., benefits on health) and fun associated with being part of a group (e.g., fun social interactions). Many walkers who were interested in joining a group walk for extrinsic reasons (e.g., the doctor recommended it), expressed concerns about whether they would enjoy a group walk (e.g., big variations in pace among older people, not enjoying walking, fear of competition). However, a peer leader who made the walk an interesting activity by promoting the enjoyable aspects (rather than the walking per se) was perceived to support people's willingness to *want to* partake.

Fun and positive stimulation. Many walkers described it as important for the peer leader to combine the walk with experiences or an environment considered as enjoyable or stimulating. Several walkers emphasized that they perceived walking on its own as "boring" or "painful", which de-motivated them from taking part in a walk that was only about walking. A regular group walker explained: *"Once you are*

our age, you choose to do things you enjoy" (Experienced group walker, male, 75 years old).

Participants emphasised that they would be interested in a walk that was not "only about walking", but that also integrated other aspects. This included doing activities that walkers perceive as enjoyable but cannot do on their own due to a lack of confidence, motivation or resources. Participants differed in what they considered as fun or stimulating. While some people considered social stimulation as fun, others preferred not to talk while walking and emphasized the importance of being offered a stimulating environment and encouraged to walk mindfully (e.g., *They (peer leader) can say 'look at the beautiful birds'"*, interested peer Leader, female, 79 years old). Participants also highlighted the importance of experiencing intellectual stimulation (e.g., opportunity to use existing skills such as good orientation) and receiving other forms of entertainment (e.g., making jokes). A peer leader who established what walkers enjoy and then integrated relevant aspects into the walk, was perceived as ideal for supporting walker autonomy.

Variety. The sub-theme "variety" included the peer leader attracting interest by providing the opportunity for new experiences. Suggestions included varying walk routes, adding themes (e.g., walking in a specific setting or to a designated destination) to walks, and providing opportunities to learn about new places. For example, a peer leader who explained the history of new places or taught walkers about different bird species could trigger interest.

Theme 2: Acknowledging Requirements and Perceptions of Walkers.

Elicits individual input. Twenty participants emphasised the importance of the peer leader asking individual group members to provide input as some may be embarrassed to express their perspective in the group setting. Other important

behaviours included asking participants to notify the peer leaders about any medical conditions' leaders need to be aware of, as well as individual preferences. One experienced walk leader explained that older people are often embarrassed or forget to express their medical requirements. A peer leader who acknowledged requirements was perceived as helping walkers feel in control of the situation.

Consensus-driven leadership style. About a quarter (20/68) of participants described behaviours that related to ideal peer leaders following a consensus-driven leadership style. This included the leader asking walkers to specify individual requirements (e.g., if they can only walk on flat surfaces due to using a walking aid, if they suffer from high blood pressure) and preferences and providing them with the opportunity to make suggestions and contribute to group decisions. Some participants suggested that taking things "to a vote" would work best for them when making group decisions. Several participants emphasised the importance of a leader who adapted their plan to the group. One volunteer explained that it is important to have a plan but: *"If I hear from the group that they are feeling that my plan is absolutely right-shit, throw that out the door, take up something else. Have a basic plan and have flexibility."* (Inexperienced peer leader, female, 73 years old)

Theme 3: Adapting to Walker's Requirements.

Provides choice and structure. Preserving walker independence and was perceived as important to the majority of participants. Of particular importance was the peer leader providing walkers with choice (mentioned by 49/68 participants) as opposed to controlling their walking behaviour:

> You cannot have regimentation. They are all at different stages so some of them can't walk so fast. Have a disability or something. and most of these people have a very high level of education. Some are doctors,

retired doctors. You don't tell people what they must do. (Experienced peer leader, female, 75 years old)

Several participants recognized that older adults often find it hard to adapt to a group setting as they are limited by an underlying health issue, as explained by a participant who expressed interest in volunteering as a peer leader:

One of the worst things older people face is loss of autonomy. If I choose to walk in the rain, I can do it, if I want to. but if you have some sort of health issue then you can't do it. (Inexperienced peer leader, female, 72 years old)

Within a group setting, participants often emphasised the importance of choice:

Let them know that you are prepared to do it at their pace or their choice. To me that's important. A lot of older people that aren't as fit are losing choices. (Inexperienced group walker, female, 85 years old)

However, a retirement village resident who started volunteering as a peer leader anticipated challenges- if too much choice is provided in a diverse setting:

Everybody has got different levels. So, I think if you have got Mr. Brown saying, "Well I don't want to walk up that way, and I want to go down that way" That can create problems. Well, I'd say "How about we go this way or" …we got two choices. We go this way of we go that way. No more than two choices because you get too many voices and you lose too much time. (Inexperienced peer leader, female, 79 years old)

Supports self-initiative and exploration. Being able to choose individual pace and intensity was considered important by the majority of participants. This

included flexibility in attendance as often participants could not commit to a full program due to conflicting appointments (e.g., medical appointments, caring for grandchildren). Encouraging walkers to be aware of their body and walk within their limitations was considered important by the majority of participants. Several walkers mentioned that being old meant that they needed to be prepared for the "unexpected" and having the choice to stop anytime and listen to their body was important. Several inexperienced leaders emphasised that promoting self-initiative in a group with differing capabilities could be challenging as a peer leader. One retirement village resident explained:

> I think the issue is that whoever is walking further ahead doesn't sort of disappear out of view. It's important not to leave anybody behind who may just turn back or may not even wish to come the next time. (Inexperienced peer leader, female, 63 years old)

An experienced group walker (female, 68 years old) mentioned how walking in a circle as part of a mall walking group works for her and stated that *"If we (as individual walkers) can do a lap and a half, we do a lap and a half. But if we can only do one, we do one."*

Further suggestions to deal with different capabilities included the peer leader leading from behind and letting walkers determine the pace, to having more than one leader to cater for the faster and slower walkers or splitting up the group into smaller groups (of different paces) with a common endpoint.

Comparison Across Sub-groups.

Walkers. Most walkers (31/37) felt it was important for a peer leader to support the autonomy of walkers. Salient themes related to the peer leader adapting to walker limitations and providing options for different levels. Behaviours

pertaining to a consensus-driven leadership style (i.e., taking decisions to a vote) were less prominent in this group. Behaviours relating to a peer leader that attracted the interest (e.g., made a walk fun) of walkers were primarily mentioned by inexperienced group walkers.

Leaders. Most leaders said it was important for a peer leader to provide autonomy support (28/31) and mentioned behaviours that referred to a consensus-driven leadership style. While many leaders mentioned the importance of providing choice, inexperienced leaders frequently emphasized the challenge of managing a group with diverse capabilities.

Competence-Supportive Behaviours.

The majority (46/68) of participants, described how a peer leader could support walkers in feeling mentally and physically more competent at walking. Table 2 illustrates themes and sub-themes that were identified as competence-supportive.

Theme 4: Safeguarding Walkers.

Safeguarding involved the peer leader ensuring that walkers felt safe while taking part in the walk. Eighteen participants emphasized the importance of safety precautions to prevent falls. A female, 79-year old resident who recently started volunteering as a peer walk leader explained: *"Falls are the last thing aged people need. They are too dangerous. Many people don't recover from falls when they are old."*

Ensures a safe walking environment. Many participants explained that a peer leader could ensure that walkers are aware of hazards, and that the walk takes place in a safe environment and is suited the walking requirements of group members. For example, if walkers used walking frames, flatter surfaces needed to be

chosen. It also included the peer leader ensuring that walks take place in good weather, during suitable hours, and in a safe area. For example, a 77-year old female resident who expressed interest in the walk leader role explained that the leader needs to ensure walks are: *"Safe from attacks, from the people outside, and from magpies."*

Ensures preparedness. Further suggestions included ensuring walkers are prepared for the walk and use appropriate aids (e.g., informing walkers of safety precautions, ensuring they take their medication and stay hydrated).

Theme 5: Supporting Walker Confidence.

Several participants mentioned confidence related barriers to participating in a group walk, such as fear of falling, being worried about not being able to keep up and being left behind, and dependence on walking aids. Behaviours relating to the theme "supporting walker confidence" described the peer leader helping walkers build confidence for walking and in a group setting.

Provides help and a sense of security. Almost half of the interviewed participants (33/68) participants emphasised that a peer leader could promote confidence by being observant and proactively supportive. A resident explained how an observant peer leader can convey confidence:

> There is always a risk. That you will fall over or something like that. And of course, they [peer leaders] keep their eye on you while we are here, that makes me feel more confident and more secure.
> (Experienced group walker, female, 70 years old)

Being supportive primarily entailed the peer leader being helpful when they notice a walker is struggling and providing positive encouragement (e.g. *"Saying 'do what you can and, if you can't or are tired just sit down.'"*, experienced group

walker, female, 71 years old). Walking close to fearful walkers was another common strategy mentioned.

Several walkers emphasised that any form of pressure can reduce perceptions of confidence, as it can be dangerous (e.g., lead to falls) and de-motivating (e.g., being discouraged because of over-exhaustion). For example, one resident who expressed interest in joining a walking group suggests that *"It has to be established from the start- it's a not a competition. If you complete the walk you are as good as the person who has done it in 20 minutes earlier than me."* (Inexperienced group walker, female, 71 years old)

Distracts from psychological barriers. Several (15/68) participants emphasised the importance of social interaction and entertainment to deal with barriers (e.g., pain, fear, boredom) that walkers struggled with (See Appendix E, Table 7.19 for an illustrative quote).

Theme 6.- Success Promoting,

Half of the participants explained that competence could be supported by a peer leader who helped walkers have a successful experience.

Provides guidance and opportunities for success. Helping walkers set realistic goals/length of walks, included setting a slow pace, and discouraging scenarios that were perceived as being over exhausting and overwhelming (e.g., walking beyond limitations, not taking breaks). It also involved providing guidance and direction. For example, a resident who had been engaging in regular group walks explained: *"If you are struggling, the leader might suggest doing something differently. Slow down a bit."* (Experienced group walker, female, 71 years old)

Provides specific and non-conditional praise. Congratulating walkers for achieving mini-goals, including attending the walk, was perceived as very important.

On the other hand, providing praise for speed or walking performance was discouraged. For example, a physically inactive resident who was interested in joining a walking group explained: *"You are not setting out who comes first. Too bad if a person comes first. You don't ... reward them for coming first."* (Inexperienced group walker, female, 71 years old)

Comparison Across Sub-groups.

Leaders. Most leaders (28/31) perceived it important for the peer leader to engaged in competence-promoting behaviours. Themes relating to promoting success experiences (in particular setting and praising the achievement of mini-goals) in walkers were mentioned by the majority of leaders (23/28). Themes relating to safeguarding were less salient in this group. (9/28).

Walkers. About a half of the walkers (19/37) described confidence promoting behaviours. Themes relating to supporting confidence (10/19) and safeguarding behaviours (9/19) were prominent among walkers. They frequently described a leader who prioritized preparedness, walker safety, discouraged competition, and who provided positive encouragement throughout the walk. Themes relating to success-promoting behaviours (7/19) were less salient in this group.

Relatedness Supportive Behaviours.

The majority (49/68) of participants, in particular group leaders, said that the peer leader could improve a sense of belonging in walkers by engaging in supportive behaviours. The importance of socialization is illustrated by a novice peer walk leader in the following quote:

Well the actual company, having the company. A lot of people do prefer to go for a walk and walk on their own, but I think most people like to walk with

someone and talk and have a conversation. So, I think in a group it's good.
(Inexperienced peer leader, female, 75 years old)

Three themes of relatedness-supportive behaviours, labelled as comforting,
connecting, and caring, were identified (See Table 5.2). Summaries for each sub-
theme and illustrative quotes are presented in 7.20 in Appendix E.

Theme 7: Comforting.

Welcomes and informs walkers. Thirty-eight participants perceived peer
leader behaviours pertaining to *comfort* as important to experience a sense of
belonging/relatedness. These included behaviours that ensured walkers felt welcome
and informed about all aspects of the walk. An experienced peer leader explained:
*"You have to give them a run-down on the what's going to happen, so they don't
come in cold."* (Experienced peer leader, male, 75 years old)

Includes all walkers. The majority of participants described a peer leader that
proactively made walkers feel part of the group, included, and accepted. For
example, an experienced peer walk leader explained: *"If they don't feel part of it,
they won't come back. So, you to make them feel welcome and make them feel part of
the group, right from the beginning."* (Experienced peer leader, female, 73 years old)

In contrast, a negative behaviour included asking too many personal
questions or embarrassing walkers. As described by an experienced walk leader:

> If you make comments about their look or their weight or something. If
> they are too heavy or too slim or whatever. We don't come here to judge
> anybody. It's not a religion voodoo. It's not a political group. It's just a
> walking group. (Experienced peer leader, female, 66 years old)

Theme 8: Connecting with Walkers.

Thirty-five participants mentioned behaviours that related to the peer leader proactively connecting with walkers and helping them connect with each other to promote effectively a sense of belonging and group cohesion. One volunteer peer leader emphasised the importance of experiencing meaningful connection when walking as part of a group:

> It's silly to be in a group where you are on your own, you know. You have to mix and match and find a compatible person to walk with or sit and rest with if you need to rest… or you know just get along with. (Inexperienced peer leader, female, 70 years old)

Socializes with walkers. A positive social atmosphere where people talked to each other and were friendly was considered crucial by the majority. Social encouragement, for example, encouraging walkers to return for a future walk. (e.g., *"Say to them 'I look forward to seeing you next week'"*, experienced peer leader, female, 75 years old), or remind them of the walk, was frequently mentioned to induce a sense of belonging and social purpose. For example, a peer leader described:

> The biggest thing with getting fit is sociability because if you are encouraged to come out and do something, you will. If you just say, 'Oh come if you want to'. I think they have got to be motivated. Somebody to say 'Come on, you are alright today. Lovely sunny day let's go' sort of thing. (Inexperienced peer leader, female, 80 years old)

A few participants added it was particular important for the peer leader to talk loud and clear to be understood by walkers with hearing problems.

Promotes connection between group members. Other supportive peer leader behaviours related to proactively socializing with walkers and creating opportunities for connection between walkers. For example, the peer leader could introduce people to each other and sometimes provide help to those struggling to feel connected as described by a female participant:

> They can try and start a conversation between different people in the group by telling them things maybe, one about the other like "Did you know that so and so...". You know things they think they might have in common. (Inexperienced group walker, female, 60 years old)

However, some walkers preferred to walk by themselves or disliked talking while they walked but enjoyed socializing after the walks. For example, a participant who had been regularly attending a peer-led walking group but preferred to walk on her own explained:

> I want to walk on my own, I don't like to talk because it just stops me walking my pace. You see, I am doing it at my own pace but if you walk with somebody, they might be slow. Now, when you talk, you don't tend to be walking. You are going slowly. But for me I am walking. They (walk leaders) won't disturb you. That's good. They know "Don't talk to her, she wants to do her lap, her goal. (Experienced group walker, female, 71 years old)

One participant mentioned that a peer leader could promote communication between group members by taking breaks during the walk (e.g., *"It's nice to stop and have a chat. So, you are communicating, not just walking",* inexperienced peer leader, female, 79 years old). Many participants mentioned the importance of the peer leader organizing a social event after each walk (e.g., Going for coffee after the walk). Two participants suggested that the peer leader could assign tasks to

individual members of the group to support group cohesion despite different walking speeds within the group (e.g., "*If you have got someone or a couple of people who are really slow. Maybe ones who are more active could sort of just stay alongside them and make sure they are ok.*", inexperienced peer leader, female, 75 years old).

    Theme 9: Caring.

    Checks on walkers' wellbeing. Several (23/68) participants described behaviours that illustrated the peer leader expressing genuine care during the walks. For example, routinely checking on group members and ensuring no one feels left behind. This included checking on their wellbeing as illustrated by a group member of a walking group in the following quote:

> If I get breathless, I just stop, or I sit down. Sometimes I didn't feel good or my knee hurts, or my foot hurts or my back hurts. And then I can just sit down. And then I like when people come and say, 'Are you ok?*'*. (Experienced group walker, female, 79 years old)

    Listens and shows compassion. Several participants emphasized the importance of a peer leader ensuring that walkers felt cared for by showing compassion, and listening to walkers, smiling and proactively greeting walkers. Behaviours relating to care were most frequently mentioned by walkers who reported living alone. An experienced peer leader explained the importance of warmth among older people:

> I give a hug to everybody because sometimes this is the only hug they have during the day. Because if you live alone you don't have anybody to kiss you and say something. I think it's a warm thing to do. (Experienced group walker, female, 71 years old)

Comparison Across Sub-groups.

Leaders. Most (28/31) leaders perceived relatedness-supportive peer leader behaviours as important. Frequently mentioned (*n* = 22) behaviours pertained to the peer leader being inclusive and welcoming (comforting) and promoting socialization among group members (*n* = 20). 13 leaders mentioned behaviours describing caring behaviours, of which most related to the leader ensuring that walkers felt good during the walk.

Walkers. Just over half of the interviewed walkers (21/37) perceived it important for the leader to engage in relatedness-supportive behaviours. Similar to leaders, walkers placed the highest importance on behaviours relating to comfort (*n* = 16) and connection (*n* =15). Being provided with an opportunity to socialize after the walk was frequently mentioned among this group.

Discussion

The present study explored peer leader behaviours that support the psychological needs that foster self-determined motivation in older adults who walk as part of a group. Nine sets of behaviours, which an older peer leader of a walking group could utilize to support autonomy, competence, and relatedness in walkers, were identified. It was found that, a peer leader is able to provide autonomy support by finding ways to provide older adults with choice, and by encouraging body awareness, walker input, and initiative during the walk. Relatedness was perceived as being best supported by ensuring that walkers feel welcome, feel cared for, and experience connection with other walkers. Competence was best supported by a peer leader who ensured walkers felt safe, who avoided pressure, distracted walkers from psychological barriers, provided positive feedback and structure, and who

encouraged the formulation of realistic goals. Overall, it was found that, leaders mainly mentioned behaviours that related to helping walkers connect, experience success, and allow a consensus-driven leadership style. In contrast, walkers emphasised behaviours that referred to a peer leader being welcoming, supporting confidence, and providing walkers with choice.

Identified behaviours that pertained to the peer leader showing care, providing walkers with options, acknowledging perceptions, providing a rationale when giving instructions, and providing specific and non-conditional praise, and highlighting intrinsic goals are consistent with previous SDT research (Hancock et. al. 2015). Hancock and colleagues (2015) provided suggestions for how individuals in position of authority (e.g., teachers, instructors, coaches) can support or thwart individuals' basic psychological needs (e.g., Hancox et al., 2018) .

The findings of the present study add to previous research by describing need-supportive behaviours specific to older peer walk leaders. The importance of safeguarding walkers, supporting confidence, and distracting them from psychological barriers aligns with research suggesting that low self-efficacy often prevents older adults from engaging in physical activity and group activities (Perkins et al., 2008). Older adults may be physically vulnerable and rely on a safe environment, including a peer leader who helps them remain safe (Chong et al., 2014). The importance of the peer leader providing active guidance and help to support confidence and promote success experiences aligns with previous SDT research on need-supportive behaviours in geriatric settings (Souesme & Ferrand, 2019). Furthermore, the importance of encouraging adults to set realistic, flexible goals, but focus on their own success is consistent with research showing that older adults benefit from goal-setting, and self-monitoring (Rosenberg et al., 2015) but not

evaluation (Nathan et al., 2014). In the context of a walking group, the results of this study highlight importance of the peer leader actively distracting walkers from psychological barriers (e.g., low confidence, fear of falling) and negative thoughts (e.g., pessimism), as a competence enhancing strategy. For a younger population, a distraction from significant physical barriers such as pain is unlikely to be as relevant.

While group walkers primarily mentioned the provision of choice, and support, socialization behaviours were primarily described by leaders, which is consistent with findings of Study 3, described in the previous chapter (Kritz et al., 2020). Furthermore, leaders emphasized success-promoting behaviours while walkers emphasized confidence building behaviours. Findings by Chong and colleagues add that, vulnerable cohorts, such as older adults who are cognitively impaired, prefer walking in a safe environment and with a walking partner. To support relatedness, participants emphasized the importance of a peer leader who is welcoming, inclusive, and trustworthy (i.e., comforting). These findings align with previous research emphasizing the importance of trust and a positive "first contact" among the older population (Brooks et al., 2017; Souesme & Ferrand, 2019). Building on past research, the present findings highlight the importance of a peer leader who proactively helps walkers connect, especially those who have been living alone/are socially isolated.

The identified themes are consistent with studies emphasising the importance of fun and intrinsic motivation for motivating older adults to take part in physical activity interventions (Dacey et al., 2008; Devereux-Fitzgerald et al., 2016). The findings of this study extend past research by guiding *how* a peer leader could make a walk fun (Perkins et al., 2008) by, for example, integrating variety and adding

stimulating components. Suggestions on providing walkers with an opportunity for feedback align with research in geriatric settings emphasizing that autonomy support includes recognizing and respecting older adults as an individual (Souesme & Ferrand, 2019).

Strength and Weaknesses.

I conducted a review of the literature and could not find any prior study that identified behaviours perceived as need-supportive by an older population in a physical activity setting. The main strength of the present study is that it adds to the SDT literature on need-supportive strategies and makes a conceptual contribution. It adds understanding on how psychological needs can be supported in an older population. I was able to obtain diverse understanding on effective leadership behaviours by ensuring that the sample represented perspectives of volunteer peer leaders and walkers who varied in leadership and group walking experience. Another strength is that the present findings provide some building blocks to train older volunteer peer leaders to be more need-supportive in future physical activity interventions. The identified behaviours can be used in the context of a SDT-based physical activity intervention to train older peer walk leaders to be motivationally supportive. However, these findings may not be generalizable beyond older, white females, and those who are interested in group walking, providing an avenue for future research. Furthermore, the findings of this study are limited by proposing strategies that have not yet been tested for their effectiveness in such settings.

Implications for Practice and Future Research.

Specific peer leader behaviours are described; that can support older adults to adopt and maintain group walking. The present findings provide an understanding of

need-supportive behaviours and highlight the importance of autonomy and competence-support. It would be useful to train older volunteer leaders in the behaviours identified in this study, and then examine the effects on need satisfaction, self-determined motivation and behaviour maintenance in older adults. Differences in perceived supportive behaviours need to be considered when training future peer leaders. Future research can quantitatively evaluate the extent to which the described strategies can be taught to older peer leaders and are effective at promoting need satisfaction, and self-determined motivation in the context of a peer-led walking intervention.

CHAPTER 6 - GENERAL DISCUSSION

Summary of Overall Findings and Interpretations

The objective of this thesis was to examine the role of a peer leader in promoting physical activity and health in older adults. The findings presented in Study 1 show that for older adults, walking with peers at least once/week is more advantageous than walking primarily alone, for improving walking self-efficacy motivation for walking, physical activity levels, and health outcomes. Study 2 then examined factors that determine levels of adherence of older volunteers to a walking intervention. Insight on barriers and facilitators that affect motivation and persistence of older peers volunteering as a walk leader is provided. Findings highlight the importance of social skills, optimism, altruism, need-satisfaction, and autonomous motivation for predicting retention as a volunteer walk leader. In Study 3, the importance of a friendly, compassionate, and optimistic peer leader is emphasised, with perceptions varying across sub-groups (i.e., experienced peer walk leaders, inexperienced peer walk leaders, experienced walkers, inexperienced walkers). Building on research linking psychological need-support to physical activity behaviour and health (Ntoumanis et al., 2020), Study 4 then provides concrete suggestions for how older peer leaders can support the self-determined motivation of group walkers. Collectively, the findings provide an understanding of the efficacy of walking with peers, and of factors that determine the retention, and the effectiveness of older adults volunteering as walk leaders. Results confirm the propositions made by SCT and SDT, on the importance of social influence, self-efficacy, and motivation for promoting behaviour change. The present research is, however, the first to specifically focus on how peer walk leaders can promote physical activity and health

in older adults. The obtained findings can have significant theoretical and applied implications. In this final chapter, findings will be discussed in relation to overall contributions to the literature, and recommendations for future research, policy and practice will be provided.

Major Contributions and Link to Previous Research.

Study 1: Impact of Peers on Physical Activity and Health.

Previous research suggests that older adults prefer to exercise with similar-aged peers (Beauchamp et al., 2007), benefit from social support (Smith et al., 2017), an exercise-partner (van Stralen et al., 2009), and group-based approaches (Hanson & Jones, 2015; Kassavou et al., 2013). More recent research suggests that older adults benefit more from engaging in exercise with others than from doing so alone (Harada et al., 2019; Hayashi et al., 2018; Kanamori et al., 2016). Findings presented in Study 1 add to this knowledge by providing specific evidence for the benefits of regular peer-accompanied walking.

Physical Activity. First, results from Study 1 showed that adults who started walking for health and engaged in regular walks with peers, experienced greater increases in physical activity levels, as compared to those who only walked alone. These findings are consistent with extensive evidence suggesting that peer-supporters (Thomas et al., 2012), peer leaders (Buman et al., 2011; Burton et al., 2017; Ginis et al., 2013) and walking groups (Kassavou et al., 2013; Meads & Exley, 2018) can be effective at promoting physical activity behaviour in older adults. Similar to Thomas et al., outcomes were compared to those walking primarily alone, but provide understanding on weekly (instead of monthly) peer-accompanied walking. This is important, as it provided an understanding of the significance of

peers as part of a regular physical activity routine, as opposed to a monthly social function. The results of Study 1 further add that engaging in regular walking as a group (Kassavou et al., 2013) *or* as a dyad (Carr et al., 2019) may both be beneficial for increasing physical activity in an older population.

Self-efficacy. Second, it was found that older adults who regularly walked with others experienced greater improvements in walking self-efficacy than those who walked primarily alone. These findings align with principles of SCT (Bandura, 2004), and research linking social support (French et al., 2014; Kosteli et al., 2016) and peer-led programs (Wurzer et al., 2017) to improvements in self-efficacy. Present findings advance past research by suggesting that for older adults walking with others at least once a week is *better* than primarily walking alone, for improving levels of self-efficacy.

Health. Third, it was found that older adults who regularly walked with others, experienced greater improvements in body fat, functional health as compared to those primarily walking alone. These findings are consistent with research documenting the health benefits of walking groups (Hanson & Jones, 2015), and of peer-supported exercise (Wurzer et al., 2017) among older adults. For example, a review found that older adults who took part in peer-led programs improved their self-perceived health, mobility and balance (Wurzer et al., 2017). Cross-sectional data further showed that independent-living older adults who exercised with others had a lower falling incidence (Hayashi et al., 2018) and higher levels of self-rated health (Kanamori et al., 2015) as compared to those who only exercised alone. Findings from Study 1 add to this research by providing longitudinal evidence on the health benefits of walking with others at least once a week as compared to primarily alone. Specifically, suggesting that among older adults who regularly walked with

peers' *changes* in functional health and body fat were greater, as compared to those who primarily walked alone. These findings are consistent with longitudinal evidence showing that older adults who exercised with others, but not alone, also experienced improvements in other domains such as mental wellbeing (Harada et al., 2019) and in decreasing their levels of depression (Kanamori et al., 2018).

Motivation. Fourth, the finding that older adults who regularly walked with peers experienced greater increases in autonomous motivation as compared to those walking alone aligns with principles of SDT (Ryan & Deci, 2017) and with research documenting the positive impact of a need- supportive environment on motivation (Ntoumanis et al., 2020). Since older adults could choose who they walked with, it is likely that they selected peers who engaged in supportive behaviours (Nieboer & Cramm, 2019; Ntoumanis et al., 2020) and whose company they enjoyed (Devereux-Fitzgerald et al., 2016; Victor et al., 2016), which could have promoted need satisfaction, thereby benefitting their levels of autonomous motivation.

To summarise, findings from Study 1 align with meta-analytical research on the benefits of group walking (Hanson & Jones, 2015; Kassavou et al., 2013) and of older peers for facilitating healthy aging in others (Wurzer et al., 2017). Advancing past literature, results provide longitudinal support for the benefit of regular peer accompanied walking – for promoting autonomous motivation, and improving walking self-efficacy, functional ability, and fat levels in previously physically inactive older adults. The benefit on autonomous motivation and self-efficacy align with propositions of SDT (Ryan & Deci, 2017) and SCT (Bandura, 2004) by emphasising the potential of social support in this context.

Study 2: Retention of the Older Volunteer Peer Leader.

Findings presented in Study 1 demonstrate the potential of using older

volunteers to promote walking behaviour in their peers. However, intervention

developers have had difficulties with recruiting and retaining older peer volunteers to

lead group walks (Thøgersen-Ntoumani et al., 2019). Cross-sectional research

suggests a link between motivation and volunteering behaviour in older adults but

lacks longitudinal insight (Grano et al., 2008). Study 2, therefore, examined the

motivational processes leading to different levels of adherence to volunteering as a

peer walk leader. In line with past research, it was found that lack of time, poor

health, and competing priorities were barriers to volunteering as a peer walk leader

(Petriwskyi & Warburton, 2007; Tang et al., 2010). It was further found that

controlled motives to volunteer, prioritising self-orientated desires, pessimism, and

experiencing a lack of need satisfaction were associated with discontinuing the role

as a peer volunteer. In contrast, altruistic and autonomous motives, compassion,

social skills, psychological need satisfaction and optimism, were identified as

important for maintaining the role as a peer volunteer. Findings highlight the role of

motivation, need satisfaction and volunteer attributes.

Motivation to Volunteer and Need-satisfaction.

Participants who volunteered for controlled reasons were motivated by the

satisfaction of self-orientated needs (Guntert et al., 2016). Volunteers who primarily

focused on satisfying self-orientated desires often did not experience need

satisfaction, were pessimistic about being successful, and dropped out of the

program (Guntert et al., 2016). This is consistent with research suggesting that older

adults stop volunteering for roles that they do not perceive meaningful (Tang et al.,

2010). However, participants who volunteered for autonomous and altruistic reasons,

received positive walker feedback, experienced the satisfaction of all psychological needs and maintained their role as a walk leader (Bidee et al., 2013). Program completers were motivated by the satisfaction of relatedness but lacked a sense of autonomy and competence, which stopped them from continuing in their role. The importance of need satisfaction (Jones et al., 2015) and altruism (Stukas et al., 2016) for determining volunteering behaviour aligns with past research. Findings further suggest that relatedness satisfaction (i.e., being liked and accepted as a leader) was important for starting as a volunteer walk leader, while the satisfaction of competence and autonomy facilitated behavioural maintenance.

The importance of experiencing a sense of autonomy (e.g., regarding the level of commitment provided) and feeling competent at the role, is consistent with past research (Wu et al., 2016). Study 2 further provides information about factors that can improve feelings of autonomy such as role flexibility, the opportunity to share responsibilities and being satisfied with the role. The secondary role of relatedness satisfaction for determining behaviour following program completion is consistent with past research (Ntoumanis et al., 2020). However, among those who maintained the role, social integration and interpersonal skills were prominent, suggesting that relatedness may have been obtained from other sources (Ryan et al., 2019).

The Link Between Personality, Motivation, and Volunteer Retention.

Peer leaders with autonomous and intrinsic motives (i.e., who had an inherent interest to help others) continued their role after the program, were successful in providing the desired help, and enjoyed helping others (Ryan & Deci, 2017). Results from Study 2 add to the literature by showing that autonomously motivated volunteers who also expressed altruistic desires, had an optimistic outlook, were

inclusive (e.g., welcomed all levels into their group) and engaged in sustainable helping strategies (e.g., adapting group pace to the slowest walker), indicating the presence of social skills, effort to help, and resilience. In contrast, peer leaders who predominantly volunteered for controlled reasons (e.g., felt obligated to help) discontinued early or after program completion, and did not enjoy helping others. Volunteers who had controlled motives, and also prioritised satisfying egoistic desires (e.g., increase their own activity levels), used unsustainable helping strategies (e.g., segregating slower walkers from faster walkers, and providing them with separate support) and were unable to provide the desired help. In line with past research, the inability to provide desired help led to emotional exhaustion, leading to subsequent dropout (Gabard, 1997; Haski-Leventhal & Bargai, 2008; Morrow-Howell & Mui, 1989). Overall, findings align with cross-sectional data linking altruistic motives (Stukas et al., 2016) and autonomous motives (Grano et al., 2008) to volunteering behaviour. Furthermore, they suggest that previous findings that link autonomous motivation to resilience, optimism, and work effort (Bidee et al., 2013; Grano et al., 2008; Wu & Chunxiao, 2019) may be generalisable across contexts.

In summary, findings from study 2 highlight the importance of need-satisfaction for promoting autonomous motivation and subsequent volunteering behaviour (Ryan & Deci, 2017). Results also suggest that prioritising altruistic desires, and a combination of autonomous motivation, and specific personal characteristics (e.g., compassion, inclusiveness, optimism, social skills), may determine the effectiveness and satisfaction as an older peer leader (Ryan et al., 2019). Feeling effective at the role, experiencing a sense of autonomy, and experiencing role satisfaction contributed to volunteer retention after program completion (Ntoumanis et al., 2020).

Study 3: Important Peer Leader Attributes.

 Findings presented as part of Study 3 add understanding on effective older peer leader attributes, as perceived by participants differing in walking and leadership experience. Overall, results emphasise the importance of an optimistic, compassionate, and friendly peer leader. The emphasis on optimism and compassion is consistent with past research with older physical activity leaders (Estabrooks et al., 2004), and research emphasising the importance of an emotionally intelligent leader (Beauchamp et al., 2016; Goleman et al., 2004; Kim & Kim, 2017). The relevance of a friendly leader is consistent with findings from a systematic review showing that cancer survivors prefer a peer mentor who is agreeable and open (Pomery et al., 2016).

The novelty of Study 3 is that it obtained heterogeneous understanding on what older adults differing in leadership and walking experience, perceive to be important peer leader attributes. Results indicated that experienced, and physically active walkers and leaders perceived a sociable peer leader as important, which aligns with research highlighting the importance of a leader who promotes connectedness among group members (Estabrooks et al., 2004; Izumi et al., 2015). However, sociability received less attention among inexperienced walkers, which is consistent with previous research findings that for some older adults, an outgoing physical activity instructor is undesirable (Hawley-Hague et al., 2014). The reduced emphasis on sociability among inexperienced group walkers may be explained in several ways. First, it was found that among inexperienced walkers, being outgoing was often associated with social dominance and "being bossy" and controlling, which was perceived as de-motivating. Second, findings from a systematic review suggest that older cohorts who engaged in dual-tasks (e.g., walking and talking) have

an increased risk of falling (Beauchet et al., 2009). Physically vulnerable older adults may, therefore, perceive it as overwhelming to socialise during a walk.

However, recent cross-sectional research found that supportive interactions during walking were linked to positive affect in older adults (Kazuhiro et al., 2020). In line with that finding, participants without group walking experience emphasised the importance of an entertaining (e.g., humorous, stimulating) and motivating (e.g., encouraging, optimistic), and credible (e.g., particular dependable, competent) peer leader. The emphasis on an entertaining leader confirms research suggesting that older adults are likely to participate in programs they consider fun (Devereux-Fitzgerald et al., 2016) and maintain involvement in activities they enjoy (Dacey et al., 2008). The importance of a credible leader aligns with research in healthcare settings suggesting that older adults prefer support from a trustworthy source (Souesme & Ferrand, 2019). The emphasis on a competent leader is consistent with research finding that older adults prefer a qualified exercise group leader (Estabrooks et al., 2004). Inexperienced group walkers emphasised the importance of a dependable leader which aligns with research suggesting that physically vulnerable adults, may rely on assistance during a walk (Chong et al., 2014). Overall, the importance of an "entertaining" and "motivating" leader, is consistent with research suggesting that older adults get discouraged from participating in programs if the group leader is perceived as de-motivating (Bethancourt et al., 2014), and benefit from supportive (Kazuhiro et al., 2020) and fun (Devereux-Fitzgerald et al., 2016) social interactions.

Study 4: Need-supportive Peer Leader Behaviours.

Findings from Study 3 highlight the importance of a motivating leader, suggesting that older adults may benefit from a peer leader who engages in need-

supportive communication strategies (Ntoumanis et al., 2020). Study 4 builds on previous research with a younger population (Hancox et al., 2018), by identifying behaviours that can help foster autonomous motivation (i.e., autonomy, confidence and relatedness). Findings from Study 4 describe behaviours, specific to the older population that are perceived to be supportive of competence, autonomy and relatedness.

Relatedness. To support relatedness, results from Study 4 align with past studies by suggesting that a supportive peer leader forms a personal bond with walkers (Estabrooks et al., 2004), and promotes social interaction between group members (Hancox, 2018; Izumi et al., 2015). While it has been argued that relatedness satisfaction plays a secondary role in determining behaviour (Ntoumanis et al., 2020), this might be different for older adults belonging to socially isolated cohorts. An individual who finds it hard to socialise with others might benefit from a peer leader who provides assistance with social integration. The emphasis on inclusion is consistent with findings from study 2 which demonstrate that volunteers who succeeded and maintained in their role as a walk leader engaged in inclusive helping strategies (i.e., not segregating slower from faster walkers), resulting in positive walker feedback.

Autonomy. The importance of allowing choice and facilitating self-initiative is consistent with past research with younger populations (Hancox, 2018). Results further emphasise the importance of a non-competitive environment in which walkers are encouraged to choose their own walking intensity (i.e., pace and number of breaks required), which is consistent with past research (Bethancourt et al., 2014).

Competence. Competence-promoting behaviours received particular attention in this population and described the importance of structure, safeguarding and

positive encouragement. Behaviours that pertained to providing support and promote safety were frequently mentioned among walkers, which builds on the importance of a dependable and encouraging peer leader described in Study 3.

The findings of Study 4 make unique contributions to the literature by identifying need-supportive behaviours specific to an older population. For example, engaging in safeguarding behaviours and proactively distracting older adults from psychological barriers (e.g., pain, lack of motivation, negative thoughts) to support confidence, and avoiding regimentation (e.g., being flexible with plans and allowing walker input) to support autonomy. Some of these behaviours may not be relevant for a younger, healthy population, but could also be investigated in other vulnerable populations (e.g., cancer survivors).

Linking Studies One to Four Together.

The Relevance of Self-efficacy and Motivation. In line with SCT and SDT, Study 1 highlights the impact of peers on behaviour, health, motivation and self-efficacy for walking. Study 3 adds to this by highlighting the importance of an entertaining (i.e., fun-promoting), optimistic, dependable and motivating peer leader, in particular for inexperienced group walkers. Findings presented in Study 4 then specify ways in which a peer volunteer can improve self-efficacy (i.e., competence) and motivation in older walkers. Findings build on research with younger populations (Hancox, 2018), and describe behaviours relevant to an older population.

The Relevance of Volunteer Characteristics. Study 2 suggests that autonomously motivated volunteers with altruistic goals, engage in sustainable helping strategies, leading to positive walker feedback, which helped them maintain their role. A positive attitude, the determination to help others, and being inclusive, and sociable were key attributes of volunteers who continued their role after the

program. Findings of Study 3 confirm the importance of an inclusive, sociable, optimistic and compassionate leader, suggesting that those traits are also important for leadership effectiveness. In Study 3, it was found that participants volunteering as a peer leader perceived it important for a leader to be outgoing and socially confident. In Study 2, program maintainers described themselves as outgoing (e.g., "I am a people's person") and socially skilled (i.e., finding it easy to interact with people). In contrast, among dropouts, some volunteers mentioned lack of social confidence (e.g., not feeling comfortable being in charge of a group). This suggests that being outgoing and socially skilled may help peer leaders enjoy their role as a peer leader, which may contribute to their effectiveness (Grano et al., 2008).

The importance of an adaptable leader was frequently mentioned by inexperienced group walkers, in Study 3. In Study 2, volunteers who dropped out of the program often reported difficulties with adapting to others (e.g., their walking pace, schedule). In contrast, volunteers who maintained their role as a leader reported adapting their plans to the requirements of the group (e.g., changing the route to allow slower walkers to finish early). An adaptable peer leader may find it easier to provide the desired help in a setting where physical capabilities and the outcome is not always predictable. For example, several walkers mentioned that they have "good days" and "bad days", and that depending on their health (e.g., pain levels) their ability to walk a certain distance or pace may vary across walks.

In sum, findings presented in this thesis, provide support for the idea that being optimistic, inclusive, compassionate, and adaptable may contribute to the acceptance and retention of an older peer leader. Sociability contributed to the persistence of volunteers and was perceived as important by active walkers. Physically inactive walkers emphasised the importance of a motivating, entertaining,

dependable and confidence-promoting peer leader, which aligns with the importance of supporting self-efficacy (Bandura, 2004) and autonomous motivation (Ryan & Deci, 2017) for driving behaviour change.

Implications, Limitations and Recommendations.

Training older volunteers to offer support to their peers is likely to be a cost-effective form of physical activity promotion. The findings of this thesis demonstrate that peers have the potential to help older adults improve their physical health, and overcome barriers, by increasing the quality of motivation and improving walking self-efficacy. Study 2 illustrates the importance of personality traits, motivational processes and need-satisfaction in determining walk leader retention. In Study 3 and 4, findings address the determinants of effective peer leadership as perceived by older adults differing in physical capability and walking experience. In the following paragraphs, first, potential implications of presented findings for theory, practice, and policy are discussed. Second, limitations and avenues for future research are discussed. In the final section, recommendations for policy and future intervention design are provided.

Theoretical Implications.

The previous section considered how this thesis contributes to the existing literature by advancing knowledge on, a) the impact of peers, b) the processes underlying volunteer retention, and c) the determinants of effective peer leadership. The following paragraphs will discuss the theoretical implications of these contributions.

The Impact of Peer Leaders on Self-efficacy and Autonomous Motivation.

Findings presented in Study 1 align with social cognitive theory and self-determination theory, in terms of highlighting a positive social influence on self-efficacy (Bandura, 2004) and autonomous motivation (Ryan & Deci, 2017). In line with SCT, participants in Study 4 highlighted the perceived importance of positive encouragement for increasing self-efficacy levels. Furthermore, findings in Study 3 highlighted the importance of an entertaining leader, which aligns with principles of SDT, highlighting the importance of intrinsic motivation (Ryan, 2017). Findings from Study 2 additionally suggest that volunteers who engaged an inclusive approach (i.e., mixed slower with faster walkers, adapting the group pace to the slowest walker), succeeded as a leader (i.e., received positive walker feedback). In contrast, volunteers who segregated slower from faster walkers faced walker dropout.

Advancing propositions of SCT and SDT these findings might suggest that slower walkers who were included in a mixed group, benefitted more in terms of self-efficacy and motivation, than when volunteers tried to support them individually. From the perspective of SCT (Bandura, 2004), observational learning may be more likely in a group setting due to a higher possibility of encountering relatable models. For example, a walker using an assistive device may benefit from observing how another individual with similar physical capability overcomes challenges when walking. From the perspective of SDT, being included in a bigger group may also have supported the need for relatedness and consequently benefitted autonomous motivation.

Volunteer retention: The Relevance of Motivation and Emotional

Intelligence.

In line with past research and SDT, autonomous motivation and need

satisfaction was linked to sustained volunteering behaviour (Ryan & Deci, 2017).

Findings from Study 2 add that autonomous motivation is important for engaging in

effective leadership strategies and for preventing emotional exhaustion of peer

volunteers. Autonomously motivated individuals demonstrated signs of resilience

(i.e., overcoming challenges, sustainable helping strategies, optimism) and were

successful in their role as a peer leader. These findings are consistent with the link

between autonomous motivation and psychological wellbeing (Ryan & Deci, 2017).

Findings from Study 2 further suggest that participants who volunteered for altruistic

and autonomous reasons, and experienced need-satisfaction, also exhibited high

levels of emotional intelligence (i.e., optimism, compassion, altruism). These

findings add to research suggesting a link between specific personality traits and

need-satisfaction (Ryan et al., 2019).

The Relevance of Leadership Self-efficacy. Findings from Study 2 suggest

that feeling competent at helping was important for persisting as a volunteer. In

particular, being able to provide the desired help without experiencing emotional

exhaustion determined whether volunteers retained in their role as a volunteer. These

findings align with the propositions of social cognitive theory, suggesting that self-

efficacy is a key determinant of behaviour (Bandura, 2004), and emphasise the need

for providing volunteers with training and support. Overall, findings highlight the

importance of targeting volunteers with altruistic motives, high levels of emotional

intelligence, and of providing volunteers with a role that supports psychological need

satisfaction.

Advancing Leadership Theory and Scale.

Scale development. In Study 3, 19 important peer-leader attributes were identified. Five important attributes (i.e., caring, encouraging, inclusive, entertaining, adaptable) have not been captured in existing leadership questionnaires. Identified attributes can inform the development of future scales that can then be used to assess the actual effectiveness of older peer leaders. First, intervention developers could use such a scale to determine whether it is possible to modify proposed attributes via peer leader training. Second, the scale can be used to determine whether attributes influence the level of need-support provided (Ryan et al., 2019). Third, traits can be used to screen volunteers to determine what kind of training they may require. For example, a physically active peer leader who has never had to cope with a physical disability may benefit from engaging in role-play as part of that training to build compassion for individuals who are less physically capable than themselves.

Advancing Leadership theory. Findings presented in study 2, add to existing leadership theory in two ways. First, important attributes (i.e., entertaining and adaptable) are identified, that are not addressed in the leadership literature. Second, leadership attributes relevant to older peer leaders volunteering in a physical activity setting are provided.

Advancing Self-determination Theory. Need-supportive behaviours identified in Study 4 add conceptual understanding to SDT in two ways. First, they provide understanding on how peer leaders could provide motivational support to older adults to promote walking specifically. Second, findings advance SDT by suggesting that need-supportive behaviours can not only be provided by positions of authority (e.g., exercise professionals), but also by individuals who share similar characteristics.

The Effective Older Peer Leader.

The Importance of Supporting Connection. Social cohesion (i.e., trust, shared values, and solidarity among older peers) is important in the prediction of walking behaviour among older adults (Ory et al., 2016), and predicts adherence to participation in walking groups (Kwak et al., 2006). Recent attention has been devoted to training peer leaders in communication strategies that promote trust and connectedness to motivate older adults to be active (Thøgersen-Ntoumani et al., 2019). However, research with younger cohorts suggests that relatedness-support does not always predict changes in physical activity behaviour (Ntoumanis et al., 2020). The findings of Study 2 suggest that social confidence was critical for persisting as an older peer walk leader. Findings described in Study 3 and 4 suggest that experiencing meaningful connection is important for experienced walkers, while those new to walking emphasise confidence promoting attributes. These findings align with research suggesting that encouragement from familiar contacts is important for behaviour initiation, and social support from group members/leader predict behavioural maintenance in older adults (van Stralen et al., 2009). However, among volunteers, relatedness satisfaction was important at the adoption stage while competence and autonomy were important for maintaining the role as a volunteer. This suggests that when recruiting volunteer peer leaders, an emphasis on a relatedness promoting environment is important, while competence and autonomy support may facilitate behavioural maintenance. In contrast, for new walkers, competence and autonomy satisfaction may be most important at the adoption stage, while relatedness satisfaction could facilitate behavioural maintenance.

From the perspective of social identity theory relatedness satisfaction and a shared sense of group identity among similar-aged peers may have motivated group

members in Study 1 to engage in more physical activity to align with emerging

group norms (Beauchamp et al., 2018; Stevens et al., 2017). This idea is further

supported in Study 2, where walkers who were excluded from group settings

dropped out of the program. Relatedness promoting behaviours, identified in Study

4, could advance understanding on how a peer leader can promote a shared group

identity among walkers and promote sustained physical activity behaviour (Stevens

et al., 2017).

The Role of Personality and Social Skills. Important leadership attributes

identified in studies 2 - 4 build on social identity research emphasising the

effectiveness of prototypical leaders (Giessner et al., 2009; Hogg et al., 2012). For

example, a leader who follows a consensus-driven leadership style (e.g., "Be an

equal and be one of them"), is compassionate (i.e., understands the needs of group

members) and demonstrates specific social skills (e.g., "Bring them to your level not

go down to theirs.") may also be more prototypical (Stevens et al., 2017).

Findings from study 2 indicated that volunteers who maintained their role

after program completion exhibited high levels of optimism and compassion, which

are indicators of emotional intelligence (Goleman, 2004). These volunteers also

engaged in sustainable helping strategies, felt satisfied with their role, and received

positive feedback from walkers- indicating their effectiveness as a leader. Also,

findings from Study 3 demonstrated that emotional intelligence, in particular

compassion, was perceived as an important leadership attribute by all groups. In the

context of walking this was described as the ability to empathise with the needs of

walkers, show compassion, adapt to their needs, and engage in tactful social

interaction (e.g., not ask questions that make them uncomfortable). These findings

suggest that emotional intelligence may pre-dispose effective leadership.

This idea is supported by evidence linking emotional intelligence to transformational leadership behaviours (Astrup & McArthur, 2009; Kim & Kim, 2017), which have been effective for helping older adults live with spinal cord injury (Beauchamp et al., 2016). Findings from Study 4 align with the importance of individualised consideration (i.e., attending to individual needs of group members). More recently, researchers suggested that emotional intelligence and certain traits may be linked to the ability to provide need-support (Gillison et al., 2019; Ntoumanis et al., 2018; Ryan et al., 2019). For example, cross-sectional research has indicated that the emotional intelligence of a coach is positively linked to autonomy and competence satisfaction in athletes (Watson & Kleinert, 2019). Past research with teachers demonstrated that high levels of openness and agreeableness also predicted autonomy-supportive behaviours at baseline (i.e., before receiving training) (Ntoumanis et al., 2018). In Study 3, being open and agreeable was coded as welcoming and friendly, which were both highly desirable traits of an effective peer leader.

Collectively, these findings suggest that an ideal leader is likely to be prototypical (i.e., relatable and representing the requirements of the group), but also have specific skills and attributes that make them effective and persist in their role. Individuals who are emotionally intelligent, and who are perceived as friendly and welcoming, may be more likely to intuitively provide need-support(Ryan et al., 2019). This idea has not been explored with older peer leaders and could be investigated in the future in the context of a peer-led walking intervention. For example, group members could be asked to indicate the level of need-support they receive from the peer leader and their need-satisfaction. It can then be examined how perceptions differ in groups led by peer leaders who exhibit or not do exhibit

relevant peer leader attributes (i.e., optimism, compassion, friendliness). In the next step, peer leaders could then be trained in need-supportive communication strategies, and it can be compared to what extent personality traits moderate their effectiveness. That is the extent to which they achieve a group with individuals who perceive need-support and experience need-satisfaction. Understanding whether older people with certain attributes are more effective at providing need-support, as compared to people without such attributes, can then determine the level and type of training individual peer leaders may require. Overall, findings align with past research in other settings, suggesting that effective peer leadership is likely to be a combination of traits, skills and behaviours (Fransen et al., 2020). Future research can attempt to merge aspects of different theoretical perspectives to explain the role of different peer leader behaviours/attributes in determining need-satisfaction, group identity, self-efficacy, autonomous motivation, and physical activity behaviour.

Conceptual implications and Strengths.

Conceptual Contributions to the Literature.

Overall, the conceptual strength of this thesis is the specific focus on peer-led walking groups for promoting physical activity in older adults. While walking is common among older adults, it has received little attention in the peer leader literature. The presented findings, therefore, address an important gap in the literature that can inform the designs of future peer-led interventions. Study 1 is the first study of its kind to include functional capacity, self-efficacy for walking, and motivation as outcomes when comparing older adults who regularly walk with peers with those who walk primarily alone. The contribution of study 2 is that it provides an in-depth, longitudinal exploration of the previously unknown determinants and

outcomes of motivational processes experienced by novice older walk leaders. The conceptual contribution of Study 3 is that it compares perceptions of effective leadership attributes between active and less active older adults, and between active peer leaders and non-leaders. Findings presented in Study 4 add to the SDT literature by providing preliminary insight into how peer walk leaders can support basic psychological needs in an older population. Overall, findings also add to limited understanding on potential mechanisms driving the effectiveness of peer-led and group-based approaches (Estabrooks et al., 2012; Hulteen et al., 2019).

Methodological Strengths.

The main methodological strength of this thesis lies in the employment of both qualitative and quantitative methods to advance understanding in an under-researched area. Furthermore, the use of a longitudinal design in Studies 1 and 2 allowed insight on changes in behaviour, motivation and health over time. The methodological strength of Study 3 and Study 4 was the use of rigorous qualitative methods with a large data set. Study 3 used mixed-methodology, which resulted in a comprehensive understanding by providing both depth and breadth (Creswell, 2018; Creswell et al., 2011). The quantitative component was ideal for establishing the perceived importance of previously identified leadership attributes. The use of accelerometry provided a relatively (compared to self-report measures) objective measure to differentiate perceptions of older adults who are physically active from those who are less active. Using the qualitative component, it was then possible to capture additional attributes, not captured in previous leadership scales. Study 4 employed a framework analysis, which is a rigorous design for evaluating and advancing existing theory in the field (Gale et al., 2013; Ritchie & Spencer, 1994).

Limitations and Recommendations for Future Research.

Self-report and sample size. In Study 1, the design was limited by a small sample size, and by relying on self-reports of who participants walked with in the preceding eight weeks, and for the measurement of physical activity behaviour. Self-reported measures can provide information on the type and context of an activity. However, they are susceptible to overestimation or underestimation (Loney et al., 2011; Schaller et al., 2016). In particular, social desirability (i.e., tendency to respond in a way that will be perceived as favourable by others) can encourage people to overreport their physical activity levels (Adams et al., 2005). Future research could, therefore, try to replicate findings using a larger sample, employing device-based measures of physical activity and tracking who participants walked with.

Generalisability of findings. The generalisability of findings reported in this thesis may be limited in several ways. First, studies have primarily included a sample consisting of white, Australian women, who are healthy and independent living. Future research can examine whether findings translate to other settings and cohorts, and include a higher proportion of males, address cultural biases, and examine those living in non-independent-living facilities (e.g., nursing homes). Second, this thesis focused on older peer leaders who use walking to promote physical activity in their peers. While walking is effective and accessible, it might not be suitable for all older adults. For example, many older adults have arthritis, which is associated with joint pain and can act as a significant barrier to engaging in land-based activities (Alkatan et al., 2016). Older adults who suffer from gait and balance disorders have a higher risk of falling, which puts them at increased risk when engaging in walking (Dokuzlar et al., 2020). For some older adults, aquatic activities, may, therefore, be

more suitable than walking, as they are associated with less joint pain (Alkatan et al., 2016) and a lower risk of falling (Merom et al., 2014).

Third, findings reported in Study 3 and Study 4 provide understanding on attributes and behaviours that were perceived important, but do not provide information on their actual effectiveness. Future research can examine the impact of identified attributes and behaviours on behavioural, motivational and health outcomes. It would also be interesting to examine the extent to which the proposed attributes and behaviours translate to other vulnerable cohorts or peer-led settings (e.g., choir leaders).

Role of Other Behavioural Determinants. This thesis predominantly focused on the impact of psychological and social determinants of behaviour change. However, research has also highlighted the importance of other determinants of behaviour, such as the physical environment (Nathan et al., 2014). In a recent study, it was found that social cohesion and a highly walkable neighbourhood independently predicted physical activity behaviour in middle to older aged adults with arthritis (Gebauer et al., 2020). For example, a walkable environment, such as living close to potential walking destinations, determined walking behaviour in older retirement village residents (Nathan et al., 2014). Findings described in study 2 support this idea where the lack of a walkable environment (i.e., where peers could walk side by side) contributed to the decision to stop volunteering as a walk leader. Thus, psychological and social determinants of behaviour need to be considered within a larger framework that also considers how other determinants interact or mediate some of the proposed effects (Cortis et al., 2017). Future research could, for example, examine the interaction of the social and physical environment in determining physical activity in older adults (Nathan et al., 2014).

The Role of Familiarity. This thesis focus on peers which includes familiar and non-familiar contacts sharing similar characteristics. Research suggests that older adults are most likely to benefit from social support from familiar and trusted contacts (Nathan et al., 2014). Other research suggests that familiar contacts are important for starting physical activity behaviour, while peers and group leaders determine behavioural maintenance in older adults (van Stralen et al., 2010). In Study 1, it was not determined to what extent participants were familiar with the contacts they walked with. Future research can examine the extent to which familiarity moderates the effectiveness of peers and of the proposed attributes. For example, does need-support provided by a familiar source (e.g., a friend or a neighbour) have a different impact than if provided by an unfamiliar source (e.g., an unfamiliar peer leader)?

Implications and Recommendations for Policy.

Findings presented in Study 1 suggest that peer-accompanied walks can have a significant impact on the physical activity and health of older adults. Such effects were achieved in a relatively short time frame (i.e., 16 weeks). By also modifying the internal determinants of sustained behaviour (i.e., self-efficacy and motivation), the potential of peers for promoting behavioural maintenance is highlighted. These findings can be used by policymakers to rationalise the use of peer-based approaches for promoting physical activity and healthy aging in older adults.

The results of this thesis can be translated into policy in several ways. First, current recommendations could be extended to advise older adults to walk at least once a week with others, either as a dyad or in a group. Findings reported in Study 1 can be disseminated to older adults to promote the benefits of joining peer-accompanied walking programs, or of walking with their friends. Second, investing

in future research studies and programs that specifically focus on optimising and implementing peer-accompanied walking regimes may be worthwhile. For some individuals, walking in smaller groups or with a partner may be a better alternative than walking in a larger group (Carr et al., 2019; Thøgersen-Ntoumani et al., 2019; Zubala et al., 2017). Third, policymakers can plan the creation of environments that provide accessible and fun opportunities for older adults to walk either as a dyad or as a group. This could include providing access to safe walking routes that allow older adults to walk next to each other without distraction (e.g., having to move out of the way for quicker walkers, cyclists). Also creating routes in areas that are environmentally stimulating (e.g., interesting nature), can assist peer leaders in being "entertaining" was perceived as particularly motivating by inexperienced walkers. Fourth, ensuring that neighbourhoods cater for age-specific requirements (Brookfield et al., 2020), could make it easier for peer leaders to engage in inclusive and safeguarding behaviours. For example, creating neighbourhoods that have flat surfaces that allow the inclusion of walkers using assistive devices, and reduce the likelihood of falling could be useful. This could cater for older adults who prefer to exercise with others, but are restricted by their physical health, and fear injury (Samra et al., 2019). Furthermore, reserving specific walking times for older walkers (e.g., mornings from 8-9, at a particular place) to avoid distraction from younger adults or cyclists could attract individuals lacking confidence. In particular, those who are embarrassed about their physical appearance or of not keeping up with the group (Bethancourt et al., 2014). Fourth, walking routes that provide easy access to emergency services, and cater for different capabilities, could prevent older peer leaders feeling overwhelmed with their role. For example, creating routes that incorporate several benches for breaks, easy access to cafes, and safe opportunities

for slower walkers to finish early or take short-cuts. Fifth, findings from Study 2 can inform policymakers on the determinants of volunteering, which can be used to incentivise more older adults to volunteer as peer leaders and result in fiscal benefits to society. To summarise, policymakers that aim to promote healthy aging can use the findings of this thesis to encourage, optimise and support peer-accompanied walking regimes. Peer-accompanied programs should be made attractive and accessible (Beauchamp et al., 2007), particularly for those with low confidence, lack of motivation who are at risk for physical inactivity (Chong et al., 2014; Perkins et al., 2008). The following section will describe how findings from Study 1-4 can inform the development of such programs.

Implications and Recommendations for Practice.

Towards an Effective Peer-led Walking intervention.

Findings presented in this thesis can inform the development of a future peer-led physical activity intervention for older adults. Specifically, how suitable volunteers can be selected, then trained to be effective as a peer leader, and supported to maintain that role. This section, therefore, uses the findings to provide recommendations towards the recruitment, training and support of older peer leaders.

Attracting Older Volunteers. Findings from Study 1 can be used to provide older adults with a meaningful rationale for volunteering for such programs. Research has shown that many older adults volunteer to give back to the community and are drawn to volunteering activities that can have a meaningful impact in their community (Tang et al., 2010).

Selecting the Right Volunteer. Specific dispositions, behaviours and motives may determine the effectiveness of volunteers and whether they will

maintain their role. Results can be used to target individuals who are likely to be effective and to maintain their role as a peer leader. Attributes identified in this thesis can be used to select peer volunteers that appeal to different types of stakeholders (i.e., experienced walkers, inexperienced walkers). These attributes could be used to select peer leaders, and for matching leaders to groups, based on their personality and preferences. For example, a peer leader who is very outgoing but not as adaptable may be ideal for leading a group of experienced walkers. On the other hand, a peer leader who has a strong desire to help and is compassionate may be ideal for leading a physically vulnerable slower group. Study 2 provides understanding on motivational processes facilitating walk leader retention. By selecting volunteers that are likely to enjoy the role, succeed in their role, and maintain in their role, unnecessary training costs could be saved.

Motives to Volunteer: It's about Helping not Competing. Ensuring that older adults volunteer for the right reasons and have accurate expectations of their role is important. The results from Study 2 indicate that the motivation to volunteer is pertinent to peer leader effectiveness and persistence as a volunteer. Autonomously motivated volunteers who also described altruistic goals (e.g., prioritising helping others over meeting their own needs) succeeded in their role and continued volunteering. Emphasising to volunteers that the role is primarily about helping others (as opposed to meeting performance goals) can ensure that peer leaders have accurate expectations of the role.

Compassion. Compassion was described in Study 3 as a key attribute of effective older peer walk leaders. This idea is supported by the finding described in Study 2 that volunteers engaging in compassionate behaviours (e.g., empathising with slower walkers and ensuring they felt comfortable and not pressured), reported

receiving positive feedback from walkers. Targeting volunteers who exhibit high levels of compassion may, therefore, be important.

Optimism. Optimism was important for predicting peer leader retention and effectiveness. Peer volunteers who maintained their role described an optimistic approach to overcoming challenges. In contrast, early dropouts felt overwhelmed by presenting challenges and exhibited pessimism. Past research has shown that optimism is linked to healthy aging in older adults (Steptoe et al., 2006). An optimistic peer leader may, therefore, be perceived as a role-model (Bandura, 2004), exemplifying how to engage in behaviours that promote healthy aging (Steptoe et al., 2006). Future peer leader programs could target the recruitment of optimistic volunteers for the role. It has long been recognised that optimism can be learned in a clinical, cognitive-behavioural setting, for example, through positive visualisation techniques (Riskind et al., 1996). However, this is likely to be an effortful process, and the feasibility of such training for older adults interested in volunteering as walk leaders needs to be tested.

Promoting Retention of Older Volunteers.

In Study 2, findings indicated that need satisfaction and the quality of motivation is important for determining whether volunteers adhere to a program and maintain their role. Autonomously motivated individuals, who experienced need-satisfaction, were effective at overcoming challenges, were inclusive and likely to sustain as a volunteer. In contrast, individuals who expressed high levels of controlled motivation were less inclusive, did not enjoy adapting to the pace of others, and dropped out early or suffered from emotional exhaustion. In future interventions, researchers could promote autonomous motivation in peer leaders, by offering support that ensures volunteers feel competent, connected and autonomous

in their role as a volunteer. For example, competence could be supported by ensuring that volunteers receive training in skills that will help them feel effective in their role, providing them with opportunities where they can learn from more experienced volunteers, providing them with recognition and meaningful feedback. Autonomy could be supported through offering roles that are flexible in terms of volunteer commitment. This will ensure that volunteers can choose to take breaks from their role (e.g., go on a holiday), or attend to other obligations (e.g., babysit grandkids, go to the doctor). Furthermore, sharing the responsibility with other peer leader volunteers can provide opportunities for connection, which can support the need for relatedness. Interventions that incorporate funded social events, or discount rates at a café, can further foster a sense of relatedness between volunteers. Overall, findings suggest that providing volunteers with an environment that satisfies the need for relatedness (e.g., ensuring that group members attend the walk) may be important for helping older adults start off as volunteer walk leader. Ensuring that peer leaders feel effective in their role, and supporting their need for autonomy (e.g., through role flexibility) may then motivate them to retain as a volunteer.

Training Peer Leaders in Need-supportive Communication Strategies.

Adequate training may increase the effectiveness of peer leaders, and support perceptions of competence which in Study 2 was linked to persistence as a volunteer. It was previously found that professionals can be trained in need-supportive communication strategies (Ntoumanis et al., 2020). Future research can use the strategies identified in Study 4 to examine whether this approach could work with older adults. That is, whether it is feasible to train older volunteers to communicate using need-supportive strategies when leading a walking group (Nunez & Leon, 2015). If peer volunteers are successfully trained to be effective at

delivering a physical activity program, they could provide a low-cost, self-sustainable alternative to using professional walk leaders, for promoting physical activity in the older population (Buman et al., 2011; Burton et al., 2017).

Table 6.1 provides an overview of suggestions on how the findings of this thesis can be used in the context of a future peer-led intervention.

Table 6.1

Translation of Findings and Recommendations for Future Older Peer-led

Interventions.

Translation of Findings	Recommendations	Further information
Dissemination. **Aim:** Support the development and translation of peer-led walking interventions **Applicable findings:** Studies 1-4	**Funding:** Investing in the development and translation of older peer-supported walking interventions. **Environment:** Planning safe, age-friendly, stimulating environments that allow side-by-side walking. **Dissemination:** Inform the older community on the benefits of walking with peers. **Recommendation:** Recommending older adults to engage in dyad and group- based walking at least once a week.	See results from Study 1 (E.g., Table 2.3) on benefits of peer-accompanied walking.
Peer Leader Recruitment and Selection Aim: Target suitable volunteers to save unnecessary training costs. **Applicable findings:** Study 1 - 3.	**Meaningful roles:** Using findings on the impact of peer support to recruit volunteers interested in helping others. **The right personality:** Targeting volunteers who exhibit key attributes that increase the likelihood of their effectiveness and retention (Altruism, Optimism, Compassion). **Role description:** Specifying a clear task description to create realistic expectations.	See Table 7.9 for overall suggestions pertaining to recruitment. See attributes listed on Table 7.14- 7.16 for a detailed description of attributes.
Peer Leader Training **Aim:** Train volunteers in all necessary skills to ensure effectiveness. **Applicable findings:** Study 3 and 4.	**Evaluation:** Assessment of existing skills and attributes. **Skill development:** Development of relevant skills and modifiable traits. **Training:** Training volunteers in need-supportive communication skills.	See Table 7.17 for suggestions pertaining to skill development. See Tables 7.18 - 7.20 for a detailed description of need-supportive strategies
Peer Leader Support **Aim:** Support volunteers to feel effective, connected and autonomous, to facilitate retention. **Applicable findings:** Study 2 and 3	**Autonomy:** Role flexibility, shared responsibilities, and opportunity to start as a walker. **Competence:** Match volunteer personality to demands of the target population. Opportunity for walker feedback and recognition. Offer support with walker recruitment. **Relatedness:** Opportunities for social exchange/connection with other volunteers.	See Table 7.9 and 7.10 for detailed suggestions on volunteer support.

Training Non-humans.

In settings where it is not possible to recruit human peer leaders, attributes could inform how robots (i.e., machines that can perform specific tasks without human interference) and avatars (i.e., a figure representing a person in a video game) might be programmed to assist older adults. A recent study used robots to provide company for older people during walks and noted that participants enjoyed the experience but missed human communication during the walk (Karunarathne et al., 2019). Subsequent research, therefore, focused on social robots which usually have a physical body, mimic human activity, and are programmed to interact and communicate with humans (Onyeulo & Gandhi, 2020). Research examining ways in which a robot can effectively interact with humans is still in the early stages.

Such communication could be improved by training robots to interact in ways that are compatible with the attributes and strategies identified in studies 3 and 4. For example, robots could be programmed to make jokes (i.e., entertaining) or describe interesting aspects of the physical environment. Furthermore, they could be programmed to provide specific feedback that will support the psychological needs of walkers (e.g., provide positive encouragement, structure and meaningful feedback on progress in the walk distance achieved). Robots are programmed to perform specific tasks by sensing the state of their environment, which could entail reacting (i.e., informing emergency services of their location) in case the walker falls (Onyeulo & Gandhi, 2020). A robot that is synchronised with a smartwatch worn by the walker could encourage them to take a break if, for example, their pulse is too high. In summary, robots could be used to simulate identified attributes and to engage in

need-supportive interaction. Future research can evaluate whether such an approach is feasible and leads to desired outcomes.

To summarise, the attributes identified in this thesis can be used to guide the selection, training, and support of peer leaders, or be used to program robots. In particular, optimism seems to be important for helping peer leaders retain and be perceived as effective in their role. Second, results point to targeting peers who volunteer for autonomous and altruistic reasons, are compassionate, and who receive relevant training. Fourth, peers that volunteer for controlled reasons could be encouraged to start as a walker which can provide them with opportunities for need satisfaction (e.g., relatedness with other walkers), or competence (e.g., helping out the peer leader with a task), and provide opportunities to perceive volunteering as fun (Devereux-Fitzgerald et al., 2016).

Summary and Conclusion

Walking is a popular, accessible and effective way for older adults to increase physical activity levels and maintain or improve health. Past research has shown that older adults face a broad range of barriers to engaging in physical activity, with common barriers pertaining to lack of motivation, lack of confidence, poor health, and cost of the activity (Chong et al., 2014). Training older volunteers to offer support to their peers as a group leader or peer-supporter, may be a cost-effective form of physical activity promotion. Findings presented in this thesis advance understanding on the role of older peer leaders in promoting physical activity and health, in several ways. First, they highlight that peers have the potential to use walking to help older adults improve their physical health and overcome barriers by increasing the quality of motivation and improving walking self-efficacy. Second,

they explain personal and contextual factors that influence motivational processes and persistence as an older volunteer, informing future avenues of support. Third, they identify dispositional and modifiable peer leader attributes perceived as important by adults differing in physical capability and walking experience. Identified attributes can inform the development of a much-needed peer leader scale for older adults and guide future peer-led physical activity intervention design. Fourth, they describe motivationally supportive peer leader behaviours specific to an older population in a physical activity context. These behaviours can inform peer leader training and inform ways in which SDT can be applied to an older population to promote walking. Finally, findings were used to provide recommendations on how suitable volunteers can be selected, then trained to be effective as a peer leader, and how they can be supported to maintain that role. Alternative suggestions pertained to training non-humans in identified attributes to support older adults residing in isolated areas. Overall, findings of this thesis highlight the potential of regularly walking with peers, advance understanding on effective mechanisms of group-based approaches, and provide recommendations for future research, policy and practice.

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APPENDICES

APPENDIX A - Further Details About the Researcher

Qualitative Experience.

The researcher is a female PhD student, who had completed qualitative training at an undergraduate and postgraduate level. She has gained qualitative research experience before the conducted research as part of her master's (Practicing interview techniques and qualitative analysis) and while working as a research assistant (Interviewing physicians, analysing interviews and open-ended responses, presenting data as part of an EU project), and has attended workshop training in the use of NVivo.

Interviews Study 2-4:

During all stages of research and analysis, the researcher was guided by an experienced supervisory team. No relationship was established with the participants before the interviews. Participants were aware of the study aims, and that the researcher was a PhD student but did not know further information about the interviewer.

ActivPals.

The researcher has also attended an informal workshop on the use of physical activity monitoring devices, including ActivPals (held by a researcher who had experience using ActivPals.)

APPENDIX B- Study 1 Supplementary Materials

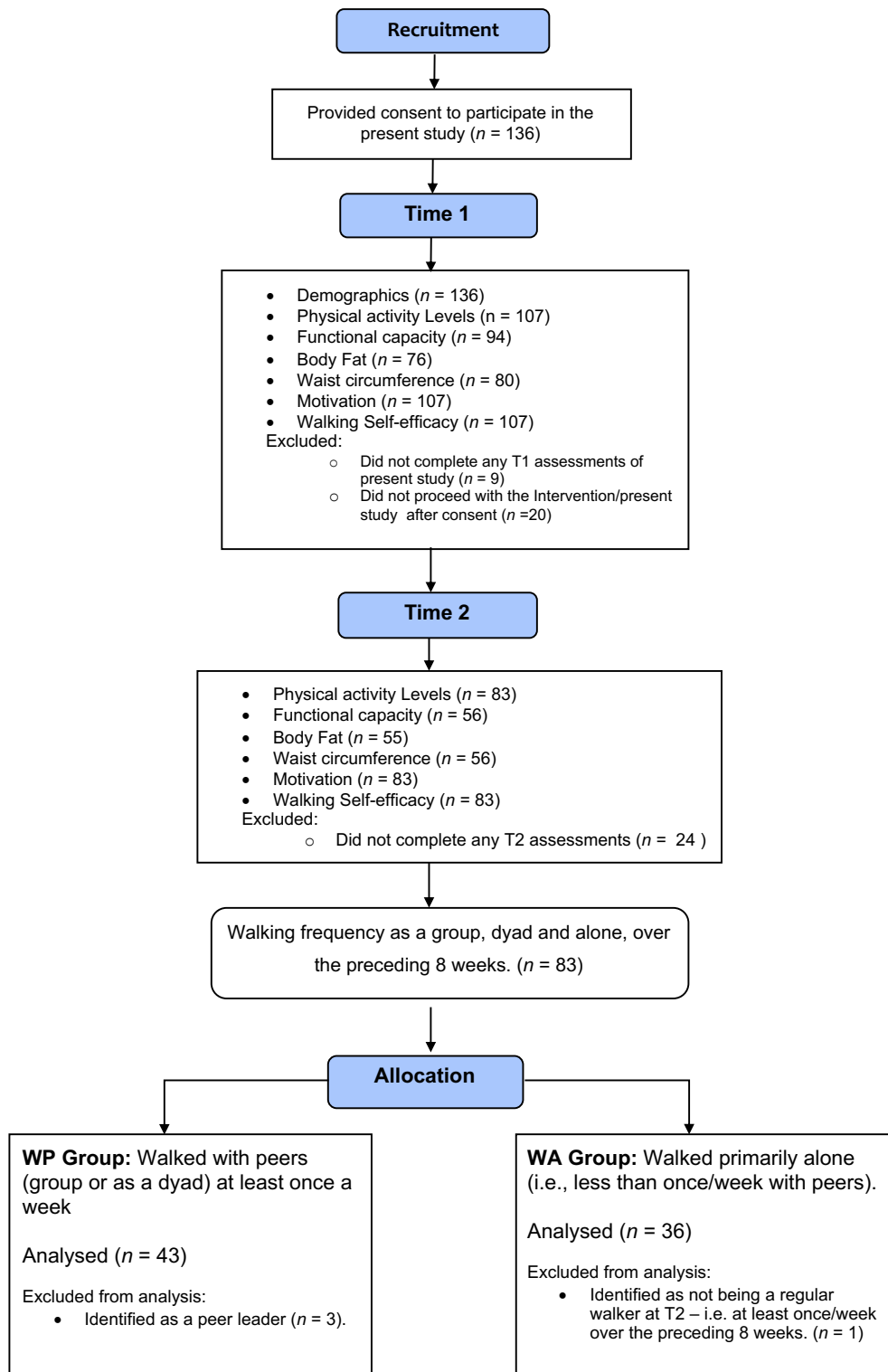## Further Details on the Research Design

Figure 7.1

Flow Diagram Illustrating the Recruited Participants and Collected Assessments Nested Within the Residents in Action Trial.
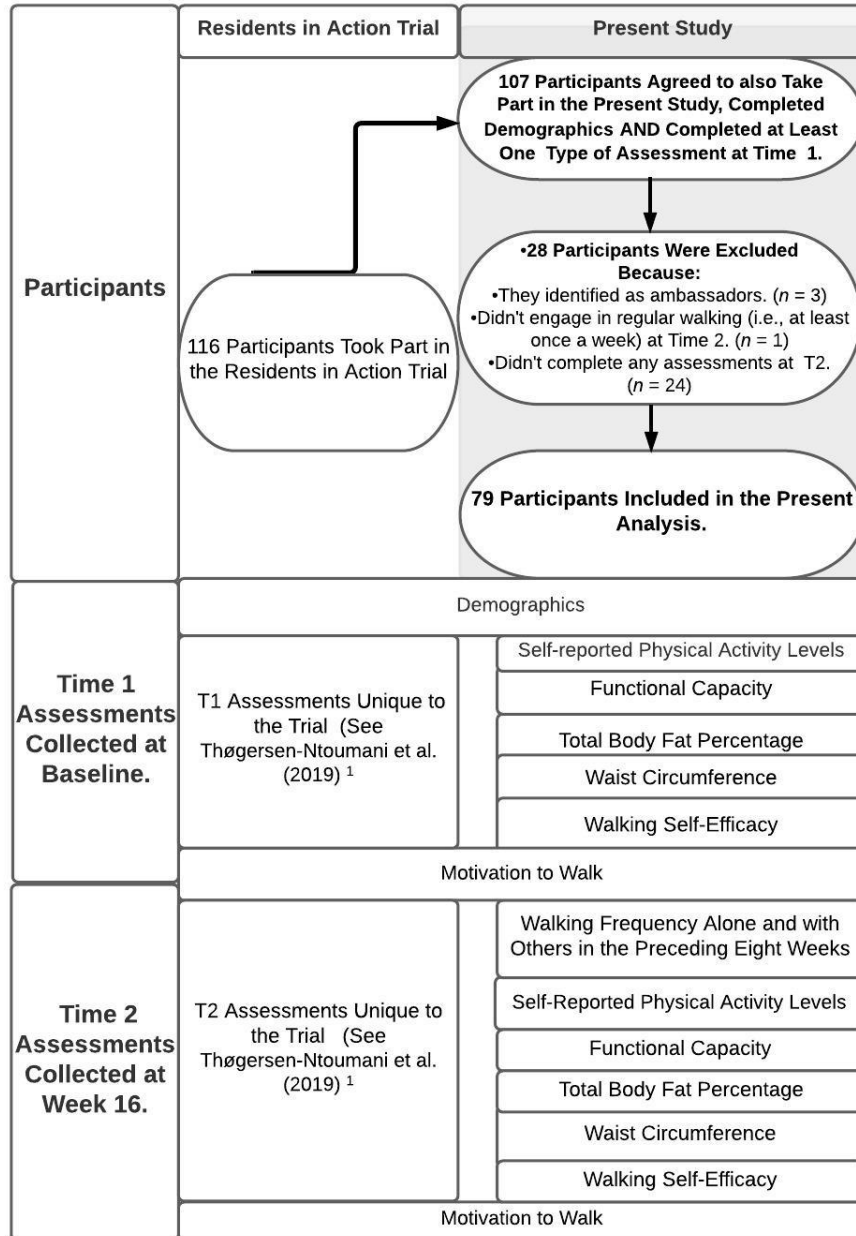
Note. 1 = For further details on the Residents in Action Trial please see "*Trial feasibility and process evaluation of a motivationally-embellished group peer led walking intervention in retirement villages using the RE-AIM framework: the Residents in Action Trial (RiAT)*" by C. E. Thøgersen-Ntoumani et al. (2019). *Health Psychology and Behavioral Medicine*, *7*(1), 202-233.
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Figure 7.2

Flow Diagram Illustrating the Number of Included Participants at each Time Point.

Further Details on the Results

Table 7.1

A Comparison of Baseline Scores between Those Who Primarily Walked Alone (WA) and Those Who Also Walked with Peers (WP).

	WP *n* = 43	WA *n* = 36	*p*
	Mean (SD) unless stated otherwise		
PASE	114 (49.1)	109 (54.1)	.672 [a]
6-Minute Walk Test, distance walked in meters	374 (74.0)	365 (72.0)	.951[a]
Walking self-efficacy	54.1 (27.6)	52.3 (29.7)	.990 [a]
Autonomous motivation	Median (IQR) =3.3 (1.13)	Median (IQR) = 2.9 (1.21)	.278 [b]
Controlled motivation	Median (IQR) = 0.95 (1.04)	Median (IQR) = 0.83 (1.35)	.362 [b]
Overall fat in %	36.8 (8.04)	33.7 (10.3)	.181 [a]
Waist circumference in cm	97.4 (10.3)	92.3 (14.7)	.115 [a]

Note. PASE = Physical Activity Scale score for Elderly indicating self-reported physical activity levels in the preceding week.
Further details on all questionnaires are provided in Appendix F.
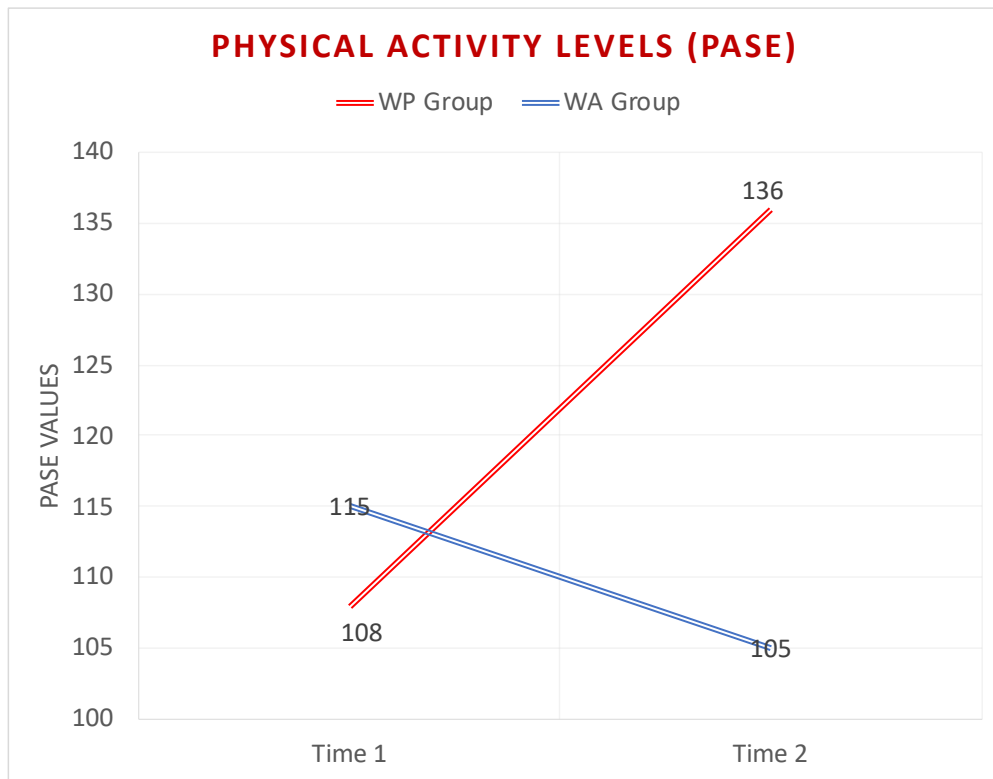*SD* = Standard Deviation
IQR = Interquartile Range
b = p value determined using one-way Analysis of Variance
c = p value determined using a Mann Whitney U Test, due to non-normal data.

Figure 7.3

Changes in Physical Activity of Those Who Walked Regularly with Peers (WP) and Those Who Walked Primarily Alone (WA).

Note. PASE values represent the mean total score, within each sub-group, calculated from the Physical Activity Scale for the Elderly (see Table 7.22 for the questionnaire and Washburn et al., 1993 for details on the calculation). All means have been adjusted for living status and health condition. Time 1 assessments were obtained at baseline and Time 2 assessments were obtained after 16 weeks.
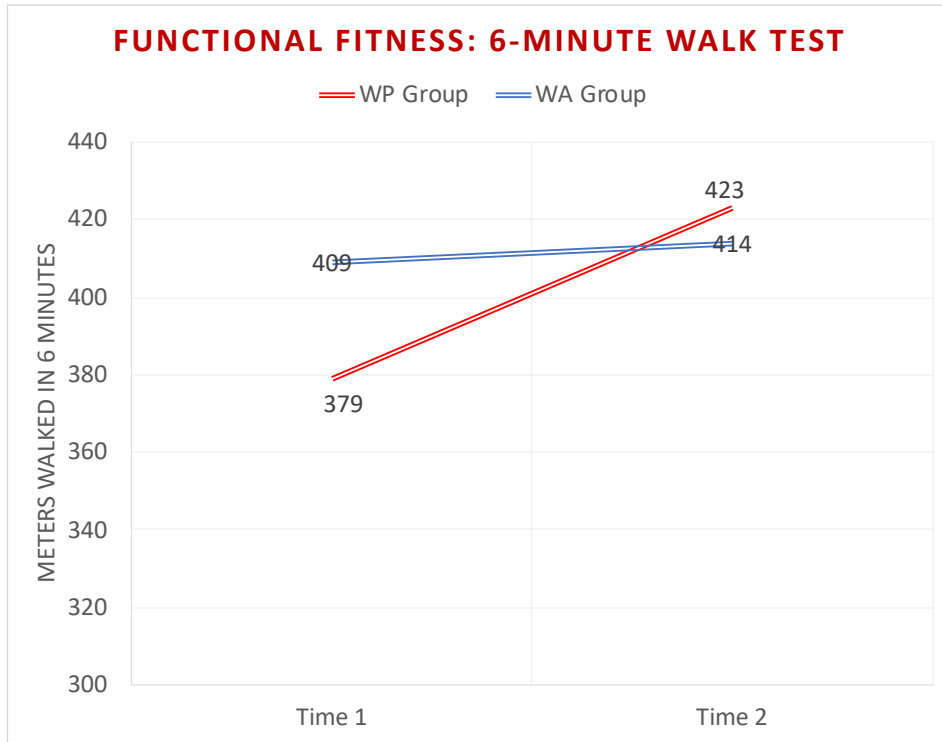
Figure 7.4

Changes in Functional Capacity of Those Who Walked Regularly with Peers (WP) and Those Who Walked Primarily Alone (WA).

Note. Values represent the mean 6-minute walk distance in meters within each subgroup. All means have been adjusted for living status and health condition. Time 1 assessments were obtained at baseline and Time 2 assessments were obtained after 16 weeks.

Figure 7.5

Changes in Walking Self-efficacy And Autonomous Motivation of Those Who Walked Regularly with Peers (WP) and Those Who Walked Primarily Alone (WA).

Note. Values represent mean walking self-efficacy (McAuley et al., 2000) and autonomous motivation Niven & Markland, 2016) within each subgroup. Further details scales are provided in Appendix F. All means have been adjusted for living status and health condition. Time 1 assessments were obtained at baseline and Time 2 assessments were obtained after 16 weeks.
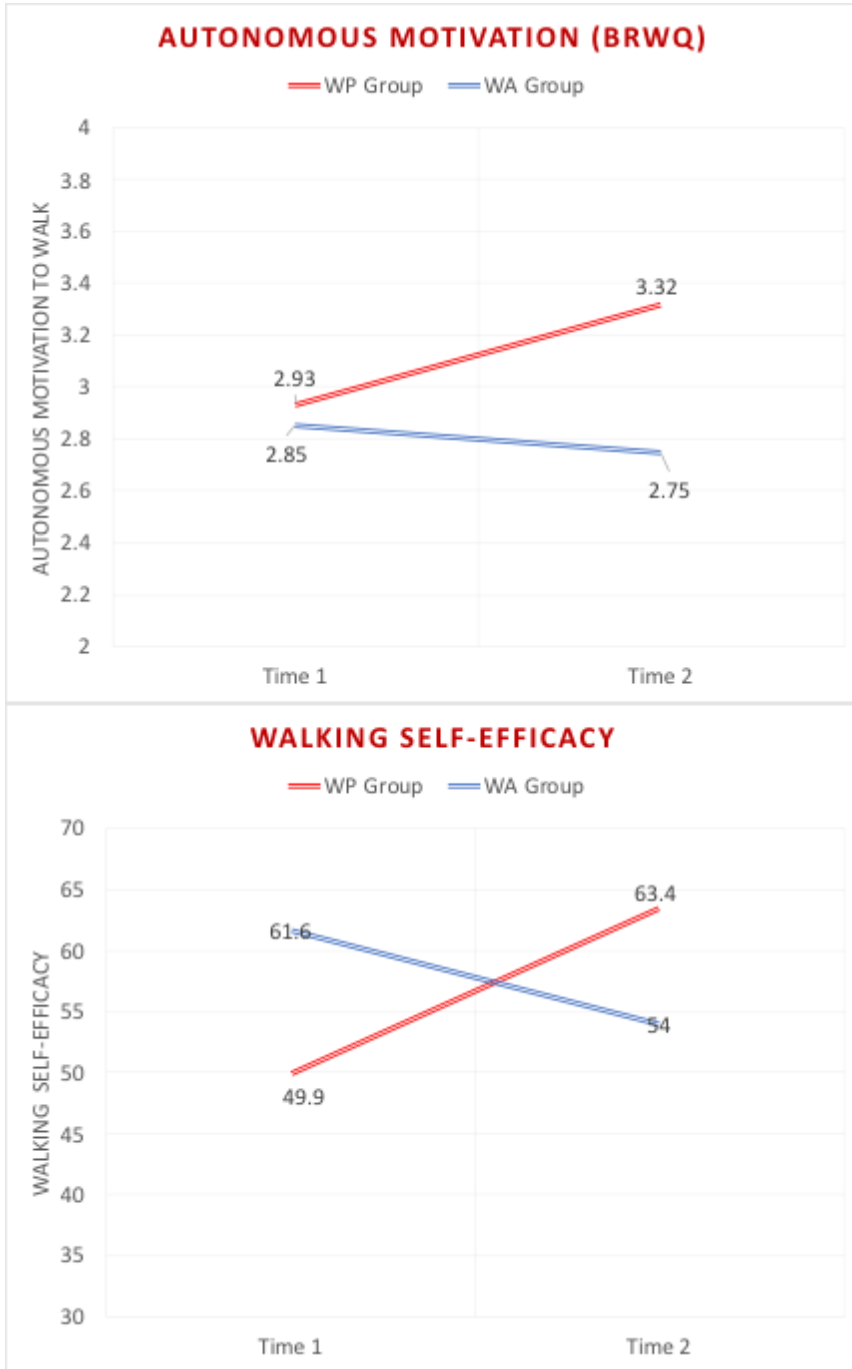
Figure 7.6

Changes in Walking Self-efficacy And Autonomous Motivation of Those Who Walked Regularly with Peers (WP) and Those Who Walked Primarily Alone (WA).

Note. Values represent means within each subgroup. Body Fat % and was determined with a Tanita Professional scale (Model BC-551). All means have been adjusted for living status and health condition. Time 1 assessments were obtained at baseline and Time 2 assessments were obtained after 16 weeks.
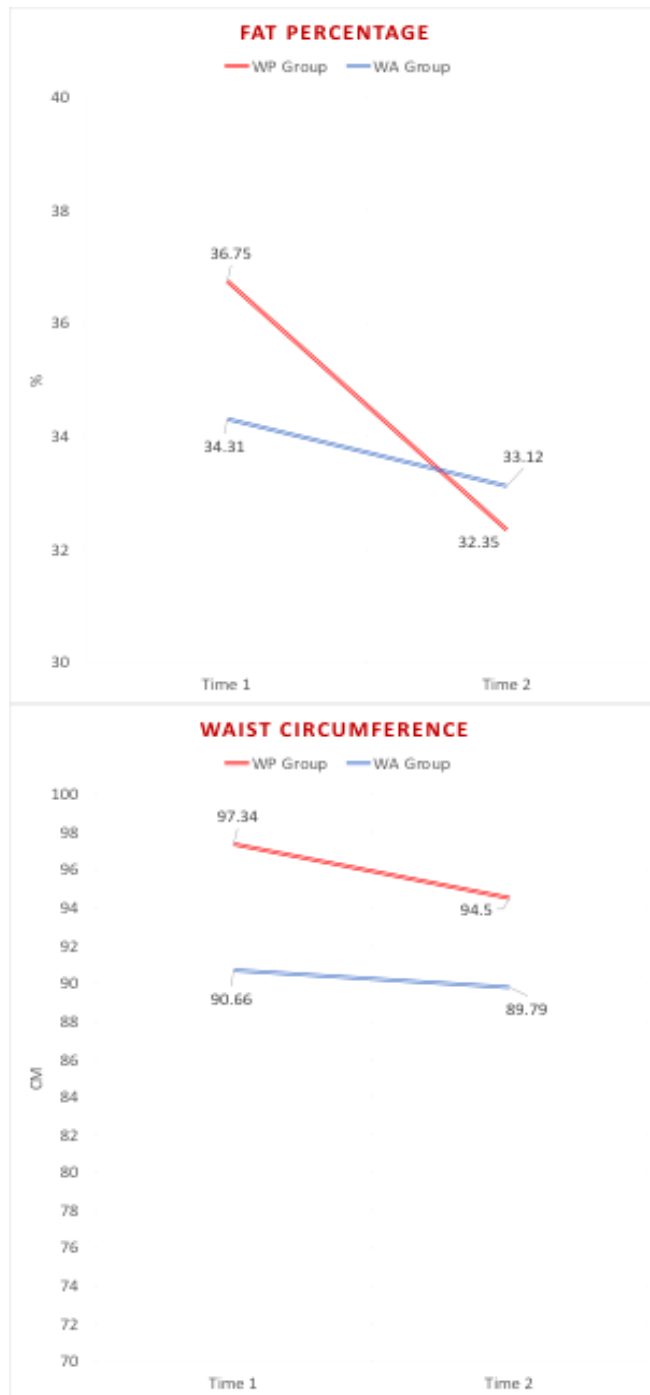
Information on the Distinction between Dyads and Group Walkers.

Among those walking with peers, 48.9% (21/43) regularly walked with a partner (i.e., as a dyad) but never as part of a group, while the remaining sample (51.2%, 22/43) walked with dyads and groups. Of those walking as part of a group (at least once during the preceding eight weeks), only 18.2% (4/22) didn't also report walking with a partner. Dyad walkers did not significantly differ from group walkers on any of our outcome variables. However, these results should be interpreted with caution due to the small sample size for the comparisons.

Information on Week 8 Data.

In this paper I only included participants who identified as regular walkers at Week 16 – i.e. those who engaged in walking at least once a week- throughout the intervention, including the first eight weeks of the program. Of those included in this study 60 participants identified as regular walkers at Week 8 (i.e., walked at least once/week during the first 8 weeks). An additional 9 participants did not complete walking frequency data at Week 8 but were still part of the program at Week 8. The remaining 10 participants did not provide us with any data at Week 8. Of those 4 identified as regular dyad walkers at Week 16 and 6 identified as regular solo walkers at Week 16.

APPENDIX C- Study 2 Supplementary Materials.

Further Details on the Recruitment Process and Participants

A total of thirty-six residents residing in fourteen retirement villages in and around Perth expressed interest in the peer leader role. Twenty-four participants discontinued as a volunteer before engaging with the program, of whom fourteen subsequently took part as a walker, and ten volunteers quit the program. Twelve volunteers engaged in the program, of whom four dropped out as a volunteer, and eight completed the program.

Table 7.2

Description of Profiles, Collected Data and Primary Reasons Provided for Stopping or Continuing as a Volunteer Peer Walk Leader.

Profile Description	Data Collection	Reason to Continue/Dropout[1]
Profile 1- Program Dropouts. Four late program dropouts: all female. Included participants who had consented to the peer leader role and attempted to lead a group (at least once) but who discontinued their role as a peer leader before program completion. All sustained as a walker	**All four were interviewed at T1 and T2.**	All described lack of enjoyment and inability to meet own goals. Two described perceived lack of support to meet role demands. Two described lack of time to meet role demands.
Profile 2- Program Completers. Five Completers: four females, one male All completed the program but indicated that they will not continue in their role as a peer walk leader.	**Four were interviewed at T1 and T2**. One was not interviewed but provided questionnaire information at T2.	All described socialization as primary motive to continue. All described inability to provide desired help or lack of enjoyment/exhaustion as a reason to stop.
Profile 3- Maintainers. Three Maintainers: all female Expressed intention to continue as a volunteer after program completion.	**All three were interviewed at Time 1 and Time 2.**	All described enjoyment, socialization and success at helping as primary motives to continue.
Profile 4- Non-engagers. 24 non-engagers: four males, 20 females Included participants who expressed interest but didn't start the peer leader role or attempt leading a group. Ten non-engagers who quit the whole program: Nine female, one male Fourteen early non-engagers who sustained as a walker: three males, Eleven females	Four were interviewed at T1 and T2. Eight were interviewed only at T1 but provide questionnaire/verbal data at Time 1. Twelve were not interviewed but provided verbal data at T2 explaining reasons for dropout.	Five mentioned a lack of walkers or were pessimistic about the acceptability of the program. Twelve indicated a lack of time/motivation to meet role demands. Two indicated poor fitness/physical confidence as a leader, all of who continued as a walker. Five described medical reasons (e.g., old age, bad health) all of whom left the program

Table 7.3

Further Details on Themes Derived from Thematic Analysis of Interviews with Individuals Classified as Non-engagers (i.e., did not attempt to lead a group).

3 female, 1 male, 63 -81 years old, BMI: 21.92 -28.70 2 divorced/separated, 1 widowed, 1 married, 3 living alone. 1 completed University, 2 completed School, 1.5-17.8 years in village, 5- 15 years leadership experience All high levels of leadership confidence at pre-intervention. [5] **All active**, PASE range: 83.21 – 217 [a]	• **Motives to walk** [b] **All High Autonomous** 2.50 -4.00 **All Low Controlled** 0.17 – 2.00 • **Motives to volunteer** [c] **All High Autonomous** 3.67-5.17 **All Low Controlled** 1.33 – 3.00
Pessimism	"When I first thought about it, I was quite keen. When I then thought about it, I thought it wouldn't work. I wouldn't waste my time trying to motivate…. there are a few ladies I know who you should, and I have been trying even to get them to walk down the corridor and back...and they won't."
Role demands (e.g., volunteering 3 times/week) didn't match lifestyle	"Well, initially I like to walk, and I do it every day and I thought it was something I could combine with my walking, so I volunteered to do it. But then once I got into it more and it got to the criteria (walking three times a week) … well the times I like to walk are early in the morning. I didn't think that would be feasible. The other thing was, I like to walk at my pace. It wouldn't have been suitable in a group activity."
Declining health	"I had to pull out. I had an injury on my ankle. I do apologize. I really apologize but I just can't keep going. I just can't. I would have loved to have been able to take part. I was really looking for forward to this as you know."

Note. PASE = Physical Activity Scale for Elderly. BMI = Body Mass Index.
a = Scores represent ranges of self-reported activity levels computed from responses to PASE (See Table 7.22). The label "active" indicated activity levels that were above the norm for the respective age-group as defined by the scale developers (Washburn et al., 1993), b = Scores represent ranges of scores computed from responses to the Behavioural Regulations in Walking Questionnaire (See Table 7.24). Scores for controlled regulation and autonomous regulation ranged from 0 and 4, with scores of 0 – 2.50 being labelled as "low" and scores of 2.51 or higher being classified as "high". c = Scores represent ranges of scores computed from responses to the Volunteer Motivation Scale (See Table 7.25). Scores for controlled regulation and autonomous regulation ranged from 0 and 7, with scores of 0 – 3.50 being labelled as "low" and scores of 3.51 or higher being classified as "high". 5 = Labels were determined from of scores computed from responses to the Leadership self-efficacy scale (See Table 7.27). Scores ranged from 0 and 7, with scores of 0 – 3.49 being labelled as "low" and scores of 3.50 or higher being classified as "high".

Further Details on Assessments and the Research Design.

Table 7.4

Questionnaires and Interview Schedule Administered at each Time-Point.

Construct	Examples of Scale Items and Interview Questions
Pre-intervention	
Questionnaire Data Demographic characteristics	• Gender, Age in years, BMI, Marital Status, Living status, Duration of living in retirement village in years, Highest level of education, Leadership experience in years.
Volunteer Motivation	• **VMS:** Because I would really feel bad about myself if I didn't volunteer (Introjected regulation) 1-*Strongly disagree* to -*Strongly agree-7)*.
Self-perceived Leadership traits	• **LTQ:** I talk freely and get along well with others (Outgoing) (1-*Strongly disagree to -Strongly agree*-5).
Leadership self-efficacy Motivation to walk	• **LSE:** I can take charge when necessary (1-*no confidence to -100% confident* -7).
Physical activity levels	• **BRWQ:** I walk because it is fun. (Intrinsic regulation) (0 -*Not true for me to Very true for me* -4). • **PASE:** Over the past 7 days, how often did you take a walk outside your home or yard for any reason? (0-*Never-Often*-3).
Interview Schedule Past experience as a leader and volunteer. Physical activity level Motives to engage in walking and in group walking Motives to volunteer Anticipated challenges, facilitators and barriers.	• Please describe any past experiences of being active/volunteering/being in a leadership role? • How active are you at the moment? What do you do? • How much walking are doing at the moment? • What motivates you to walk/walk with others? • Why do you want to volunteer as a walk leader? • What, if anything, could stop you from continuing? Anticipated challenges? What might help you continue?
Post-intervention	
Questionnaire Data: Intention to continue volunteering	• What is the likelihood that you will continue to volunteer as a walk leader?" (*1 = Very unlikely, to 5 = Very likely*).
Interview Schedule: Facilitators to volunteering Barriers to volunteering Challenges and successes Intention and motives to continue volunteering, associated barriers and facilitators to continue.	• What helped you continue in your role as a walk leader? • Why did you stop volunteering as a walk leader? • What challenges or difficulties did you experience? • What successes did you have or what went well? • What is the likelihood that you will volunteer as a walk leader in the future? Why? • What might stop you/ motivate you to volunteer as a walk leader in the future?

Note. Further details on how scores were determined, and their validity are presented in Appendix F, Table 7.21. BMI = Body Mass Index. LTQ = Adapted Leadership Traits Questionnaire (Jetvic, 2013, Northouse, 2013, see Table 7.28). PASE = Physical Activity Scale for the Elderly (Washburn et al., 1993, see Table 7.22). BRWQ = Behavioural Regulation in Walking Questionnaire (Niven & Markland, 2016, see Table 7.24), VMS = Volunteer motivation scale (Millette & Gagne, 2008, see Table 7.25). LSE = Leadership self-efficacy scale (Kane and Baltes, 1998, see Table 7.27).

Further Details on Participant Profiles.

Table 7.5

Information on Participant Characteristics Within Each Profile.

	Demographic Characteristics	Leadership	Physical Activity[1]	Motivation to Walk[3]	Volunteer Motivation[4]
Program Dropout 4 Members in Profile	4 females, 66- 75 years old BMI Range[2]: 20.99 – 25.97 3 Separated, 2 Divorced All living alone. 2.5 – 5.0 years in village 3 completed University, 2 completed secondary school. 2 high levels of leadership	0 -20 years leadership experience 3 high levels of leadership confidence 1 low levels of leadership confidence	**2 Less active** **2 Active** PASE range[1]: 68.50 – 148	**Low Autonomous** *(n =1)* **High Autonomous** *(n =3)* 1.75 – 3.08 **All Low Controlled** 1.08 – 1.96	**Low Autonomous** (n = 2) **High Autonomous** (n = 2) 2.83 – 3.86 **All High Controlled** 4.00 - 4.83
Program Adherer 4 Members in Profile	1 male, 3 female, 75- 83 years old. BMI range[2]: 23.81 – 25.10 2 Married, 1 Widowed, 1 Divorced 3 living alone, 1 living with spouse Living 1.1 – 8.3 years in village 2 completed University, 2 completed vocational training	1 - 60 years leadership experience 3 high levels of leadership confidence 1 low levels of leadership confidence	**2 Less active** **2 Active** PASE range[1]: 105 - 239	**All High Autonomous** 2.67 – 3.83 **All Low Controlled** 0.38-1.96	**All High Autonomous** 3.94 – 5.69 **All High Controlled** 4.67 – 5.50
Maintainers 3 Members in Profile.	3 females, 70-78 years. BMI range[2]: 21.85 – 28.53 1 Married, 2 Widowed 2 living alone, 1 living with spouse. Living 3-5 years in village. All completed school.	2-30 years leadership experience All high levels of leadership confidence	**All Active** PASE range[1]: 64 – 237	**All High Autonomous** 3.83-3.92 **All Low Controlled** 1.21 – 2.00	**All High Autonomous** 4.69 -6.00 **All Low Controlled** 2.67 -3.00

Note. [1] = Scores represent ranges of self-reported activity levels computed from responses to Physical Activity Scale for Elderly (PASE). The label "less active" and "active" indicated whether activity levels were below/above the norm for the respective age-group as defined by the scale developers (Washburn et al., 1993), 2 = BMI = Body Mass Index 3 = Scores represent ranges of scores computed from responses to the Behavioural Regulations in Walking Questionnaire. Scores for controlled regulation and autonomous regulation ranged from 0 and 4, with scores of 0 – 2.50 being labelled as "low" and scores of 2.51 or higher being classified as "high". [4] = Scores represent ranges of scores computed from responses to the Volunteer Motivation Scale. Scores for controlled regulation and autonomous regulation ranged from 0 and 7, with scores of 0 – 3.50 being labelled as "low" and scores of 3.51 or higher being classified as "high".[5] = Labels were determined from scores computed from responses to the Leadership self-efficacy scale. Scores ranged from 0 and 7, with scores of 0 – 3.49 being labelled as "low" and scores of 3.50 or higher being classified as "high"

.Table 7.6

Further Details on Themes Derived from Thematic Analysis of Interviews of Individuals categorized as Program Dropouts (Profile 1)

Themes	Description and Examples
Focus on self-orientated goals throughout the program.	• Desire to increase own physical activity levels, obtain social rewards, ego-enhancement.
Perceived lack of support/resources to meet role demands.	• Lack of time to volunteer three times per week • Perceived lack of support (e.g., with encouraging walkers to join, responsibility for group).
Basic psychological needs not satisfied.	• **Perceived lack of Autonomy** • Not wanting to adapt to other walker's needs (e.g., walking pace, time-schedule). • **Perceived lack of Relatedness** Lack of walker interest/motivation. Inability to create desired social connection during or after the walk. • **Perceived lack of Competence:** Inability to provide the desired help (e.g., walker dropout).
Lack of internalization of motives throughout the program.	• Reduction of autonomous motivation, dominance of other priorities. • Not enjoying the role of a group leader/ responsibility. • Satisfaction as a volunteer determined by meeting self-orientated goals.

Table 7.7

Further Details on Themes Derived from Thematic Analysis of Interviews of Individuals Categorised as Program Completers (Profile 2).

Dominance of Obligation and Guilt Throughout the Program.	• Desire to obtain social rewards(e.g., experience socialization with other walkers, experience recognition). • Feeling obliged to volunteer/to reduce guilt (e.g., responsible as a village committee member, being asked by others).
Temporary Satisfaction of Psychological Needs.	• **Autonomy:** Enjoyment of organizing and leading a group (e.g., enjoying the initiative of making the walks interesting and choosing suitable routes). • **Relatedness:** Creating meaningful connections with walkers and other volunteers. • **Competence:** Perceived success at initiating a walking group.
Unsustainable Helping Strategies Reducing Perceived Autonomy.	• Provision of individual support/adaptation to needs of individual walkers leading to emotional exhaustion.
Inability to Provide the Desired Help Reducing Perceived Competence.	• Use of ineffective group management strategies. For example, segregation of slower from faster walkers leading to walker dropout.
Motives to Help not Fully Internalized.	• Pessimism for helping (i.e., perceiving a walking group with inexperienced walkers not feasible). • Lack of enjoyment in helping inexperienced walkers (exhausting to adapt to slower walkers, can't provide desired help, can't relate to demotivated walkers, perceiving it a "chore" to help slower walkers.)

Table 7.8

*Further Details on Themes Derived from Thematic Analysis of Interviews of
Individuals Categorised as Maintainers (Profile 3).*

Dominance of Altruistic Desires Throughout the Program.	• Desire to help those who need help. • Compassion for inexperienced walkers.
Effective and Sustainable Helping Strategies. Use of Social Support to Meet Role Demands.	• Inclusive group management. • Adapting to the needs of the slowest walkers. • Use of relevant previously acquired experience. • Delegating leader role to other walkers/volunteers while away.
Satisfaction of All Basic Psychological Needs.	**Satisfaction of Need for Autonomy.** • Enjoying helping others to walk more. • Perceived control of level of commitment through support from other walkers/volunteers. **Satisfaction of Need for Relatedness** • Perceiving support from other volunteers/group members. • Using social skills to create group cohesion (e.g., meaningful connection with walkers, socialization during and after the walk). • Leadership acceptance (e.g., being accepted as the group leader, perceived as role model, gets asked for advice). **Satisfaction of Need for Competence** • Leadership confidence and opportunity to use previously acquired skills (e.g., know-how in exercise, leadership and group management). • Successful at eliciting positive walker interest and initiating regular group walks • Positive feedback from walkers and ongoing walker commitment.
Enjoyment and Optimism.	• Optimism and flexibility (e.g., not taking it personally if walkers don't attend regularly). • Intention to continue volunteering as a peer walk leader. • Intrinsic motivation to walk and help others.

Table 7.9

Suggestions/illustrative Quotes for Recruitment, Training to Support Motivational Processes of Older Adults Volunteering as Peer Walk Leaders.

Suggestions	Illustrative Quotes Derived from Interviews.
Recruiting Volunteers	
• Clarity on role tasks and role demands.	"You could say, 'Okay, now if you're a walk leader at the end of this when we do the workshop, you will be expected to...'" Program dropout
• Emphasizing the social aspect/intrinsic benefits of helping others.	"You're dealing with older people and they have funny ... A lot of them haven't moved with the times and they have funny ideas about walking groups… Maybe you could call it social walking group which would suggest that you can chat or you're going to socialize as well as walk." Program dropout
• Manageable role demands.	"Smaller groups is the way to do it. You start off with a bigger group and fail." Program dropout
• Shared responsibility (e.g., at least two walk leaders per group) • Role flexibility (e.g., choice on level of commitment)	"If somebody else had taken on the role to do it and all I had to do is turn up and do the walks when I could." Program dropout
Selecting volunteers	
• Positive attitude and flexibility. • Interest in others, social confidence, • Autonomous motivation to exercise. • Altruism and willingness to adapt." • Relevant past Leadership skills	"It's just being positive yourself and knowing the benefits you gained from it (exercise)." Program maintainer "I used to be an aerobics instructor. So, I had that background for a long time. So, I feel very confident in that role." ." Program maintainer
Training volunteers	
• Establishing group cohesion (e.g., planning in opportunities for socialization during/after the walk).	"We certainly got to know each other and a bit …we enjoy each other's company and have a cup of coffee together and that sort of thing." Program completer
• Eliciting positive walker interest and initiating regular group walks (e.g., role modelling, makes it interesting, adapts to slower walkers)	"I make it fun and talk about happy things. You need to be able to impart how you feel. If you are happy and energetic and positive, it makes them feel better." Program maintainer
• Social skills training: Training to help volunteers understand needs of group members and create meaningful social interactions.	"We got a very good group because even (slow walker), she walks with a frame. She really can walk quite well. I think you need to be able to understand their capabilities." Program maintainer
• Sustainable helping strategies and ways to avoid exhaustion, to delegation of tasks.	"He took over on two occasions when I couldn't be there. He was a very good walker." Program maintainer
Providing volunteer support during the program	

- Organizing Social events: Facilitating regular contact with other volunteers
- Positive Recognition for volunteers to promote leadership identity (e.g., positive feedback).
- Walk and talk friendly routes.

Table 7.10

Overall Factors That Support Versus Thwart the Motivation of Peer Walk Leaders.

Need-satisfaction
Sense of Autonomy
• Positive attitude (optimism, flexibility).
• Autonomous motivation to exercise.
• Focus on meeting altruistic desires (e.g., desire to help, patience).
• Role flexibility/shared responsibility.
• Opportunity to choose walking pace and level of commitment.
Sense of Relatedness
• Peer leader selection: interest in others, social confidence.
• Social skills training: Training to help volunteers create meaningful social interactions, compassion.
• Establishing group cohesion (e.g., planning in opportunities for socialization during and after the walk, friendship, shares life stories)
• Social opportunities: Facilitating regular social contact with walkers/other volunteers.
• Leadership acceptance (e.g., being accepted as group leader, get asked for advice).
• Walk and talk friendly routes
Sense of Competence
• Leadership confidence and skill.
• Opportunity to use previously acquired skills (i.e., applicable know-how in exercise, leadership and group management).
• Successful at eliciting positive walker interest and initiating regular group walks (e.g., role modelling, sets a time, plans a route, structure, makes it interesting).
• Use of sustainable helping strategies: effective at overcoming challenges without volunteer burnout.
• Positive feedback from walkers and walker commitment.
• Clarity on role tasks
• Smaller/manageable groups.
Need- frustration
Lack of Autonomy
• Controlled motivation to exercise.
• Not enjoying helping others.
• Having to adapt to inexperienced walkers.
Lack of Relatedness
• Lack of walker interest/attendance and walker dropout.
• Lack of opportunity to connect during or after walk.
• Unable to create meaningful social interactions.
Lack of Competence
• Use of unsustainable helping strategies.
• Inability to provide the desired help.
• Mismatch of demands of role and available resources and skills (e.g., unable to volunteer 3 times a week)

APPENDIX D - Study 3 Supplementary Materials

Further Details on Interview Questions.

Table 7.11

Interview Questions on Peer Leader Attributes.

Question on Attributes.	Example Prompts.
What do you think are key traits, skills and behaviours of a peer leader who is effective at leading a walking group for older adults?	What qualities/personality/skills might he/she have, what is an ideal peer leader for you?
	Can you describe some things an effective walk group leader could do or refrain from?
	What should an effective peer leader say or not say?

Note. Past research (Northouse, 2013 Goleman, 2004) informed the definition of what I considered attributes (skills and inherent or modifiable characteristics). I used this knowledge to specifically ask participants about the traits and skills that match this definition. However, I deliberately followed an inductive, data-driven approach as I aimed to explore attributes that may not have been previously captured.

Further Details on the Study Methodology.

Further Details on the Administration of the ActivPAL and Analysis of the Data.

Administration. The researcher gave participants a face-face demonstration on how to re-attach the monitor (if it needed to be removed) and provided them with the necessary materials (i.e., Tegaderm, nitrile sleeves, alcohol pads). Participants were additionally provided with a detailed information sheet containing re-attachment information, procedural details, and contact details of the researcher. We excluded participants who wore the ActivPals for less than three days. However, the majority of participants wore the device for the recommended wear-time. A log sheet was provided to record the removal of the monitor, as well as times of going to and getting out of bed.

Analysis. I used the STATA algorithm, which isolates waking hours from sleeping time (time spent in bed), long periods of non-wear time, and invalid data (Edwardson et al., 2017). Processed data were checked visually for accuracy using heat-maps, as described previously (Edwardson et al., 2017). Physical activity data included sitting time, standing time, and stepping time (light and moderate to vigorous) with outcomes calculated across all waking hours. A day was defined as valid if it had less than 95% spent in any one behaviour (e.g., standing or sitting), more than 500 steps, and 10 hours or more of data from waking hours. Total moderate-to-vigorous physical activity (MVPA, h/day) was calculated as the sum of

time spent in MVPA (stepping events > 3.00 METS). Light physical activity (min/day) was determined from standing and stepping events. (1.50-2.99 METs). ActivPAL data was included in the analysis if participants provided at least three valid waking days of data (Reid et al., 2013). The first day of data was discarded from the analysis to minimize the possibility of reactivity.

Further Details on the Analysis of Qualitative Data.

Data saturation. During analysis, within all sub-groups, data saturation was reached. During the interview and preliminary analysis process, we felt that data saturation was reached when the researcher (who conducted all interviews) observed no more additional codes/themes within each sub-group. Data saturation was then demonstrated by constructing a data saturation table for each sub-group. Rows were labelled by code, and columns pertained to individual interviews. The information recorded in the cells of the table illustrated where each code was first identified. Two blank columns for later interviews (i.e., indicating no more new themes) provided documentary evidence that saturation was reached within each sub-group.

Coding process of qualitative data. The researcher immersed themselves into the data and pasted relevant portions of transcripts into a word file. Interview content was selected based on whether it mentioned attributes or descriptions of attributes. Meaning units were organized into codes which consisted of words and concepts with similar meaning (e.g., "kind" and "nice" were code as friendly). For example, words such as "friendly", "kind", and "nice" were all coded as friendly due to their similar meaning. The data was coded using an inductive/data-driven approach without any pre-given coding scheme. The analysis entailed manifest and latent components- the latter was informed by definitions provided by participants (e.g., One participant stated, "Has to be outgoing, so somebody who likes people",

informed subsequent coding of "somebody who likes people" as "outgoing"). Coding included text that directly referred to attributes. For example: "*You have to feel comfortable with them (peer leader) ... be **welcoming***" was coded as "Welcoming". We also included short **descriptions** of attributes. For example: "*You got to be able to project your voice and tell them (the walkers) straight and accurately what you want them to do*" was coded as "articulate". Similarly, "*Has to be able to understand people's needs*" was coded as "compassionate". An open coding process (Hsieh & Shannon, 2005) of the first four transcripts resulted in a coding scheme containing nineteen distinct codes. These codes were discussed among the research team and modified if necessary. The first four transcripts were then re-coded to ensure consistency after the modification, after which the remaining transcripts were coded. A set of categories from the list of codes was then derived. For example, the codes "friendly" and "welcoming" were both assigned to the category "inclusive", "outgoing" and "social skills" were assigned to the category "sociable".

Rigour. All data were coded by the researcher, at multiple time points and achieved high levels of agreement (intra-rater reliability) across the data. All coding decisions, themes and sub-themes were discussed extensively within the research team, which included a supervisory team of experienced qualitative researchers. The development of a detailed code book, including the code name, the description and an example (For a simplified version see Tables 7.16-7.18), allowed us to maintain rigour throughout the development of the coding structure.

Additional Information on Participant Characteristics.

Inexperienced peer leaders. Inexperienced peer leaders represented the group with the highest proportion of individuals living alone (68%, 17/25). Even though all

inexperienced peer leaders were new to the role as a peer leader, some (24 %, 6/25) reported past experience as a coach or physical trainer and a few (16%, 4/25) experience as a volunteer leader in their retirement village committee.

Experienced peer leaders. Experienced peer leaders had been volunteering as a peer leader of a walking group for an average of 8 years ($SD = 4.69$), were the youngest group of the four examined in this study, with the majority (67%, 10/15) of leaders being less than 75 years old, and included the highest proportion of males (33%, 5/15). Two experienced peer leaders reported experience as a peer leader in other settings, which included acting as a bushwalking leader and a sewing instructor at their retirement village. Apart from being active as a peer leader, there were no differences between experienced and inexperienced peer leaders on any socio-demographic variables.

Inexperienced walkers. Inexperienced walkers reported no recent group walking experience, represented the least educated of the four groups (only 37% completed higher education), and were the oldest, with the majority (67%, 29/43) being at least 75 years old.

Experienced walkers. Experienced walkers had walked as part of a mall walking group for an average of three years ($SD = 4.10$, Range = 0.5 – 15). The majority (56%) had completed higher education. Experienced walkers were younger ($p < .05$, 73 vs. 79) than inexperienced walkers, but did not differ on any other demographic characteristics.

Further Details on Results.

Table 7.12

Comparison of Device-derived Physical Activity Engagement between Inexperienced

and Experienced Walkers. Data presented as Mean (SD) Unless Stated Otherwise.

Activpal parameters	Inexperienced Walkers $N = 42$	Experienced walkers $N = 17$	Mean Difference (95% *CI*)/ *p* value unless stated otherwise.
Number of valid wear days [a]	Mdn = 7.00, IQR = 1.00 [b]	Mdn = 6.00 IQR = 1.00 [b]	*U* = 271, p = .133 [c]
Waking wear time (h/day)	Mdn = 15.29 IQR= 1.61 [b]	Mdn = 15.91 IQR = 1.24 [b]	*U* = 248, p = .068 [b]
Time sitting h/day [a]	10.05 (2.08)	9.17 (2.84)	-0.88 (-2.22-0.45) 0.192
Avg. h/day standing	4.08 (1.57)	5.39 (2.37)	0.028 1.32 (0.26-2.38)/ *.015*
Avg. h/day stepping	1.25 (0.42)	1.70 (0.70)	0.45 (0.15-0.74)/ *.004*
Avg. h/day active in light intensity	0.50 (0.18)	0.72 (0.32)	0.22 (0.085-0.34) *.002*
Avg. h/day active in MVPA[a, b]	0.75 (0.30)	0.98 (0.41)	0.23 (0.0425-0.423)/ *.017*
Avg. steps/day Median[l]	2874.10 (1064.53)	3882.88 (1650.37)	1009 (285-1732)/ *.007*

Note:
Bold italic typeface indicate *p* value is significant.
[a] = Number of valid days (wear time ≥10 h/d) included in the analysis.
[b] = Data represent the median (*Mdn*) and interquartile ranges (*IQR*) due to skewed distributions as determined by Shapiro-Wilk Test p<.05.
[c] = Equal variances are not assumed due to skewed distribution. p- values were therefore determined by a Mann-Whitney U.
[d] = Normality and heterogeneity assumed, *p* values were determined by an independent T-test. *CI* = Confidence Interval.
MVPA: Moderate to vigorous physical activity.

Table 7.13

Comparison of Device-Derived Physical Activity Engagement between Inexperienced and Experienced Peer Walk Leaders. Data Presented as Mean (SD) Unless Stated Otherwise.

Activpal parameters	Inexperienced peer leaders N = 24	Experienced Peer leaders N =15	Mean Difference (95% *CI*)/p – value unless stated otherwise [4]
Number of valid wear days [1]	Mdn = 7.00 IQR = 1.00 [2]	Mdn = 7.00 IQR = 2.00 [2]	*U* = 163 p = .43 [3]
Waking wear time (h/day) [1]	15.43 (1.27)	15.6 (0.93)	0.21 (-0.56 - 0.97)/ .59
Time sitting h/day	9.73 (1.51)	8.97 (1.98)	-0.76 (-1.88 -0.36)/ .18
Avg. h/day standing	4.37 (1.42) [2]	4.65 (1.98) [2]	*U* = 158 p = .410 [3]
Avg. h/day stepping	1.47 (0.51)	1.8 (0.45)	0.32 (-.001 – 0.65)/ ***.051***
Avg. h/day active in light intensity	0.57 (0.18)	0.65 (0.19)	0.080 (-0.043-0.20) .19
Avg. h/day active in MVPA[1,2]	Mdn = 0.81 IQR = 0.36 [2]	Mdn = 1.05 IQR = 0.64 [2]	*U* = 124 (p = .076) [3]
Avg. steps/day Median[1]	Mdn = 3198.00 IQR = 1692.00 [2]	Mdn = 3857.00 IQR = 2492.00 [2]	*U* = 123 (p = .072) [3]

Note:
Bold italic typeface indicate *p* value is significant. SD = Standard Deviation
MVPA = Moderate to vigorous physical activity
1 = Number of valid days (wear time ≥10 h/d) included in the analysis.
2 = Data represent the median (Mdn) and interquartile ranges (IQR) due to skewed distributions a determined by Shapiro-Wilk Test p<.05.
3 = Equal variances are not assumed due to skewed distribution. p- values were therefore determ by a Mann-Whitney U.
 4 = Normality and heterogeneity assumed, *p* values were determined by an independent T-test.

Table 7.14

Example Quotes and Frequencies Of Codes Relating the Theme Credible.

Categories	Codes	Description	Example quotes	*%*[1]
Competent	Confident	Confident, can give direction, willing to lead, experienced, respected, proactive.	"You really need someone out there who can command attention and get their attention and carry out the job." EPL	27
	Articulate	Articulate, good voice projection. Able to give clear instruction.	"You got to be able to project your voice and tell them straight and accurately what you want them to do. So they can follow on." EPL	5
	Authentic	Role model, inspiring, fit, passionate, know-how, honest.	"They need to be quite passionate about the exercise. They need to believe that it's good for you as well." EGW	16
Adaptable	Democratic, Consensus-driven leadership	Equal, not bossy, receptive to feedback, can include walkers in group decisions, open-minded.	"A leader needs to be receptive of advice or comments. Not brush it aside "I know best". You know so. That's my views. And my views only." IGW	27
	Flexible	Problem solving and group management skills. Adapts to capacity of walkers, flexible.	"I guess it's a matter of being able to manage the group in a way that would suit everybody. For example, somebody who is walking slowly may be happy to go to a certain point and then - perhaps with somebody else- they will turn back." IPL	13
Dependable	Organized	Prepared, structured, orientated.	"Make sure that they know sort of a little bit beforehand and read what the weather was going to be like that day." IPL	12
	Trustworthy	Reliable, punctual, stable, responsible, conveys security, answers questions.	"Just give them, the know who to approach…they have to feel secure. They got to have confidence in that person." IPL	24

Note:
[1]N = 101
IGW = Inexperienced group walker, IPL Inexperienced peer walk leader
EPL = Experienced peer walk leader, EGW = Experienced group walker

Table 7.15

Example Quotes and Frequencies of Codes Relating the Theme Motivating.

Categories	Codes	Description	Example Quotes	% [1]
Entertaining	Fun	Humorous, fun	"Fun, so that we are not concentrating or thinking too much about the walking effort itself. If I am focused on how far I am going and everything, I could easily give up, because you let the pain levels take over or you think "Oh that's just a little bit too far for me." IGW	33
	Stimulating	Knowledgeable about area. Makes it interesting.	"Be able to give them something that interests them. If you are walking through the village there are so many bird species or you could point out "Look at that beautiful flower". IPL	9
Encouraging	Optimistic	Happy personality, positive, uplifting, relaxed, encouraging with positive praise.	"They got to look happy and be happy you know. Even though as things go wrong for you" EGW	55
	Enthusiastic	Motivated, engaged, Infectious enthusiasm.	"You have got to encourage them to be like you and enjoy it. Not say "Oh well, we won't worry about walking too much today." IPL	15
Social skills	Socially skilled	Good interpersonal skills, can solve group conflicts, good listener.	"Somebody, if there is contention amongst the group to be a good problem solver. Well and you know, if there is a bit of contention well then resolve it." IGW	24
	Outgoing	A peoples person, extraverted, socially confident	"Be communicative, be a general sort of extravert. Extravert is a good idea." IGW	19

Note:
[1]$N = 101$
IGW = Inexperienced group walker, IPL Inexperienced peer walk leader
EPL = Experienced peer walk leader, EGW = Experienced group walker

Table 7.16

Example Quotes and Frequencies Of Codes Relating the Theme Likable.

Categories	Codes	Description	Example quotes	% [1]
Inclusive	Friendly	Warm, kind, likable, gets along with others.	"Make them all feel welcome. Walk with them, talk with them, and make sure that they are with someone. I quite often have often have coffee with them the first couple of times and make sure that they meet other people. And feel a part of it. If they don't feel a part of it, they won't come back." EPL	42
	Welcoming	Receptive, approachable, inclusive and inviting.		29
Sensitive	Compassionate	Non-judgmental, open-minded, understanding, patient, tactful, tolerant sensitive, considerate, responsive to needs, empathy.	"Have compassion for people, understand people's feelings and needs. Oh you got to have patience as well." EPL "You got to be very tactful with some people." IGW	39
	Non-demanding	No competition. No pressure, encourages individual goals, considerate, safety over achievement.	"The ambassador should make sure to not make it too hard for them. It's about finding the right level of exercise." IPL	15
Caring	Interested	Interested in connection and welfare of walkers.	"Interest in people themselves. I tend to walk with them for the whole time, find out a little bit about them, tell a little bit about me." EPL	15
	Helpful	Observant, watches out for struggling walkers, supportive.	"If you are little bit slower than usual. Check that you are ok." IGW	18

Note:
[1]*N* = 101
IGW = Inexperienced group walker, IPL= Inexperienced peer walk leader
EPL = Experienced peer walk leader, EGW = Experienced group walker

Table 7.17

Examples of Mentioned Skills to Support Identified Attributes.

Themes and Categories	Skills Supporting Attributes
Theme 1: Credible	
Category 1: Competent Code 1: Confident Code 2: Articulate Code 3: Authentic	Ability to provide guidance, initiate a walk, lead, set the pace. Clear articulation and communication skills. Know-how about effective walking with older adults, risks/benefits.
Category 2: Adaptable Code 4: Democratic Code 5: Problem solving skills	Group management skills, consideration of individual needs. Problem solving skills in the context of walking as a group.
Category 3: Dependable Code 6: Trustworthy Code 7: Organized	Know-how on planning safe walks, acting in emergency situations. Organizational and orientation skills.
Theme 2: Motivating	
Category 4: Entertaining Code 8: Fun Code 9: Stimulating	Know-how about the walk area, sights and knowledge that can be used to make the walk interesting (e.g., explaining bird species). Know-how about different suitable routes.
Category 5: Encouraging Code 10: Optimistic Code 11: Enthusiastic	Know-how on positive, confidence-boosting communication strategies.
Category 6: Sociable Code 12: Outgoing Code 13: Social skills	Interpersonal skills training including listening skills and conflict resolution.
Theme 3: Likable	
Category 7: Inclusive Code 14: Friendly Code 15: Welcoming	Communication skills supporting walker connection and inclusion.
Category 8: Sensitive Code 16: Compassionate Code 17: Non-demanding	Know-how and understanding about requirements of different groups of older adults.
Category 9: Caring Code 18: Interested Code 19: Helpful	Being able to identify situations requiring support and knowing how to provide effective help.

Figure 7.7

Tree Diagram Illustrating the Categorisation of Data into Codes, Categories and Themes.
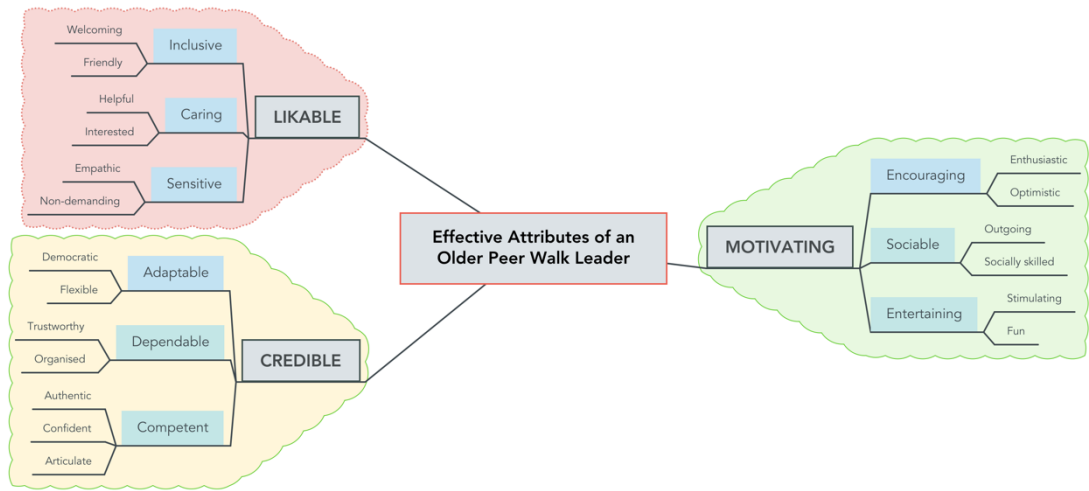
APPENDIX E - Study 4 Supplementary Materials

Further Details on Results

Table 7.18

Examples of Autonomy-Supportive Behaviours.

Themes and Sub-themes	Illustrative Quote
Theme 1: Attracting Interest.	
Emphasises intrinsic benefits. Emphasises health benefits, security, and enjoyable aspects walking in a group.	"You could point out that it's not something they got to do. It's something they want to do. It will help them- help their circulation." IPL
Fun and positive stimulation. Provides social, physical, environmental and intellectual stimulation, use of humour and fun.	"Say 'This was a good…what a great half an hour have we done'. And laugh…needs to be fun, not just all hard work." IPL
Variety. Varies the route, provides walkers with the opportunity to see new places.	"You can't be doing the same thing over and over. I think, if you are walking, you need to go in different areas." IGW
Theme 2: Acknowledging Requirements and Perceptions of Walkers.	
Elicits individual input. Asks individual walkers to state their requirements and preferences. Is receptive to suggestions and feedback.	"Every few weeks have a little group discussion and just get feedback on how they are managing it. As an ambassador that's your responsibility that everybody has input." IPL
Consensus-driven leadership style. Asks for group input before making decisions, elicits positive feelings and perspectives from walkers.	"You need to get them to voice what they want. "Out of this group where is it that you want to go? How long do you want to go?" IPL
Theme 3: Adapting to Walker's Requirements.	
Provides choice and structure. Accommodates different and changing abilities and preferences, provides opportunities for breaks, to stop early, start late, attend/try without commitment.	"You could say 'Ok we will do the short walk on a Monday; we will do the longer walk on a Wednesday.'" IGW
Supports self-initiative and exploration. Encourages walkers to become aware and respond to their individual needs, discourages competition, leads from behind. Allows walkers to determine their own intensity.	Say 'Let's just take it slowly, see how we go. If you don't like it, it doesn't matter'. Don't put any pressure. If you give people an out, they'll often come in." IPL

Note. IGW = Inexperienced group walker, IPL = Inexperienced peer walk leader
EPL = Experienced peer walk leader, EGW = Experienced group walker

Table 7.19

Examples of Competence-Supportive Behaviours.

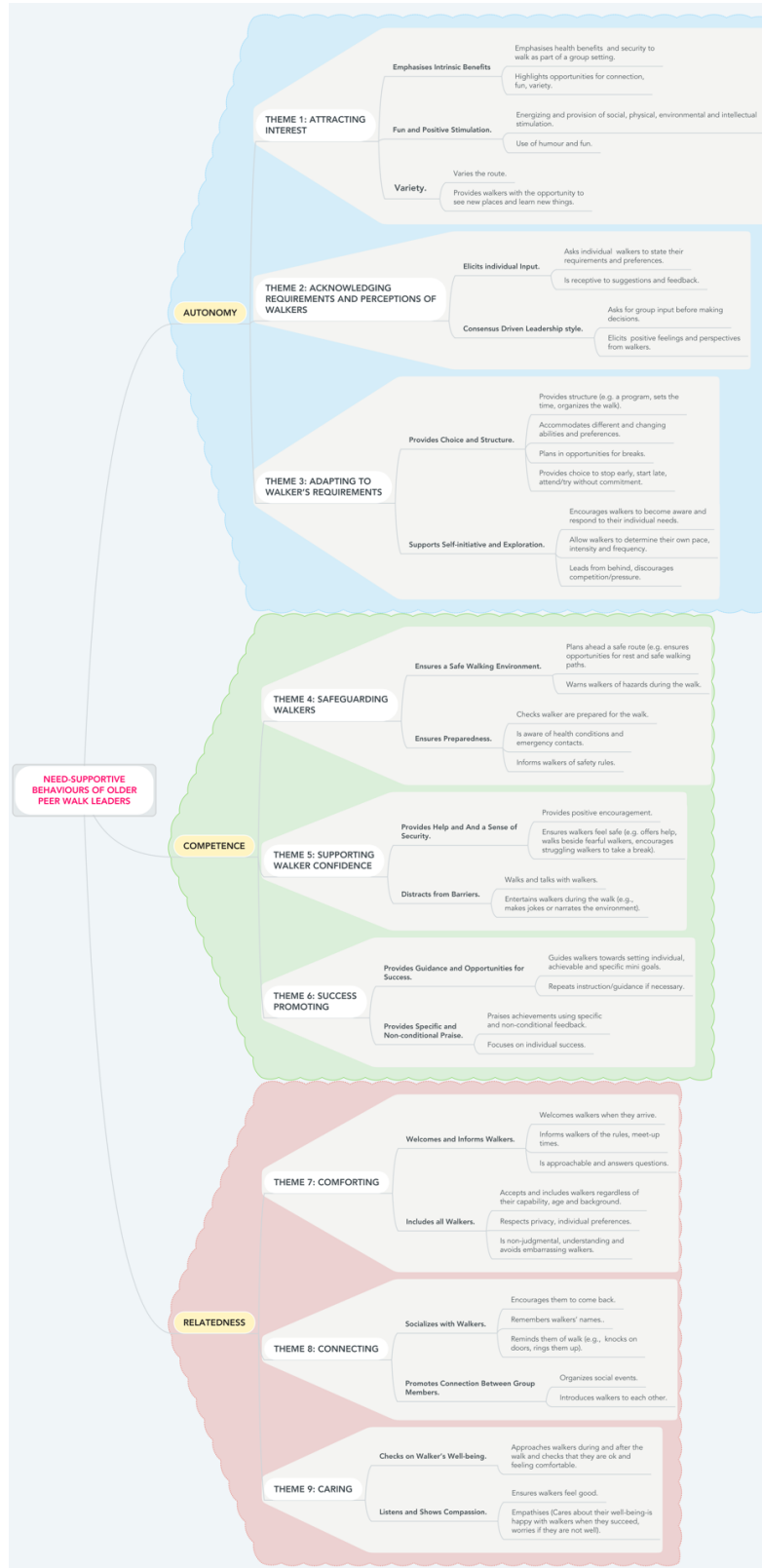| Themes and Sub-themes	Illustrative Quote
THEME 4: SAFEGUARDING WALKERS.	
Ensures a Safe Walking Environment. Plans ahead a safe route (e.g., ensures opportunities for rest and safe walking paths.) Warns walkers of hazards during the walk.	"You need to explain to them 'Watch where you are walking' and 'Be careful, we have the honkey nuts from the trees.' They can break your ankle if you twist it. Constantly saying 'Watch where you place your feet, so you don't fall.'" IPL
Ensures Preparedness. Checks walkers are prepared for the walk. Is aware of health conditions and emergency contacts. Informs walkers of safety rules.	"The walk leaders must know what people's medical problems are…say 'I am sorry, I am being very personal, but do you have any medical problems that we are not aware of…is there something we should be watching out for.'" EPL
THEME 5: SUPPORTING WALKER CONFIDENCE.	
Provides Help and a Sense of Security. Provides positive encouragement, ensures walkers feel safe (e.g. offers help, walks beside fearful walkers, encourages struggling walkers to take a break).	"If anyone says, 'Oh look I am not feeling …My legs are hurting' … say 'Please go and sit down, the couch is up further.'" EPL
Distracts Walkers from Barriers. Walks and talks with walkers. Entertains walkers during the walk (e.g., makes jokes or narrates the environment).	"For me walking in a group is all about distraction. It's nice for them (peer leaders) to talk to us. When you are talking you don't know how much you walk, because you are distracted." IGW
THEME 6: SUCCESS PROMOTING.	
Provides Guidance and Opportunities for Success. Guides walkers towards setting individual, achievable and specific mini-goals. Repeats guidance if necessary.	"It's matter of finding out, how far people could walk and don't do too much, so they are motivated to come back again." IPL
Provides Specific and Non-conditional Praise. Praises achievements using specific, non-conditional feedback. Focuses on individual success.	"Walking with them and saying, 'Oh you did well this week.' And 'Today you are doing a lot better than you did last week.'… mainly praise and making them positive at their pace." IPL

Note. IGW = Inexperienced group walker, IPL = Inexperienced peer walk leader
EPL = Experienced peer walk leader, EGW = Experienced group walker

Table 7.20

Examples of Relatedness-Supportive Behaviours.

Themes and Sub-Themes	Illustrative Quote
Theme 7: Comforting.	
Welcomes and informs. Welcomes walkers when they arrive. Informs walkers of the rules, meet-up times. Is approachable and answers questions.	"You welcome at the door and then when you are going around you say 'Hello, how are you?' This makes them feel good." EPL
Includes all walkers. Accepts and includes walkers regardless of their capability, age and background. Respects privacy, individual preferences. Is non-judgmental, understanding and avoids embarrassing walkers.	"Try and make them feel comfortable. Say 'You are allowed to be frightened. There is nothing wrong with that. Don't beat yourself up about that. But just look this person. She had a friend who was like that. She is ok now.' IPL
Theme 8: Connecting.	
Socializes with walkers. Remembers walkers' names Reminds them of walk (e.g., knocks on doors, rings them up). Encourages them to come back.	"Some residents here I know are very shy. But just introduce yourself, say 'Hello'. And draw them out." IPL
Helps group members connect. Introduces walkers to each other. Organizes social events.	"If we see somebody alone, we say 'ok, talk to her, talk to her'. We match-make. I oversee, those walking alone. Because it's nice to talk to somebody." EPL
Theme 9: Caring.	
Checks on walker's wellbeing. Approaches walkers during and after the walk and checks that they are ok and feeling comfortable.	"It's good maybe just to check in with people, like you know. 'Are you ok walking on the ground?' Just check in with people." IGW
Listens and shows compassion. Listens to walkers' problems. Ensures walkers feel good. Empathizes (Cares about their wellbeing-is happy with walkers when they succeed, worries if they are not well).	"Some can walk further than others. So, you would really need to say 'Do you want someone to stop with you while you sit here. You might not feel as if you want to be alone.'" IPL

Note. IGW = Inexperienced group walker, IPL = Inexperienced peer walk leader
EPL = Experienced peer walk leader, EGW = Experienced group walker.

Figure 7.8

Schematic Diagram Illustrating Summaries of Themes and Sub-Themes.

APPENDIX F - Questionnaires

Table 7.21

Overview and Description of Scales Used as Part Of This PhD

Concept, Scale Name	Description	Calculation of Scores
Demographic characteristics	Gender, Ethnic Origin, Country of Birth, Age in years, BMI . Marital status (*Never married, Married Separated/Divorced, Widowed*). Living status (*Alone, with partner*). Living in village (N*umber or years/months*). Highest level of education (*Secondary education, Vocational training, College or University*). Smoking (*Current smoker/Previous smoker/Never smoked*). Use of assistive device (*Yes/No*)	
Self-reported physical activity levels, PASE **See Table 7.22**	11-item scale assessing the frequency and duration of various activities undertaken over the past seven days and cited as reliable and valid (Vagetti et al., 2014).	PASE scores were computed as described elsewhere (Washburn et al., 1993).
Walking Self-efficacy, SWS **See Table 7.23**	10-item scale assessing the confidence to execute a walk on a 100-point percentage scale comprised of 10-point increments (McAuley et al., 2000).	Total walking self-efficacy was calculated by summing the confidence ratings and dividing them by the total number of items, resulting in a maximum possible efficacy score of 100%.
Motivation to walk, BRWQ **See Table 7.24**	23-item scale measuring the level of self-determination with reference to walking. The scale has been cited as reliable and valid (Niven & Markland, 2016).	Scores were computed for controlled, motivation/autonomous motivation by weighting subscales of volunteer and walking motivation scales and combining them as described elsewhere (Ryan & Deci, 2000).
Volunteer motivation, VMS **See Table 7.25**	12-item scale adapted to older walk leaders. The scale has been cited as reliable and valid (Millette & Gagne, 2008).	
Leadership and Volunteering Experience **See Table 7.26**	2 Items adapted from (McCormick, 2002) and used to determine type of past volunteering and leadership experience, frequency of experience, and duration of experience (in years/ months).	
Leadership self-efficacy, LSE **See Table 7.27**	8-item questionnaire, asking respondents to rate their confidence to perform various leadership activities. The scale has been cited as reliable (McCormick, 2002).	Item responses were summed and averaged to result with an overall leadership self-efficacy score.
Leadership traits and emotional intelligence LTQ. Emotional intelligence **See Table 7.28**	17-item leadership traits and emotional intelligence questionnaire adapted to older walk leaders and cited as reliable (Jetvic, 2013, Northouse, 2013).	Items were summed and averaged by the no. of items to obtain a score ranging from 1-4.

Note. BMI = Body Mass Index, Weight (determined using a Tanita scale) in kilograms was divided by self-reported height in meters squared to determine BMI.
PASE = Physical Activity Scale for the Elderly (Washburn et al., 1993).
SWS – Self-Efficacy for Walking Scale (McAuley et al., 2000).
BRWQ = Behavioural Regulation in Walking Questionnaire (Niven & Markland, 2016).
VMS = Volunteer Motivation scale (Millette & Gagne, 2008).
LSE = Leadership Self-efficacy Scale (Kane and Baltes, 1998).
LTQ = Leadership Traits Questionnaire. Items were adapted from Jetvic, 2014 and Northouse, 2013.

Table 7.22

Physical Activity Scale for the Elderly (PASE)

Question	PASE Scale items (Washburn et al., 1993)
1 – 1 a	Over the <u>past 7 days</u>, how often did you participate in sitting activities such as reading, watching TV, or doing handcrafts? [a] What were these activities? (e.g. watching TV, sewing) (Open response)
1b	On average, how many hours per day did you engage in these sitting activities? [b]
2	Over the <u>past 7 days</u>, how often <u>did you take a walk</u> outside your home or yard for any reason? For example, for fun or exercise, walking to work, walking the dog, walking in a mall, treadmill walking etc? [a]
2a	On average, how many hours per day did you spend walking?
3 – 3a	Over the <u>past 7 days</u>, how often did you engage in light sport or recreational activities such as bowling, golf with a cart, shuffleboard, fishing from a boat or pier or other similar activities? [a] What were these activities? (open end question)
3b	On average, how many hours per day did you engage in these light sport or recreational activities? [b]
4 - 4a	Over the <u>past 7 days</u>, how often did you engage in moderate sport or recreational activities such as doubles tennis, ballroom dancing, hunting, ice skating, golf without a cart, softball or other similar activities? [a.] What were these activities? (open end question)
4b	On average, how many hours per day did you engage in these moderate sport or recreational activities? [b]
5 – 5a	Over the past <u>7 days,</u> how often did you engage in strenuous sport or recreational activities such as jogging, swimming, cycling, singles tennis, aerobic dance, skiing (downhill or cross country or other similar activities? [a] What were these activities? (open end question)
5b	On average, how many hours per day did you engage in these strenuous activities? [b]
6 – 6a	Over the <u>past 7 days</u>, how often did you do any exercises specifically to increase muscle strength or endurance, such as lifting weights or push-ups, etc.? [a] What were these activities? (open end question)
6b	On average, how many hours per day did you engage in exercises to increase muscle strength or endurance, such as lifting weights, push-ups, or physical therapy with weights, etc.? [b]
7	During the <u>past 7 days</u>, have you done any light housework, such as dusting, washing or drying dishes, or ironing? [c]
8	During the <u>past 7 days</u>, have you done any heavy housework or chores such as vacuuming, scrubbing floors, washing windows, or carrying wood? [c]
9a	During the <u>past 7 days,</u> how often did you engage in home repairs like painting, wallpapering, electrical work, etc.? [c]
9b	During the <u>past 7 days</u>, how often did you engage in lawn work or yard care, including snow or leaf removal, chopping wood, etc? [c]
9c	During the <u>past 7 days</u>, how often did you engage in outdoor gardening? [c]
9d	During the <u>past 7 days</u>, how often did you engage in caring for another person such as a child, dependent spouse, or another adult? [c]
10	During the <u>past 7 days</u>, how often did you work for pay or as a volunteer? [a]
10a	How many hours per week did you work for pay and/or as a volunteer? [b]
10b	Which of the following categories best describes the amount of physical activity required on your job and/or volunteer work? CATEGORY 1 ("Mainly sitting with slight arm movements") includes examples such as: office worker, watchmaker, seated assembly line worker, bus driver, etc.) CATEGORY 2 ("Sitting or standing with some walking") includes examples such as: cashier, general office worker, light tool and machinery worker.) CATEGORY 3 ("Walking, with some handling of materials generally weighing less than 50 pounds" includes examples such as: mailman, waiter/waitress, construction worker, heavy tool and machinery worker.)

Note. The questionnaire items were validated and obtained from *"The Physical Activity Scale for the Elderly (PASE): development and evaluation."* by R.A. Washburn et al., 1993, *Clinical Epidemiology*, *46 (2),* p.153-162. https://doi.org/10.1016/0895-4356(93)90053-4

a = Response options: 1= Never, 2 = Seldom (1-2 days), 3 = Sometimes (3-4 days), 4 = Often (5-7 days)
b = Response options: 1= Less than 1 hour , 2 = 1 but less than 2 hours, 3 = 2-4 hours, 4 = More than 4 hours
c = Response options: 1 = Yes. 2 = No

Table 7.23

Self-Efficacy for Walking Scale

Scale Items (McAuley et al., 2000) [a]

I believe that I can walk…
1   For 5 minutes at a moderately fast pace without stopping
2   For <u>10 minutes</u> at a moderately fast pace without stopping
3   For <u>15 minutes</u> at a moderately fast pace without stopping
4   For <u>20 minutes</u> at a moderately fast pace without stopping
5   For <u>25 minutes</u> at a moderately fast pace without stopping
6   For <u>30 minutes</u> at a moderately fast pace without stopping
7   For <u>35 minutes</u> at a moderately fast pace without stopping
8   For <u>40 minutes</u> at a moderately fast pace without stopping
9   For <u>45 minutes</u> at a moderately fast pace without stopping
10   For <u>50 minutes</u> at a moderately fast pace without stopping

Note. The scale was adapted from "*Exercise environment, self
efficacy, and affective responses to acute exercise in older adults*" by E. McAuley et al., 2000,
Psychology and Health, *15*, p. 345.
a = Participants were provided with the following text: Please indicate below how confident you are
that you can successfully walk at a moderately fast pace without stopping. A moderately fast pace
is sufficient to increase your heart rate and to work up a sweat.
Response options: 0% = Not at all confident - 50% = Moderately confident- 100% = Highly
confident.

Table 7.24

Behavioural Regulations in Walking Questionnaire

Questionnaire Items (Niven & Markland, 2008)	
1	I think it is important to make the effort to walk regularly
2	I don't see why I should have to walk .
3	I take part in walking because my friends/family/work colleagues say I should
4	I walk because it's fun
5	I think walking is a waste of time
6	I value the benefits of walking
7	It's important to me to walk regularly
8	I can't see why I should bother walking
9	I consider walking consistent with my values
10	I don't see the point in walking
11	I walk because it is consistent with my life goals
12	I walk because others will not be pleased with me if I don't
13	I get pleasure and satisfaction from participating in walking
14	I feel under pressure from my friends/family/work colleagues to walk
15	I find walking a pleasurable activity
16	I feel guilty when I don't walk
17	I consider walking to be part of my identity
18	I feel ashamed when I miss a walking session
19	I enjoy my walking sessions
20	I feel like a failure when I haven't walked in a while
21	I get restless if I don't walk regularly
22	I walk because other people say I should
23	I consider walking a fundamental part of who I am

Note. The questionnaire items were obtained from "*Using self-determination theory to understand motivation for walking: Instrument development and model testing using Bayesian structural equation modelling.*" by A. G. Niven & D. Markland, 2008, *Psychology of Sport and Exercise*, *23,* p. 94. https://doi.org/10.1007/s11031-007-9079-4

a = Participants were asked: Using the scale below, please indicate to what extent each of the following statements are true for you.

Response options: 0 = Not true for me – 4 = Very true for me

Table 7.25

Volunteer Motivation Scale

	Scale Items (Millette et al., 2008) [a]
1	I am volunteering so other people would approve of me.
2	I am volunteering to get recognition from others.
3	I am volunteering because my friends and family insist that I do.
4	I am volunteering because I would really feel bad about myself if I didn´t.
5	I am volunteering because I would feel guilty if I didn´t.
6	I am volunteering because it makes me feel proud and like a worthy person.
7	I am volunteering because it really feels personally important for me to do.
8	I am volunteering because volunteering has become a fundamental part of who I am.
9	I am volunteering because volunteering is part of the way I´ve chosen to live my life.
10	I am volunteering because it is fun.
11	I am volunteering because it is interesting and enjoyable for me to volunteer.
12	I am volunteering for the enjoyment I feel when I volunteer.

Note. The scale was adapted from "*Designing volunteers' tasks to maximize motivation, satisfaction and performance. The impact of job characteristics on volunteer engagement.*"

a = Participants were asked: Why are you volunteering as a walk leader?
Response options: 1 = Completely disagree – 7 = Completely agree

Table 7.26

Leadership and Volunteering Experience

Construct	Question
Leadership experience [a]	1. How often have you occupied leadership positions in groups, associations, institutions, etc. (e.g. leader in a sports team, coordinator of cultural or political groups, etc.)? (Response option: No leadership experience = 1 – 5 =More than 6 experiences) 2. If you have previously been in a leadership position please specify: a) The context/role (e.g. community, work) (Open response) b) The duration in years, months (Open response) c) Whether you are still active in a leadership role (Response Option: Active/Not Active).
Volunteering experience •	1. In the past how often have you volunteered for the community? (Response option: No volunteering experience = 1 - 5 = More than 6 experiences) 2. If you have previously volunteered please specify: a) The context/role (e.g. community, work) (Open response) b) The duration in years, months (Open response) c) Whether you are still active in a volunteering role (Response Option: Active/Not Active).

Note. a = The leadership experience items were adapted from "*Extending Self-Efficacy Theory to Leadership: A Review and Empirical Test*" *by M.J. McCormick (2002), Journal of Leadership Education, 1*(2), p.40.

Table 7.27

Leadership Self-Efficacy Scale

Leadership Self -efficacy Scale Items (Kanes & Baltes, 1998)

1   I perform well as a leader across different group settings. [a]

2   I can motivate group members. [a]

3   I can build group members confidence. [a]

4   I can develop team work. [a]

5   I can take charge when necessary. [a]

6   I can communicate effectively. [a]

7   I can develop effective task strategies [a]

8   I can assess the strength and weaknesses of the group. [a]

9   I can establish good relationships with the people I walk with. [a]

10   With my experience I can help group members to reach their targets. [a]

11   I can motivate group members and arouse their enthusiasm during a walk.[a]

12   I am able to motivate and give opportunities to any group member to reach his/her personal goal. [a]

13   I can usually make the people I walk with appreciate me. [a]

14   Overall, how <u>effective</u> do you currently feel you will be as an ambassador? [b]

Note.
The scale items were adapted from the leadership self-efficacy scale which was presented in *"Efficacy assessment in complex social domains: Leadership efficacy in small task groups*." by T.D. Kane & T.R. Baltes, at the annual meeting of The Society of Industrial and Organizational Psychology. Dallas, TX. The items were obtained from "Leader Self and Means Efficacy: A multi-component approach" by S.T. Hannah et al., 2012, Organizational Behaviour and Human Decision Processes, *118* (2), p.146.
http://dx.doi.org/10.1016/j.obhdp.2012.03.007
a = Response options: *(1 = No confidence – 7= 100 % confidence)*
b = Response options: (1 = Not at all– 7 = Very much)

Table 7.28

Adapted Leadership Traits Questionnaire and Emotional Intelligence Items.

Leadership Traits Questionnaire Items (Northouse 2013) [a, b]

1   **Articulate:** Communicates effectively with others.

2   **Perceptive:** Discerning and insightful.

3   **Self-confident:** Believes in themselves and his/her abilities.

4   **Self-assured:** Is secure with self and free of doubts.

5   **Persistent:** Stays fixed on goals, despite interference.

6   **Determined:** Takes a firm stand and acts with certainty.

7   **Trustworthy:** Acts authentic and inspires confidence.

8   **Dependable:** Is consistent and reliable.

9   **Friendly:** Shows kindness and warmth.

10   **Outgoing:** Talks freely and gets along with others.

11   **Conscientious:** Thorough, organised and controlled.

12   **Sensitive:** Has tolerance, is tactful and sympathetic.

Emotional Intelligence items (Goleman, 2004, as used in Jetvic, 2013) [b]

1   **Self- Awareness:** Able to recognize and understand their own moods, emotions and drives as well as their effect on others.

2   **Self-regulation:** Able to control or redirect disruptive impulses and moods.

3   **Motivation:** Passion for work for reasons that go beyond money or status.

4   **Empathy:** Ability to understand the emotional make-up of other people and the skills to treat people according to their emotional reactions.

5   **Social skill:** Proficient in managing relationships and building networks as well as finding a common ground and building the rapports.

Note. The leadership traits questionnaire has been adapted version from "*Leadership: Theory and Practice*" By P.G. Northouse, 2013, Sage Publications, p. 38. The emotional intelligence items were adapted from "*What traits do Peer Leaders use to help their students?*" in *Conference Proceedings of the Peer-Led Team Learning International Society*, College of Technology of the City University of New York.
a = Study 2: All participants were asked: What's your personality like? Please indicate the extent to which the following traits apply to you. Response options: 1 = Strongly Disagree – 5 = Strongly Agree. b = Study 3: Experienced walkers were asked: To what extent does your most effective peer walk leader exhibit the following traits? Response options: 1 = Strongly Disagree – 5 = Strongly Agree. Inexperienced walkers were asked: How important is it for a prospective peer walk leader to have the following traits? Response options: 1 = Not at all important – 5 = Very important

APPENDIX G - Submitted Abstracts

Submitted Abstract -Study 1 -Under revision with "*Journal of Aging and Physical Activity*".

"It's better together": A Nested Longitudinal Study

Examining The Benefits of Walking

Regularly with Peers Versus Primarily Alone in Older Adults.

Kritz, M., Thøgersen-Ntoumani, C., Mullan, B., Stathi, A., & Ntoumanis, N

We examined whether purposeful walking with peers (WP) at least once a week contributes to better behavioural and health outcomes in older adults than primarily walking alone (WA). We used a longitudinal cohort design and recruited participants aged 60 and older (N =136) at the start of a 16-week walking intervention. Participants who walked on average at least once a week in the final eight weeks of the intervention were included in the analysis (N =79; 66 Females, Mage (SD) = 77.73 (6.91). It was found that autonomous motivation, walking self-efficacy, functional capacity, body fat, and physical activity improved more in the WP group compared to the WA group, after controlling for whether participants lived alone/with others and their health status. Our results extend current literature by providing longitudinal evidence for the added benefits of regular peer accompanied walking in older adults and highlight the importance of investing in peer-supported interventions. Keywords: motivation; physical activity; peer groups; retirement villages; walking self-efficacy

Motivation for Volunteering in Older Peer Walk Leaders:

A Longitudinal Qualitative Investigation

Kritz, M., Ntoumanis, N., Mullan, B., Stathi, A., & Thøgersen-Ntoumani, C.

BACKGROUND AND OBJECTIVES: Peer volunteers offer a cost-effective avenue for promoting physical activity in older adults. However, recruiting and retaining such volunteers is challenging. We aimed to examine longitudinally factors that determine levels of adherence of older volunteer walk leaders, to a 16-week walking intervention. RESEARCH DESIGN AND METHODS: We used a multiple case study design, informed by self-determination theory, to identify three motivational profiles: program dropouts, program completers, and program maintainers. One male and ten female (Mdn_{Age} = 75 years, age range: 66 – 83 years) novice peer walk leaders were interviewed twice over four months, and data were analysed using thematic analysis. Questionnaire data provided additional information on volunteer characteristics and motives. RESULTS: Self-orientated goals, obligation and guilt, use of unsustainable helping strategies, and lack of psychological need satisfaction were barriers to adherence. Social confidence and relatedness satisfaction (e.g., socialization with group members) motivated program completion. However, prioritization of altruistic goals, engaging in inclusive, and sustainable helping strategies, psychological need satisfaction, optimism and enjoyment were important for driving maintenance. DISCUSSION AND IMPLICATIONS: Results describe how differences in volunteer characteristics and motives may affect processes that determine persistence as an older peer walk leader. We provide suggestions on how to select, train, and support older volunteers to maximize their adherence to physical activity programs. Keywords: health promotion, physical activity, multiple case study design.

Submitted Abstract -Study 4 - Under review with *"Psychology and Health"*.

How Can Older Peer Leaders Best Support Self-Determined Motivation for

Walking in Physically Inactive Older Adults? A Self-Determination Theory

Perspective.

Kritz, M., Thøgersen-Ntoumani, C., Mullan, B., Stathi, A., & Ntoumanis, N.

OBJECTIVE: We aimed to determine what older adults perceive to be need-supportive behaviours of peer walk leaders, drawing primarily from Self-Determination Theory (SDT). DESIGN: Participants (volunteer peer leaders $n = 31$ and walkers; $n = 37$; Mage (SD) = 73.86 (6.71) were recruited from retirement villages and existing walking groups. MAIN OUTCOME MEASURES: We conducted semi-structured interviews to identify peer leader behaviours that support autonomy, competence and relatedness, and analysed the data using framework analysis. RESULTS: Important peer leader behaviours included acknowledging and adapting to walkers' requirements, supporting confidence, promoting success experiences, and encouraging meaningful connection. Both leaders and walkers highlighted the importance of making walkers feel comfortable, included, and cared about. Leaders highlighted the importance of supporting walker interaction, engaging in a consensus- driven leadership style, and providing non-conditional praise. Walkers described a leader that provided them with the opportunity to walk at their own pace, provided positive encouragement, and emphasized the fun aspects of walking. CONCLUSION: Being inclusive, accommodating individual requirements, and providing confidence-building encouragement are important strategies that can be used by peer walk leaders in the future to help older adults feel motivated during group walks, with a view to promoting long-term physical activity engagement.

Keywords: self-determination theory, walking, peer leaders, need-supportive behaviours

Research Article presented as Study 3

Published in "*The Gerontologist*"

Effective Peer Leader Attributes

for the Promotion of Walking in Older Adults.

Please see:

Kritz, M., Thøgersen-Ntoumani, C., Mullan, B., McVeigh, J., & Ntoumanis, N.

(2020, April). Effective Peer Leader Attributes for the Promotion of Walking in

Older Adults, *The Gerontologist*, https://doi.org/10.1093/geront/gnaa014.-

APPENDIX H - Ethical Approval

Ethical Approval Study 1 and Study 2

10-Aug-2016

Name: Eva Thogersen-Ntoumani
Department/School: School of Psychology and Speech Pathology
Email: C.Thogersen@curtin.edu.au

Dear Eva Thogersen-Ntoumani

RE: Ethics approval
Approval number: HRE2016-0187

Thank you for submitting your application to the Human Research Ethics Office for the project **Promoting walking, less sitting and better mental health in older adults**.

Your application was reviewed by the Curtin University Human Research Ethics Committee at their meeting on **02-Aug-2016**.

The review outcome is: **Approved**.

Your proposal meets the requirements described in National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research (2007)*.

Approval is granted for a period of one year from **10-Aug-2016** to **09-Aug-2017**. Continuation of approval will be granted on an annual basis following submission of an annual report.

Personnel authorised to work on this project:

Name	Role
Thogersen-Ntoumani, Eva	CI
Ntoumanis, Nikos	Co-Inv
Burton, Elissa	Co-Inv
Hill, Keith	Co-Inv
Cerin, Ester	Co-Inv
Biddle, Stuart	Co-Inv

Standard conditions of approval

1. Research must be conducted according to the approved proposal

2. Report in a timely manner anything that might warrant review of ethical approval of the project including:
   - proposed changes to the approved proposal or conduct of the study
   - unanticipated problems that might affect continued ethical acceptability of the project
   - major deviations from the approved proposal and/or regulatory guidelines
   - serious adverse events
3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)
4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion report submitted on completion of the project
5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
6. Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
7. Changes to personnel working on this project must be reported to the Human Research Ethics Office
8. Data and primary materials must be retained and stored in accordance with the Western Australian University Sector Disposal Authority (WAUSDA) and the Curtin University Research Data and Primary Materials policy
9. Where practicable, results of the research should be made available to the research participants in a timely and clear manner
10. Unless prohibited by contractual obligations, results of the research should be disseminated in a manner that will allow public scrutiny; the Human Research Ethics Office must be informed of any constraints on publication
11. Ethics approval is dependent upon ongoing compliance of the research with the Australian Code for the Responsible Conduct of Research, the National Statement on Ethical Conduct in Human Research, applicable legal requirements, and with Curtin University policies, procedures and governance requirements
12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

Special Conditions of Approval

This letter constitutes ethical approval only. This project may not proceed until you have met all of the Curtin University research governance requirements.

Should you have any queries regarding consideration of your project, please contact the Ethics Support Officer for your faculty or the Ethics Office at hrec@curtin.edu.au or on 9266 2784.

Yours sincerely

Professor Peter O'Leary
Chair, Human Research Ethics Committee

Ethical Approval Study 3 and Study 4

05-Jul-2016

Name: Eva Thogersen-Ntoumani
Department/School: School of Psychology and Speech Pathology
Email: C.Thogersen@curtin.edu.au

Dear Eva Thogersen-Ntoumani

RE: Ethics approval
Approval number: HRE2016-0114

Thank you for submitting your application to the Human Research Ethics Office for the project **In search of key attributes of peer leaders for the promotion of physical activity in the elderly**.

Your application was reviewed through the Curtin University low risk ethics review process.

The review outcome is: **Approved**.

Your proposal meets the requirements described in National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research (2007)*.

Approval is granted for a period of one year from **05-Jul-2016** to **04-Jul-2017**. Continuation of approval will be granted on an annual basis following submission of an annual report.

Personnel authorised to work on this project:

Name	Role
Thogersen-Ntoumani, Eva	CI
Kritz, Marlene	Student
Ntoumanis, Nikos	Supervisor
Mullan, Barbara	Supervisor

Standard conditions of approval

1. Research must be conducted according to the approved proposal
2. Report in a timely manner anything that might warrant review of ethical approval of the project including:
   - proposed changes to the approved proposal or conduct of the study

- unanticipated problems that might affect continued ethical acceptability of the project
- major deviations from the approved proposal and/or regulatory guidelines
- serious adverse events

3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)
4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion report submitted on completion of the project
5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
6. Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
7. Changes to personnel working on this project must be reported to the Human Research Ethics Office
8. Data and primary materials must be retained and stored in accordance with the Western Australian University Sector Disposal Authority (WAUSDA) and the Curtin University Research Data and Primary Materials policy
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11. Ethics approval is dependent upon ongoing compliance of the research with the Australian Code for the Responsible Conduct of Research, the National Statement on Ethical Conduct in Human Research, applicable legal requirements, and with Curtin University policies, procedures and governance requirements
12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

Special Conditions of Approval
None.

This letter constitutes ethical approval only. This project may not proceed until you have met all of the Curtin University research governance requirements.

Should you have any queries regarding consideration of your project, please contact the Ethics Support Officer for your faculty or the Ethics Office at hrec@curtin.edu.au or on 9266 2784.

Yours sincerely

Dr Catherine Gangell
Manager, Research Integrity