



PHYSICAL ACTIVITY AND HEALTHY AGEING:

A mixed methods study of the factors influencing older people's
physical activity decisions and behaviours

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Abstract

Despite the many health benefits that accrue from regular participation in physical activity up to 50 percent of people over 65 years of age are reported to be inadequately physically active to realise these benefits. The aim in the present thesis was to use a mixed methods approach to better understand the complex array of environmental, social and individual factors that contribute to older people's physical activity behaviours. This approach enabled the refinement of a health action model that depicted these factors and their likely associations and the exploration of ways in which physical activity might be encouraged and supported in this population.

Two hundred and twenty three participants (82 ± 7 years old) from six residential locations in Northern Tasmania completed a physical activity survey that assessed their level of physical activity, their perceptions of activity and the degree of social support for activity they received. Twenty people were selected for face-to-face interviews to explore in-depth the complex phenomenon of ageing and physical activity.

Survey results indicated that the percentage of inadequately physically active participants was significantly lower than reported in the extant literature. This finding raises important questions about the way in which older people's activity levels are currently assessed. Interest in, perceived importance and utility of physical activity were high and positively associated with activity level, while the perceived amount of effort it took to be active was negatively associated with activity level. The least active quartile of survey participants reported significantly higher effort associated with being active.

Thematic analysis of interview data revealed the main barriers to activity to be injury or illness, a lack of competence and lack of time. Interviewees described their main motivations as being the support of enthusiastic others, being fully engaged in activities and having fun while being active. A refined health action model is posited based on the survey and interview findings which, by providing greater insight into the factors influencing physical

activity behaviours, supported the redistribution of barriers and motivators from a single factor to individual and specific factors. Enhanced social engagement positively influences multiple factors within the model and presents an important intervention point for changing people's behaviours.

The findings from the present thesis suggest that to increase participation by older people in regular physical activity exercise and health professionals need to utilise techniques that promote and support engagement. Theories such as adult play and reversal theory provide insights into how activity leaders might maximise engagement and enable participants to experience the arousal associated with activities as challenging, exciting and safe and to overcome anxieties associated with a fear of failure or fear of injury. Finally, techniques such as motivational interviewing and acceptance and commitment therapy can be incorporated into discussions around physical activity to resolve ambivalence and explore opportunities for self-managed change.

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Chapter 1 Introduction

The experience of ageing is a highly individual and subjective experience dependent on a multitude of factors such as the presence of illness or injury, physical capacity, mental health, social support, social participation, socioeconomic status, residential location and personal and societal preconceptions of the ageing journey. At a biological level the field is divided between those who believe that ageing is a simplistic biological process of shortening telomeres and increasing oxidative and cellular damage and those who say the ageing process is far too complex for serious scientific study (Kirkwood, 2008). At a health and socio-cultural level terms such as 'successful ageing', 'healthy ageing' and 'active ageing' have risen in prominence in the gerontology literature of late (Hadler, 2011). With an increasingly aged Australian population the elements of these concepts warrant further investigation so that this extra longevity can be enjoyed rather than endured (Kirkwood, 2008). However, researchers note that there is, as yet, no consensual definition of successful ageing (Depp & Jeste, 2006; Pruchno, Wilson-Genderson, Rose, & Cartwright, 2010; Reichstadt, Sengupta, Depp, Palinkas, & Jeste, 2010); and, although a majority of studies listed disability / physical functioning as a component of their definitions (Depp & Jeste, 2006), successful ageing must encompass more than the mere absence of disease and dysfunction (Blazer, 2006). Like the definition of wellness which includes the six dimensions of physical, social, psychological, emotional, intellectual, and spiritual health (Education for Health and Wellness, 2001) a definition of successful ageing would likely contain an integration of physical, mental and spiritual wellbeing from both a subjective and objective point of view (Pruchno, et al., 2010). Of these dimensions, both physical health and emotional health are amenable to improvement through regular participation in physical activity (Kruger, 2007; Orsega-Smith, Payne, Mowen, Ho, & Godbey, 2007; Prohaska, et al., 2006; Rejeski & Mihalko, 2001; Roumie, 2006; R. Sallis, 2009; US Department of Health and Human Services, 1996; Wesch, Milne, Burke, & Hall, 2006; Yates, Djousse, Kurth, Buring, & Gaziano, 2008).

Participation in regular bouts of physical activity has been shown to contribute to longevity by offering protection against chronic diseases and improvements in general wellbeing. If it is accepted that physical activity can offer these health and wellbeing benefits and contribute to 'successful ageing' then it is important to explore ways of enhancing older people's participation. However, despite research reporting that up to 95 percent of people over 65 agree that physical activity is beneficial to them (Crombie, et al., 2004) the reported rates and levels of participation are low. It is widely reported that up to 50 percent of older people do not regularly participate in adequate levels of physical activity to realise health benefits (Australian Bureau of Statistics, 2007b; M. Booth, Bauman, & Owen, 2002; Crombie, et al., 2004; Lim & Taylor, 2004; Mummery, Kolt, Schofield, & McLean, 2007).

In light of the changing demographics, which will see a doubling in the number of Australians aged over the age of 65 by 2050 (United Nations Population Division, 2006), it is important to better understand what limits many older people from engaging in adequate levels of physical activity and what motivates those who are adequately active. Increased knowledge will enable the development and trial of strategies to enhance older people's activity levels. At present the reasons for low participation rates in physical activity are not well understood. Research in this area has been dominated by large population surveys where responses are coded into categories from open ended questions or respondents are asked to select from predefined lists of possible motivations or limitations to their increased participation in physical activity (Australian Bureau of Statistics, 2007b; M. Booth, et al., 2002; M. Booth, Bauman, Owen, & Gore, 1997; Lim & Taylor, 2004). This approach limits the depth of information gathered by not exploring what is meant by statements such as "I am too old to exercise" or "I do not have enough time to exercise". Further, the combined effect of environmental, social and individual factors on older people's engagement in physical activity requires closer investigation. There is an emergent need to understand, in depth, older people's experiences of habitual physical activity behaviour and behaviour change

toward healthy levels of physical activity across a range of residential settings (Grodesky, Kosma, & Solomon, 2006).

Research Questions

The present thesis seeks to answer the following research questions about older people's physical activity behaviours:

- In what ways do environmental, social and individual factors impact on older people's level of physical activity?
- In what ways do these same factors shape older people's perceptions of physical activity?

Tasmania

The study for the present thesis was conducted in Tasmania, an island state of Australia with an estimated population at 30th of June 2008 of 497,500. The state covers an area of 68,401 sq km and there are four cities; Greater Hobart, Launceston, Devonport and Burnie (Australian Bureau of Statistics, 2008b). All areas outside of the Greater Hobart area are classified rural or remote according to the Australian Standard Geographical Classification scheme (Australian Bureau of Statistics, 2008a). Sixty percent of the Tasmanian population lives in these rural or remote areas. This study was conducted in Launceston and surrounding districts. The mean age of the Tasmanian population at last census was 39.4 years and the percentage of Tasmanians over the age of 65 was 15 percent, which is more than 74,000 people (Australian Bureau of Statistics, 2008b).

Outline of Thesis

In Chapter 2 the literature that underpins our current understanding of physical activity and ageing is explored. The benefits of regular physical activity are described and current recommended levels of physical activity to realise these benefits are discussed. The physical

activity behaviours of older Australians are presented along with the motivators and barriers to physical activity currently reported for this age group. Environmental, social and individual factors that contribute to older people's activity levels are also discussed.

Chapter 3 contains a description of the mixed methods approach taken to address the research questions posed in the present thesis, the rationale behind the selection and recruitment of participants, the selection and development of survey instruments and descriptions of the selected study sites.

In Chapter 4 findings from this study are presented and discussed. To summarise the main survey findings; the percentage of participants who were adequately physically active was significantly higher than percentages reported in the literature, participants reported high interest in and importance of physical activity; and, that the least active quartile reported that being physically active took significantly greater effort and was significantly less useful to them. The interview findings lend support to the quantitative results that physical activity in later life is important to maintain health and facilitate participation in activities of daily living. Interviewees also described the main barriers to them being physically active as illness or injury, feelings of incompetence and a lack of time. They identified motivations for activity as having support from enthusiastic others to be active, being fully engaged in an activity and having fun. Interviewees identified many opportunities within their neighbourhoods for being physically active but reported that many activities were poorly attended.

In the discussion section (Chapter 5) the findings are discussed in light of the supporting literature. Ways of overcoming the reported barriers to physical activity described by interviewees are explored. Overcoming health fears and a fear of failure is possible through the use of verbal encouragement, social support and by maintaining the emphasis on fun and engagement. Techniques of charismatic leadership are discussed as this style of leadership has great potential to engage older people and support them to be more physically active.

In the conclusion the major themes from the present thesis are drawn together to form recommendations for engaging older people in physical activity and implications for practice and future research are discussed.

Chapter 2 Literature

Ageing is a journey that each of us is taking but which is, nonetheless, a highly individual experience. A range of factors such as physical and mental health, socioeconomic status, living environment and social contact -and the way in which we manage and respond to challenges posed by these factors- will colour our experience of ageing. As well as being an individual journey, collectively the world's population is also getting older (see Figure 1).

Figures from the United Nations put the present Australian population over the age of 65 at 10 percent. By 2050 this figure is estimated to be 20 percent (1 in 5 people) (United Nations Population Division, 2006).

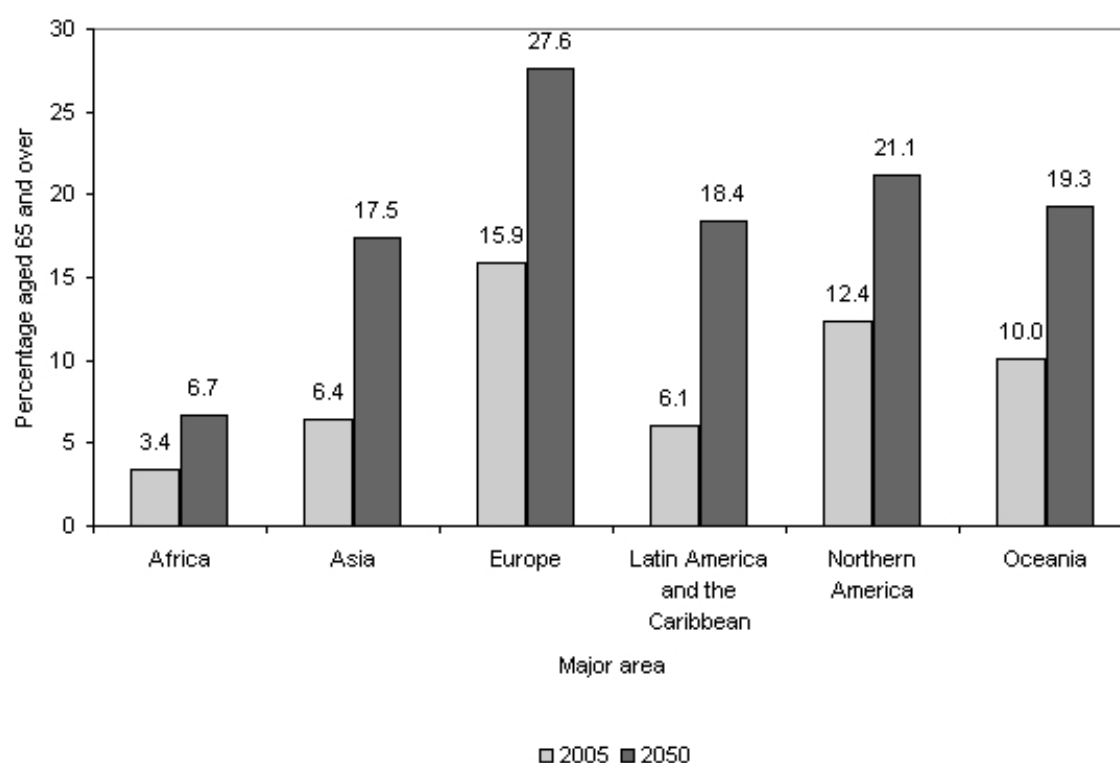


Figure 1: 2005 and predicted 2050 population figures for people aged 65+ (United Nations Programme on Ageing, 2006)

Tasmanian figures indicate that 15 percent of the population is aged over 65 (Australian Bureau of Statistics, 2008b). This ageing demographic which is occurring worldwide, while it

need not be viewed as a crisis to be overcome (Kinnear, 2001), does pose unique challenges to governments for the provision of health care and social services to older citizens. One important challenge is to explore ways of enhancing older people's long term health and wellbeing so that they may derive maximum enjoyment from their later years (Prohaska, et al., 2006). According to the World Health Organization, "Active ageing allows people to realize their potential for physical, social, and mental well-being throughout the life course [...]" (World Health Organization, 2012). One of the contributors to physical and mental wellbeing is maintaining the capacity to engage in activities of daily life and to, as far as possible, prevent or delay the onset of injury or illness.

In Australia the National Health Priority Areas are cardiovascular health, diabetes mellitus, arthritis & musculoskeletal conditions, mental health, cancer control, injury prevention & control, asthma and obesity (Australian Institute of Health and Welfare, 2011). A large and accumulating body of research evidence supports the central role that regular participation in physical activity has to play in the prevention and / or treatment of these conditions.

Campaigns such as Exercise is Medicine (EIM) aim to make physical activity prescription a part of every doctor's consultation and a range of evidence-based resources on the effectiveness of physical activity as a treatment modality are available for download from the EIM website (Exercise is Medicine Australia, 2011). With a recent study indicating reductions in all-cause mortality risk of 14 percent for men and 41 percent for women from even low levels of regular activity there would seem to be little doubt that older people can enhance their health and wellbeing through regular participation in physical activity (Brown, et al., 2012).

Physical inactivity is a modifiable risk factor for chronic diseases such as coronary artery disease and type II diabetes (Barengo, Hu, Lakka, & Pekkarinen, 2004; Batty, 2002; Franco, et al., 2005; Stewart, et al., 2005). A systematic review of epidemiological studies into the effect of physical activity on coronary heart disease in older adults (Batty, 2002) concluded that the majority of studies (predominantly of older men) provided some evidence of the

cardio-protective effects of exercise and that this association was unlikely to be due to reverse causality or confounding variables. However, in this review the author was unable to quantify the type, intensity, duration, and frequency of exercise required to produce protective effects. In another observational study of thirty thousand middle-aged Finnish residents, Barengo et al. (2004) reported that moderate recreational and workplace physical activities were positively associated with reduced cardiovascular disease and lower all-cause mortality. In further research it was reported that, for men and women aged over 50, total life expectancy and cardiovascular disease-free life expectancy was enhanced by regular participation in moderate to high intensity physical activities (Franco, et al., 2005). The efficacy of physical activity to protect against cardiovascular disease was thought to be mediated by reductions in blood pressure, decreases in body weight, and improved blood lipid profiles (Hu, Barengo, et al., 2004).

Regular physical activity is also recognised as an effective preventative measure against and treatment for the control of type II diabetes mellitus (Hu, Lakka, Barengo, & Tuomilehto, 2004). Prevention and disease management are effected by improved glycaemic control via up-regulation of glucose transporters in skeletal muscle following exercise bouts (Thomas, Elliott, & Naughton, 2006). Physical activity also decreases fat mass reducing intracellular fat stores that are hypothesised to interfere with cell signalling in glucose metabolism and with mobility of glucose transporters (Boden & Chen, 1995; Marcus, Addison, Kidde, Dibble, & Lastayo, 2010).

Good health and wellbeing in old age also rely on having the functional capacity to participate in activities of daily living. Functional capacity is a combination of muscle strength and aerobic fitness, both of which decline with age (Westerup & Meijer, 2001). These age-related declines may be minimized or reversed by engaging in a physically active lifestyle. Reports from randomised controlled studies show that significant increases in muscle strength and bone mineral density can be achieved with as little as six months of strength and endurance training (Barrett & Smerdely, 2002; Cress, et al., 1999; Holviala, Sallinen,

Kraemer, Alen, & Hakkinen, 2006). Further, one study of older male runners reported that despite a decline in training volumes over time, bone mineral density was maintained, particularly in the hips and spine of these active older men when compared with a low activity control group (Wiswell, Hawkins, Dreyer, & Jaque, 2002).

A physically active lifestyle may also boost immune system function thereby lessening the incidence of illness in later life. In a group of healthy older adults, wound healing was reported to have been accelerated in participants who undertook regular exercise compared to a group of non-exercising controls (Emery, Kiecolt-Glaser, Glaser, Malarkey, & Frid, 2005). Emery et al. hypothesised that this increased rate of healing was facilitated by enhanced neuroendocrine responsiveness due to exercise induced stress in the exercise group. These results suggest that exercise can play an important role in recovery from dermal wounds.

Genetic research also highlights the beneficial contribution of regular physical activity to healthy ageing. Leukocyte telomere dynamics (measureable features of the genetic material in white blood cells) are biological markers of ageing in the human body. In a study of over 2000 twins, researchers found that the more physically active twin had longer telomere length than their less active sibling. This significant difference remained after adjustments for confounding risk factors for genetic damage such as smoking and increased BMI, suggesting that increased levels of physical activity delayed genetic ageing (Cherkas, et al., 2008).

Psychosocial benefits are also associated with continued involvement in regular physical activities. Improved perceptions of one's health related quality of life can lead to enhanced feelings of well being and lower disease rates. For example, older adults participating in the Better Ageing project reported enhanced feelings of physical competence that were associated with increases in their general strength and fitness and a greater ability to perform daily living activities (Fox, Stathi, McKenna, & Davis, 2007). Participants in this

study were volunteers from Better Ageing exercise groups in Britain, France and Italy. As well as enhanced physical competence participants also reported that the group exercise sessions, which they attended twice a week for 12 months, were very enjoyable. “Part of the enjoyment experienced in class was clearly the quality of relationships and environment created through a high standard of leadership expertise and support. Participants commented on the knowledge, the patience and the enthusiasm of both the researchers and the class leaders. They praised the support they received especially during the first sessions...” [pp. 598].

In another study, lower physical self-efficacy scores were shown to be strong predictors of depressive symptoms in a sample of 200 retirement village residents. However, the degree of self-efficacy that residents felt for physical activity was more dependent on their perceptions of their physical status than it was on their objective physical status (Davis-Berman, 1990). Researchers have also reported significant positive associations between older people’s levels of physical activity, exercise self-efficacy, and physical and global self-esteem (McAuley, et al., 2005).

Physical activity can also play a major role in the prevention of, and recovery from, cancer. In a recent review article the authors found convincing evidence for physical activity reducing the risk of breast cancer in women and colon cancer in both men and women (Pinto & Hartman, 2010). In a position stand statement for Exercise and Sports Science Australia (formerly the Australian Association for Exercise and Sports Science) Hayes, Spence, Galvao, and Newton (2009) stated that as well as being a known risk factor for some cancers, particularly breast and colorectal cancer, “Participating in exercise has also been associated with benefits during and following treatment for cancer, including improvements in psychosocial and physical outcomes, as well as better compliance with treatment regimens, reduced impact of disease symptoms and treatment-related side effects, and survival benefits for particular cancers” [pp. 2].

Regular participation in physical activity has also been reported to improve memory function and has the potential to improve sleep quality and reduce dementia risk. Enhanced memory function was reported in older adults who regularly undertook either cardiovascular (dancing, tennis) or mind-body (Tai Chi) exercise when compared with sedentary counterparts (Chan, et al., 2005). While the research into improved sleep patterns and reduced dementia risk are in their infancy, encouraging first steps are being made (Larson, et al., 2006; Montgomery & Dennis, 2002).

In summary, in the research data there is clear evidence to indicate that regular participation in physical activity confers a multitude of health benefits on the participant. As F. Booth, Gordon, Carlson and Hamilton (2000) stated, “we know of no single intervention with greater promise than physical exercise to reduce the risk of virtually all chronic diseases simultaneously” [pp. 778]. Yet, research results suggest that 50 percent of older adults do not participate in adequate levels of activity to realise these benefits (Australian Bureau of Statistics, 2007b). Thus it would appear that not enough is known about what limits half of this demographic from being physically active. One of the main aims in the present thesis is to learn more about why older people do and do not engage in regular physical activity. As a first step towards greater engagement in physical activity it is important to gain a better insight into barriers to regular physical activity; it is also important to understand how these barriers are being overcome by those who are active on a regular basis.

Defining Adequate Levels of Physical Activity

An understanding of the positive impact of physical activity on health and wellbeing is not new; as far back as the fifth century BC physicians were aware of the links between inadequate physical activity (coupled with a poor diet) and poor health (Georgoulis, Kiapidou, Velogianni, Stergiou, & Boland, 2007). Herodotus and Hippocrates both extolled the benefits of what they called ‘gymnastic exercise’ in the prevention and cure of diseases (McRae, 1890) and prior to the industrial revolution a “natural cycle of regularly intermittent

activity was likely the norm for most of human existence” [pp. 11] (US Department of Health and Human Services, 1996).

However, the industrial and technological revolutions of the past two centuries have significantly changed work and lifestyle patterns leading to a steady decline in physical activity levels and corresponding rises in the rates of lifestyle diseases such as heart disease and diabetes (Egger, Donovan, Swinburn, Giles-Corti, & Bull, 1999). Concerns about low fitness levels and the rise in preventable diseases in the mid 1900s prompted the creation of population physical activity guidelines (US Department of Health and Human Services, 1996).

The initial development of these activity recommendations focused on exercise for fitness rather than more general physical activity recommendations for health. However, arising from Pollock’s (1973) review of endurance training programs, the 1978 American College of Sports Medicine (ACSM) position stand was a milestone in the development of recommendations in that it differentiated between the fitness benefits and health benefits of physical activity and provided guidelines for both outcomes (US Department of Health and Human Services, 1996).

The 1996 Surgeon General’s report on physical activity and health (US Department of Health and Human Services, 1996) was a landmark document in shaping our modern physical activity recommendations for health. The report emerged from a growing consensus between health professionals on the health benefits to the wider population of regular participation in ‘moderate intensity’ physical activity. This represented a change from previous guidelines which recommended intermittent vigorous activity and was an acknowledgment that large sections of the population viewed the requirement for vigorous activity as a barrier to participation. The development of these public health guidelines were targeted at groups identified as having low levels of activity coupled with high rates of

disease due to inactivity (Egger, et al., 1999). That is to say, public guidelines represent a minimum level of activity recommended to provide health benefits to those who are inactive.

As a global leader in exercise and sports science the ACSM is influential in producing activity guidelines which it articulates through the release of position stands. The ACSM is the largest sports medicine and exercise science organisation in the world whose charter is to advance health through science, education, and medicine (American College of Sports Medicine, 2007a). As such, ACSM guidelines and position stands form the cornerstone of practice for exercise professionals worldwide. The latest public guidelines from the ACSM, in conjunction with the American Heart Association (2007b), recommend that adults over 65 years of age do 30 minutes of moderate intensity aerobic exercise five days a week; or, 20 minutes of vigorous aerobic exercise 3 days a week. Additionally, the ACSM recommends 8 to 10 strength training exercises (10 to 15 repetitions) two or three times a week. In their guidelines to older adults the ACSM suggests that if you are able to exceed the minimum recommendations, you should do so. They point out that these are minimum requirements to maintain good health.

The ACSM recommendations are similar to those issued by the Australian Government (Commonwealth of Australia, 2009) who state in their health campaign “How do you measure up?” that Australians should aim to do 30 minutes of moderate activity on most, preferably all, days of the week. These recommendations are echoed in recent physical activity guidelines formulated specifically for older adults by the National Strategy for an Ageing Australia (Sims, Hill, Hunt, & Haralambous, 2009) suggesting that 30 minutes on five or more days a week is a minimum for promoting and maintaining good health.

These public guidelines, couched as they are in specific volume and frequency recommendations for the layman, do not yield a linear value that can be used in scientific studies for comparisons between populations or associations with other study variables. Without calculation of a linear value only the observation that a person is, or is not, meeting

recommendations can be made. Additionally, people with activity patterns that vary from the guidelines, for example those who do less frequent but more vigorous exercise, may be incorrectly classified as not meeting the recommended target of 30 minutes of moderate activity on each day of the week. Calculating energy expenditure as metabolic equivalents provides a way to express time, intensity and frequency of physical activity as a linear value for comparison. Converting the Australian recommendations (Commonwealth of Australia, 2009) for sufficient physical activity to metabolic equivalents would result in an energy expenditure of 630 MET (metabolic equivalent) minutes per week ($\text{MET}\cdot\text{min}\cdot\text{week}^{-1}$). This is calculated by multiplying 30 minutes by 7 days by a MET value of 3. Three is the MET value allocated to a moderate physical activity such as walking at 4 kph (Ainsworth, et al., 2000). Further examples from Ainsworth et al. of MET values associated with daily activities are:

- 1 MET riding in a car or bus
- 2 MET cooking or food preparation
- 3 MET child care with occasional lifting; walking at 4kph
- 5 MET cleaning gutters; low impact aerobic dance
- 7 MET freestyle lap swimming (light or moderate effort)
- 9 MET moving household furniture up stairs; running at 8 kph

The ACSM guidelines of 30 minutes 5 times a week plus 2 sessions of strength training would yield a similar figure to the Australian guidelines ($600 \text{ MET}\cdot\text{min}\cdot\text{week}^{-1}$). A figure greater than $600 \text{ MET}\cdot\text{min}\cdot\text{week}^{-1}$ was used to signify adequate physical activity in a recent Australian study comparing differences in rates of compliance with physical activity guidelines when different scoring algorithms were employed (Mealing, Bowles, Merom, & Bauman, 2011). Mealing et al. reported that using a volume only algorithm such as $\text{MET}\cdot\text{min}\cdot\text{week}^{-1}$ resulted in the highest rates of compliance; algorithms using volume and frequency (total minutes and total sessions) yielded the lowest rates of compliance. In the 65 plus age group ($n=2807$) Mealing et al. reported that 37 percent of respondents met activity

guidelines when MET.min.week⁻¹ were used and 22 percent of the same sample when compliance was measured using the criteria of five sessions and a total of more than 150 minutes per week. The implication for the present thesis is that using MET.min.week⁻¹ may produce a higher percentage of adequately active survey participants when compared with other studies employing different algorithms for adequate physical activity calculations. However, the ability to derive a linear value for energy expenditure to be used for comparison and correlation analyses warrants the selection of MET.min.week⁻¹ as the measure of physical activity in this study.

How Active Are Older Australians?

Australian Bureau of Statistics' (ABS) figures suggest that less than half of the older Australian adult population participate in any kind of sport or recreational physical activity (Australian Bureau of Statistics, 2007b). Other population researchers also report low rates and frequency of participation in physical activity for this cohort (Armstrong, Bauman, & Davies, 2000; Lim & Taylor, 2004). The ABS data, gathered from more than 1.2 million older Australians during the 2005-2006 Multi-Purpose Household Survey (MPHS), asked respondents to indicate any participation in the preceding twelve months in a range of sports and physical activity pursuits. Fifty-one percent of males and forty-eight percent of females aged 65+ reported participating at least once in a sporting or recreational physical activity pursuit in the preceding twelve months. The most commonly reported physical activity among those surveyed was walking (29%) and 26 percent of respondents reported participating in a sport or physical activity pursuit more than twice weekly. No data on the duration of participation was gathered in the MPHS survey making direct comparison with national physical activity recommendations difficult. However, these MPHS figures suggest that 51 percent of older people do not participate in any form of sport or physical activity pursuit and that possibly only 26 percent are meeting current guidelines of multiple sessions of physical activity each week.

A higher percentage of older people meeting recommended guidelines was reported by Lim and Taylor (2004). Using data from the 1999 New South Wales Older Peoples' Health Survey (OPHS) they reported that 49 percent of respondents met current guidelines for physical activity. From the OPHS survey data of more than 8,000 people aged 65+, Lim and Taylor dichotomised level of activity into adequate or inadequate based on the criteria of engaging in 30 minutes or more of walking, moderate or vigorous activity on at least five days in the previous week.

Further support for Lim and Taylor's (2004) findings can be found in Armstrong, Bauman, and Davies' (2000) work, who, using the results from the 1999 National Physical Activity Survey, reported that 44 percent of older adults were sufficiently active, 38 percent were insufficiently active and 18 percent were sedentary. The criteria used by Armstrong et al. for each category was:

- Participants reporting no participation in physical activities in the week preceding the survey were classified as sedentary
- Those who accumulated at least 150 minutes of walking, moderate or vigorous activity were classified as sufficiently active (time spent in vigorous activity was weighted by a factor of two)
- Those who accumulated less than 150 minutes were classified as insufficiently active

Gardening and heavy yard work were not included in the Armstrong et al. calculations of sufficient physical activity as the authors felt that not enough research was available to accurately classify these activities although they predicted that in future these activities would be counted as moderate physical activity. Participants in the survey self-reported these activities as being vigorous.

What is indicated by the three aforementioned studies is that a large proportion of older Australians do not report engaging in recommended levels of physical activity. However,

there is no clear indication of the extent of this phenomenon with figures for insufficient levels of physical activity ranging from 74 to 51 percent of the cohort across the three reports.

In addition to these low rates of engagement in recommended levels of activity, a large percentage (20%) of older Australians were reported to be in the precontemplation stage of exercise (M. Booth, et al., 1993). This means, according to the transtheoretical, or stages of change, model (Prochaska & DiClemente, 1983), that they currently do no exercise and that they have no intention to start exercising.

The transtheoretical model, developed by Prochaska and DiClementes (1983), conceptualises behaviour change as a process which occurs over time with progress toward sustained behaviour change involving movement through five distinct stages, each of the five stages depicting when a person will change. The amount of time a person spends in any one stage is variable and there can be movement between stages in both directions. The five stages are:

- Precontemplation: the individual is not considering making a change and may not feel a need to change
- Contemplation: the need for change is being considered but no steps toward change have yet been taken
- Preparation: the individual intends to take action and small steps may be taken
- Action: overt action has been taken and positive change has occurred
- Maintenance: ongoing participation in the new behaviour is incorporated into the individual's life

M. Booth et al. reported that the percentage of Australian adults in the precontemplation stage increased by age group, but that the percentage in the action / maintenance stage

was similar across the age groups. The action / maintenance stage was defined by M. Booth et al. as exercising regularly and intending to continue. A summary of distribution by age group from the M. Booth et al. study is shown in Figure 2. For the 60+ age group the main distribution was across, do no exercise, no intention to start (20%), exercise occasionally, no intention to increase (22%), and exercise regularly, intend to continue (40%). This research indicates that older people are more fixed in their activity patterns with little or no intention to change, having either decided that these patterns of activity are adequate or possibly having lost confidence in their abilities to make a change with results showing a distinct polar distribution of older adults between regular & ongoing activity and the two categories in which respondents had no intention to start exercising or to engage in more than occasional exercise. In effect both of these last two categories could be described as precontemplation as there is no intention to change behaviour to engage in regular exercise.

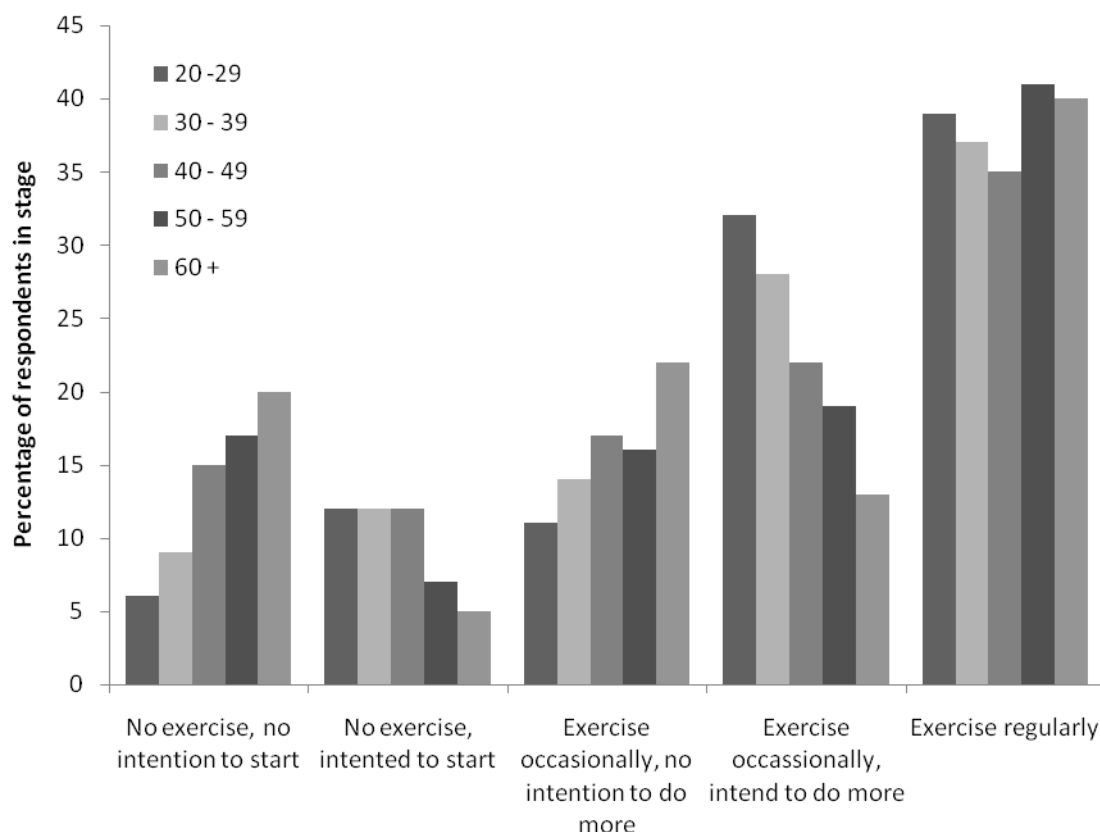


Figure 2: Distribution by age decade across the five stages of change (M. Booth et al., 1993)

According to Norcross and colleagues (2011) most people in the precontemplation stage are unaware of the need to change, although often family, friends or health professionals are aware of the need for them to be more physically active. They also underestimate the benefits of changing and overestimate the difficulties or barriers to change. “If [health professionals] try to impose action on precontemplators, they are likely to drive them away, while attributing their lack of progress to clients’ resistance.” [pp. 10] Norcross and colleagues suggest motivational interviewing (Miller & Rollnick, 2002) as a suitable treatment modality for those in the precontemplation stage because of its philosophy of ‘rolling with client resistance’. By resisting the urge to impose judgement or action on the client, health professionals increase their chances of maintaining client contact and working

collaboratively toward behaviour change (Miller & Rollnick, 2002; Norcross, et al., 2011; Rollnick, Miller, & Butler, 2008). Work in the present thesis will seek to better understand the factors that motivate those who exercise regularly with a view to developing effective strategies to boost regular activity levels of all, as well as reviewing techniques such as motivational interviewing for their potential to motivate those who do little or no regular physical activity.

Differentiating Exercise and Physical Activity

It is important to note that although physical activity and exercise are terms that are often used interchangeably, they do not mean the same thing. Physical activity is the voluntary movement of skeletal muscle that results in energy expenditure, whereas exercise is repetitive body movements done to improve or maintain physical fitness (Caspersen, Powell, & Christenson, 1985). The difference is one of intent, with exercise being a more planned construct than physical activity, which is incidental to all activities of daily living. Physical fitness relates to one's capacity to do physical activities. Physical activity and exercise are both correlated with physical fitness, but exercise has a stronger association (Caspersen, et al.). While physical activity and exercise both contribute to physical fitness it is important to understand that these two phrases may be perceived differently by older people. Older people may resist increasing their activity levels through exercise because they perceive exercise as demanding and not enjoyable and associate exercise with discomfort and possible health side effects (O'Brien Cousins, 2000). This perspective is supported by research in which it was reported that participation in a short (10 week) health promotion course about the benefits of exercise in maintaining heart health was effective at changing these perceptions (L. Rowland, Dickinson, Newman, Ford, & Ebrahim, 1994). Physical activity is also positively correlated with increases in physical fitness, albeit not as strongly as exercise. Couched in terms of increasing their levels of physical activity, such as walking to the shops, working in the garden, or playing football with grandchildren, older people may find increasing their activity levels both appealing and manageable. In the present thesis

older people's perceptions of activity will be explored to determine whether they do make this distinction between physical activity and exercise.

Exercise Modes

In surveys, walking is by far the most popular exercise mode reported by older adults (Australian Bureau of Statistics, 2007b; Australian Sports Commission, 2009; M. Booth, et al., 1997). As noted earlier in the section on the activity levels of older Australians, 38 percent of older adults reported walking as their primary exercise mode, with 98 percent of this walking being non-organised (Australian Bureau of Statistics, 2007b). Lawn bowls, golf, aerobic exercise, and swimming were tied for distant second with approximately 5 percent participation rate in each. Further, neighbourhood walking programs have been used to good effect with older populations to boost activity levels, increase cardiorespiratory capacity, and improve exercise self-efficacy (Gary, 2006; Roumie, 2006; R. Rowland, Fisher, Green, & Dunn, 2004). Nonetheless, it may be that walking occupies such a prominent position in survey results because it is free (many older adults have limited budgets (Rhodes, et al., 1999)) and does not rely on access to exercise facilities. Lack of access to exercise facilities and programs may play a deciding role in older adults' activity choice. Conservative estimates from an American study indicated that physical activity program positions for older adults would have to rise by 78 percent to meet the growing population demand (Hughes, et al., 2005). Access to, and utilisation of, exercise resources and programs within communities may present a barrier to increased levels of physical activity in those communities and this possibility will be explored in the present thesis.

Perceived Barriers to Exercise

Older adults have been found to report a variety of perceived barriers to increased levels of physical activity and a summary of quantitative research is presented in Table 1.

Table 1: Summary of studies into perceived barriers to increased physical activity

Reference	Participants	Main Barriers
(Australian Bureau of Statistics, 2007b)	N = 1, 557, 000	56% Too old
	Aged 65+	20% Injury or illness
		9% Not interested
(Lim & Taylor, 2004)	N = 8, 881	72% Health problems
	Aged 65+	7% Not enough time
		4% Pain
(M. Booth, et al., 2002)	N = 402	44% Already active enough
	Aged 60+	17% Not enough time
		Predominance of remaining responses varied by gender
		Women – Too old / Not sporty
		Men – Injury / Poor health
(M. Booth, et al., 1997)	N = 566	40% Injury
	Aged 60 to 78	27% Poor health
		20% Too old

Older adults in the studies by the ABS (2007b) and Lim and Taylor (2004) were asked open questions about barriers to participation in physical activities with their responses being coded into broad categories. In contrast, the studies by M. Booth, Bauman and Owen (2002) and M. Booth, Bauman, Owen and Gore (1997) required respondents to pick their main barriers from a limited list. A better understanding is needed of what respondents mean when they describe themselves as too old or not having enough time to exercise as these phrases alone do not provide the depth of understanding required to successfully overcome

these perceived barriers. Another interesting finding from M. Booth et al. (1997) was that older adults were more likely than younger adults to consult a physician for advice on exercise appropriate to their health status. This stands to reason when the main barriers reported for not participating in more exercise were age, injury, and poor health. Of the four studies summarised above only the ABS population study asked about motivations for exercise. For older adults, they reported the main motivations to be health and fitness (60%), enjoyment (18%), well-being (8%), and social / family support (7%). Once again, a more comprehensive understanding of these broad categories and an investigation of how these barriers might be overcome would contribute greatly to future programs to enhance participation rates and levels of activity.

Some progress toward a deeper understanding of these motivations and barriers comes from a review article by Allender et al. (2006). In a review of 24 qualitative papers (four of which reported results for respondents 60+) these authors reported that although most participants across the age groups were cognisant of the health benefits of being physically active only the older participants reported this as a reason for participation. For the older people in this review the health benefits of physical activity were described as reducing the effects of ageing and being fit enough to play with their grandchildren; and, while a doctor's referral may have prompted the uptake of activities in later life it was the social connections formed and enjoyment of the activities that encouraged regular and ongoing participation. Allendar et al. reported that the main barriers to older people being more physically active were unclear guidance about the correct quantity of physical activity and a lack of age appropriate role models. Further, focus group sessions conducted with 396 older people from a range of ethnic backgrounds in the United States (Mathews, et al., 2010) found the commonly reported barriers were health problems, fear of falling and inconvenience and that physical activity was enabled by positive outcome expectations, social support and access to programs. In the present thesis the aim is to build upon these observations and to explore, in depth, older people's motivations for physical activity and to understand the

barriers to activity that they face. It is hoped that, by exploring the lived experience of older people, ways in which some are successfully overcoming these barriers can be incorporated into a robust model of engagement.

Environmental, Social and Individual Factors

Variables that influence older adults' decisions to get active and stay active can be broadly divided into three categories, environmental, social, and individual (Weinberg & Gould, 2003). The environmental level includes the built environment, such as access to local recreational areas, facilities, and neighbourhood improvements to support activity, such as footpaths and bike trails. Another environmental factor is the demographics of an area, the population density, crime rate, and socio-economic status. Social variables relate to dimensions such as how the participant interacts with their friends and family, their level of social engagement and social cohesion and the ambience of the social setting. Also important are the support systems available through general practitioners, community workers, and wellness centre staff. Individual variables have been the research focus of a majority of studies to date, either by quantifying motivators or limiters, or through interventions that attempt to change these individual factors (Li, et al., 2005). However, as Li et al. assert, "little is known about the influence of the social and physical environment or environmental policy on the aging population" [pp. 94]. Further they state that the literature on ageing and physical activity has failed to address the complex interaction of individual and contextual factors.

One environmental factor that may impact on physical activity levels is residential location. Lucas (2002) divides spatial concentrations of older adults' into three broad locales, age-left-behind (where younger cohorts have moved away), ageing-in-place (remaining in their original community), and retirement destination (retirement village). Older adults report a variety of reasons for choosing to move to a retirement village (or equivalent) including, better health care and support, low maintenance needs, to meet new friends and better

personal security (Buys, 2001). The village environment, in many cases, offers better access to physical activity opportunities than the resident's original community, such as swimming pool, exercise room, walking paths, and tennis court (M. Bernard, Bartlam, Sim, & Biggs, 2007; Lucas, 2002). However, there is evidence that suggests that these facilities are not well utilised by residents (M. Bernard, et al., 2007). Additionally, life in a retirement village removes some of the activities of daily living associated with ageing-in-place (remaining in one's own home) such as lawn mowing, gardening and home maintenance. These activities of daily living all constitute forms of physical activity and contribute to daily energy expenditure (Gunn, et al., 2002). Older people who age-in-place still have these tasks to attend to and accrue the physical activity associated with them. However, as mentioned in the section on activity levels of older people, in some surveys these tasks were not included in the assessment of reported activity levels (Armstrong, et al., 2000).

Older people in the age-left-behind and ageing-in-place groups may also retain a continuity of association with activities and organisations, such as bowls and service clubs, which those moving to a retirement village may lose (Eilers, Lucey, & Stein, 2007). These associations provide opportunities for physical activity in familiar surroundings and friendship circles. However, in light of the low suggested physical activity rates of older people, it would seem that, regardless of location and access to resources, better approaches are needed to promoting and sustaining participation in regular physical activity.

Research looking at the interaction of environmental, social and individual factors on older people's physical activity levels is scarce. In one Australian study environmental factors that were significantly associated with activity were footpaths that were safe for walking and access to local facilities (M. Booth, Owen, Bauman, Clavisi, & Leslie, 2000). In this study the authors also reported that regular participation with, and support from, family and friends showed a significant positive association with exercise; whereas, in a later American study no association was reported between social support and activity levels (Brassington, Atienza, Perczek, DiLorenzo, & King, 2002). However, in both of these studies the authors

reported that self-efficacy for exercise (an individual factor) was positively correlated with being active. This finding, that self-efficacy for exercise is positively correlated with level of physical activity, is supported by a number of other researchers (Y. Lee & Laffrey, 2006; Umstattd & Hallam, 2007; Wesch, et al., 2006).

There is also scant research exploring the interactive effect of self-perceptions and social influences on exercise behaviour in older people. One study did investigate the interplay of these two factors on the leisure-time physical activity levels of teenagers (Sabiston & Crocker, 2008). These researchers reported that feelings of competence for activity and subjective belief in the value of activity were strong correlates of physical activity level. Further, they reported that social support (from parents and friends) was a significant source of competence and value beliefs. The direct effect of competence and value beliefs, combined with the indirect effect of best friend and parent influences accounted for 49 percent of the variation in activity level in this study population. In the present thesis support from friends and family as a motivation for activity will be explored to try and ascertain if Sabiston and Cocker's findings (reported in a student population [N=857] aged 15 to 18 years) hold true for an older cohort.

Some progress toward a better understanding of the interplay of environmental, social and individual factors on older people's physical activity behaviour comes from Browning, Sims, Kendig, and Teshuva (2009). These authors used a health action approach as the basis for their study; orienting it around the health action model (see Figure 3) developed in the Melbourne Longitudinal Studies on Healthy Ageing (Kendig, et al., 1996). The authors postulated that this approach recognised "that the amount and types of current physical activity need to be understood in the context of the social and health resources that support or inhibit engagement in physical activity, beliefs about physical activity, and beliefs about the meaning of health" [pp. 1]. Browning et al. reported that the variables of age, educational status and income were shown to be correlates of total physical activity; although the mechanisms of these associations were not explored. Predictors of energetic physical

activity were age, education, personal security scores and positive health beliefs. In line with Davis-Berman's findings (1990), Browning et al. also reported that positive health beliefs predicted energetic activity independent of the reported health status of the participant. In other words, these authors reported that how people felt about their health and functional abilities predicted their physical activity levels to a greater extent than their actual health and functional status. This is important because if perceptions of health can be changed independently from actual health status then this provides a potential point of intervention to help older people become more active.

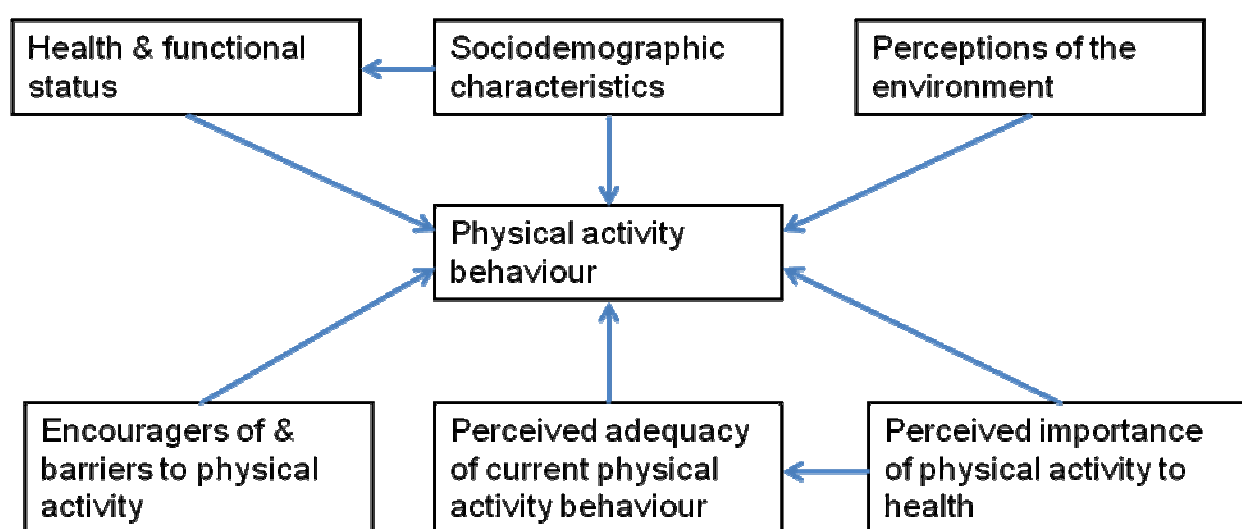


Figure 3: Health action model of physical activity behaviour (Browning et al., 2009)

In addition to correlates of physical activity, Browning et al. (2009) also reported that the majority of their respondents (96%) agreed with the statement that 'there was a lot older people could do to keep healthy' and that most (71%) reported that the amount of physical activity they currently did was 'about right'. The commonly cited enablers of physical activity reported in this study were motivation, enjoyment, availability of activities and the desire to achieve good health. The main barrier to physical activity was reported as poor health.

Browning et al. (2009) began their paper with a depiction of the health action model from the Melbourne Longitudinal Studies on Healthy Ageing (Kendig, et al., 1996) (see Figure 3). This model is used to frame the study and as a basis for the discussion. However, although the

model encompassed environmental, social and individual factors influencing physical activity behaviour, the study design did not purport to test the model and some of the reported findings did not lend support for the model as it is represented.

The authors were limited in their ability to test the model by the question and response combinations used to ascertain respondents' health and activity perceptions (see Table 2).

The questions were framed in a very general way, were not specific to the individual and the available responses were limited in their scope. For example, the 'importance of physical activity' questions were not worded with reference to the individual being surveyed but referred to older people in general. This is problematic when the model depicts factors influencing an individual's physical activity choices but the questions used to test the model were about general and not self-perceptions. Also, as with past population surveys (Armstrong, et al., 2000; Australian Bureau of Statistics, 2007b; Lim & Taylor, 2004), respondents were selecting from a set of predefined answers and these responses were limited in their scope and graduation. Additionally, health and functional status was divided into perceived status and actual status in the survey but appears as a single factor in the model.

Table 2: Outline of questions for the Browning et al. study (2009)

Factor	Question	Response choices
Perceived importance of physical activity to health	There is a lot older people can do to keep healthy.	Yes No
	How important is physical activity for older people?	Very important Important Somewhat important Not important
Perceived adequacy of current physical activity behaviour	Is your usual physical activity enough?	Not enough About right Too much
	The way I live my life these days is:	Very healthy Fairly healthy Not so healthy
Perceived health status	Self-rated health	Excellent Very good Good Fair Poor
Actual health status	Interviewer rated walking disability	Yes No
	Timed Get Up and Go Test	
Perceptions of the environment	Personal security index	Index measuring respondents' feelings of safety in their suburb during the day and at night and at home at night.
	Subjective neighbourhood index	An index mentioned in the methods section but not presented in the results
Extrinsic influences on physical activity behaviour	Does anyone encourage you to be physically active?	Yes No
	Extrinsic barriers and enablers to physical activity were assessed	

There were also points of difference between the relational links depicted in the health action model and the reported correlations and predictors in the Browning et al. study. In the model, sociodemographic characteristics were shown to have a direct effect on physical activity as well as an indirect effect via health and functional status. And while the survey questions tested for these associations and the results supported the direct effect, they showed no indirect association via health and functional status (neither perceived nor actual status) although this link has been comprehensively demonstrated (Matthews & Gallo, 2011). The authors did, however, report that the sociodemographic characteristics of age, occupation and education had a significant effect on the perceived importance of physical activity yet this association was not incorporated into the model.

The Browning et al. (2009) study represents an important step in understanding the interaction of factors contributing to older people's physical activity behaviours. Other models depicting factors affecting physical activity behaviour in later life were sought in the literature search for the present thesis but none was located. The health action model while not supported in some areas by Browning et al. represented nonetheless a good starting point for a study that probed more deeply into the factors to better understand the identified barriers and motivations. In the present thesis it is envisaged that the intersection of the quantitative and qualitative data gathered could be used to expand and revise the health action model.

Promoting Physical Activity

Approaches to engaging people in more regular physical activity can take two different forms; 'waiting' which is based on a medical model approach, and 'seeking' which is based on a public health approach (King, 2001). The more familiar approach is the waiting stance which is commonly employed in mass media campaigns and by the medical establishment. In the waiting stance information is presented to a broad audience after which the promoters, or practitioners, wait for interested individuals to avail themselves of the services on offer. A

drawback of the waiting stance is that it largely results in participation from motivated audience members who are often already reasonably active. An alternative is to seek out target groups within the wider audience and promote directly to these groups. This is a more direct approach to the problem of enhancing participation rates and one that shows good potential for implementation in a community setting to try and engage older people in higher levels of physical activity (King, 2001).

Literature to support King's assertion about the usefulness of employing a seeking stance to engage older people in physical activity per se is scant. However, this method has been successfully employed to recruit participants for research studies and clinical trials (Blanton, et al., 2006; Jancey, et al., 2006). In both of these studies recruitment was conducted by investigators from outside of the target community. In community, more success might be expected when community members are employed as seeking agents (Laventure, Dinan, & Skelton, 2008). Social modelling, community action and social engagement are all elements that may be enhanced by formal or informal implementation of a seeking stance.

Social Engagement

Engaging with others on a regular basis, be they friends, family or health / exercise professionals, can have a significant impact on health and wellbeing. Social engagement can be broken down into two component parts, social support and social participation. Using Kahn's (1979) definition social support is the expression of positive affect from one person to another, the affirmation of another's views or behaviours and the giving of symbolic or material aid. Social participation is the extent of interaction with the social environment; that is, interacting with others and participating in activities with others (Levasseur, Richard, Gauvin, & Raymond, 2010). Further, increased social participation provides more opportunities for social support to be given or received. Enhanced levels of the components of social engagement, support and participation, have the potential to increase physical activity levels. Orsega-Smith and colleagues (2007) posited that social support was as

important as self-efficacy in shaping the leisure time physical activity behaviours of older people. A recent discussion paper from the Institute for Social Participation at La Trobe University in Melbourne highlights the potential importance of social participation to health as it seeks to investigate the links between social participation and consumer participation in health services (Bathgate & Romios, 2011).

Social engagement has been mentioned previously in this literature review as a significant motivator for older people to participate in physical activity, a significant source of physical activity competence and value beliefs for young people, and (using a seeking stance) as a possible method to promote participation in physical activities. In further support of the positive impact of social engagement on health Depp and Jeste (2006) reported significant associations with definitions of successful ageing found in the literature of both; greater physical activity and, more social contacts (these may provide both support and participation opportunities). Additionally, there are reported associations between lower social activity and motor decline (Buchman, et al., 2009) and less social activity and increased depressive symptoms (Bergdahl, Allard, Alex, Lundman, & Gustafson, 2007).

In the Buchman et al. study, each 1-point decrease in the amount of social activity was associated with a decline in motor function of approximately 33 percent. Put another way, this 1-point decrease in social activity was equivalent to a participant being effectively 5 years older at baseline in this study. The authors posited that engaging in social interactions and motor control both rely on the structural and functional integrity of the brain. Planning and participating in social engagements assisted in the maintenance these structures and connections offsetting age related motor function decline. Social interactions also provided an opportunity for being physically active which further offset losses of motor function.

Bergdahl, Allard, Alex, Lundman and Gustafson (2007) reported that for the men in their study depression was closely correlated with social factors such as the loss of a loved one and having no one to confide in. For both men and women in the study, experienced loneliness was closely related to symptoms of depression.

Maintaining and boosting social participation in later life may have wide ranging health benefits. Engaging with others can provide a protective effect against loss of motor function, depression and cognitive decline as well as providing opportunities to be physically active. Social engagement also provides a potential mechanism by which increased physical activity might be promoted, encouraged and supported. Any study that seeks to understand the physical activity behaviours and beliefs of older people must take into account their patterns of social engagement and the mechanisms by which these linkages are established and maintained. The importance, and timeliness, of investigating these links between social engagement and health matters is supported by discussion points arising from the Bathgate and Romios (2011) paper; “Is social participation a useful concept in understanding consumer participation in health?” and “What spaces are different population groups invited to participate in?” [pp. 12].

Summary

In summary, the ageing world demographic means that researchers need to investigate approaches that will improve the health and wellbeing of older citizens. One way to do this is through enhanced levels of physical activity which have a cardio-protective effect, help to prevent and control type II diabetes, and maintain functional capacity (Barengo, et al., 2004; Batty, 2002; Franco, et al., 2005; Holviala, et al., 2006; Hu, Lakka, et al., 2004; Stewart, et al., 2005; Thomas, et al., 2006).

At present it appears that only half of people over 65 are adequately active to realise the aforementioned health benefits (Australian Bureau of Statistics, 2007b; Lim & Taylor, 2004; Mummery, et al., 2007). A deeper understanding is needed of the factors that motivate some older people to be adequately active and the factors that limit others from becoming more physically active. A qualitative approach may provide this deeper understanding of older people’s exercise attitudes and behaviours. Understanding how theories of engagement fit

with older people's lived experiences will provide valuable insights and assist in the promotion of activities to this population.

In this literature review a number of questions have been raised about older people's physical activity perceptions and behaviours. Firstly, what limits up to 50 percent of older people from being adequately active? How do older people perceive physical activity? What barriers prevent older people from becoming more active? -Is it access to resources, poor health, a perception of being too old, or feelings of incompetence? What motivates older people to be more active and how can these motivations best be enhanced? And lastly, what effect does social engagement have on older people's physical activity behaviours? Given the questions that have been raised as a result of this review of the literature it would appear that older people's level of engagement in physical activity is not a simple product of their knowledge and belief in its importance but by a range of environmental, social and individual factors.

Based on this exploratory hypothesis the following research questions have been formulated:

- In what ways do environmental, social and individual factors impact on older people's level of physical activity?
- In what ways do these same factors shape older people's perceptions of physical activity?

Chapter 3 Methodology

The present thesis reports on the results of a mixed methods project investigating the role of environmental, social and individual factors on older people's physical activity decisions and behaviours. Motivations and barriers to physical activity were investigated along with perceptions of activity and social support for healthy exercise behaviours in older Tasmanian people.

Theoretical and Methodological Framework

Work in this thesis is guided by the pragmatic paradigm, within which the research questions are the central driving force and the researcher may employ a variety of methods to seek to answer these questions (Mackenzie & Knipe, 2006). Pragmatic research aims to understand the practical consequences of answers to the research questions and how these might be best used to formulate the next action or future practice (Burke Johnson, 2004). In line with this theoretical framework a mixed methods approach was adopted to attempt to answer the research questions as this allowed for the construction of a more complete picture of older people's behaviours, perceptions and attitudes. This approach based on the pragmatic paradigm and using a combination of research methods has been described by others in the field as imperative for understanding the complex phenomenon of ageing and physical activity (Grant & O'Brien Cousins, 2001).

Quantitative Approach

The first research question posed in the present thesis required an investigation of the influence of a number of factors on older people's physical activity levels. The aim was to ascertain how physical activity levels varied across residential location, with increasing age and with the activity levels of family and friends. The correlation of activity levels with affective measures such as interest, importance and utility of physical activities was also sought. A quantitative approach to answering these questions was adopted based in part on

the work of others in this area of study (Armstrong, et al., 2000; M. Booth, et al., 2002; M. Booth, et al., 1997; Sabiston & Crocker, 2008). The benefits of a quantitative approach are the objectivity and generalisability of results, the repeatability of the process and the ability to apply analytical statistics to ascertain the significance of associations and differences between groups. A quantitative approach can provide insight into 'what' is occurring but the explanation of 'why' and 'how' the phenomenon is occurring is a matter of informed, and yet still subjective, speculation based on the results obtained (Gorard, 2003).

Qualitative Approach

The second research question in the present thesis, "in what way do these factors shape older people's perceptions of physical activity?" does not lend itself to discovery using quantitative methods. To gain an understanding of how people feel about physical activity and how their life experiences and attitudes impact upon their perceptions and behaviours requires a different approach.

Narrative analysis was selected as the qualitative approach to attempt to answer this research question as this form of inquiry draws from participants' stories that reveal how they view and understand their lives (Wertz, et al., 2011). In this study semi-structured interviews were used to draw forth these stories with the aim of addressing the 'why' and 'how' of the phenomenon under study, namely perceptions and attitudes toward physical activity. A categorical analysis of the interview content was carried out which abstracts sections of text into a coding structure allowing comparison across a number of narratives; thus a deeper understanding of the factors involved can be formed (H. Bernard, 2000; Wertz, et al., 2011). Qualitative interviews allow the researcher to tap into participants' perspectives and meanings and when combined with quantitative results provide a way to directly discuss the issues under investigation (Burke Johnson, 2004). Interviews however are potentially open to bias; firstly on the part of the interviewer whose body language and phrasing may influence the interviewee's responses; and, on the part of interviewees who may be subject

to inaccurate or selective recall and misconceptions (Gratton & Jones, 2004). Inaccurate or selective recall can also bias quantitative data gathered by survey. Narrative analysis, too, can be biased by the analyst's preconceptions of the subject matter and to multiple interpretations that could be drawn from the data, however this inherent bias is an integral part of the narrative approach, as Wertz et al. point out, "[...] narrative research is an interpretative enterprise consisting of the joint subjectivities of researcher and participants subjected to a conceptual framework brought to bear on textual material (either oral or written) by the researcher" [pp. 225].

Mixed Methods

Mixed methods research can be summarised as a class of research where the researcher mixes quantitative and qualitative techniques, methods and approaches within a single study. The mixed methods approach uses a pragmatic enquiry method that utilises deductive (the testing of theories), inductive (the discovery of patterns) and abductive (uncovering the best set of explanations for understanding the results) approaches (Burke Johnson, 2004). As outlined in the previous sections, used alone, each of the traditional research approaches, quantitative and qualitative, have their advantages and drawbacks. By combining these approaches in the one study it is hoped that a more complete picture of older people's behaviours and attitudes around physical activity can be constructed. Further, it is hoped that weaknesses due to bias in each of the approaches can be overcome due to the ability to triangulate the quantitative and qualitative results to uncover the best set of explanations for the observed phenomenon (Wisdom, Cavaleri, Onwuegbuzie, & Green, 2011).

The mixed methods approach employed in the present thesis involved the quantification of physical activity levels (by survey) to test the assumption that about 50 percent of people over 65 are inadequately physically active. Beliefs about the importance and utility of physical activity were also quantified by survey and then more in depth information was

gathered from face to face interviews, after which thematic analysis was employed to identify patterns and trends in the interview data. Using interviews allowed for a more detailed analysis of older people's perceptions of physical activity as well as an opportunity to explore 'how' and 'why' social engagement and social support for activity influenced people's behaviours. A flow chart of the study design is shown in Figure 4.

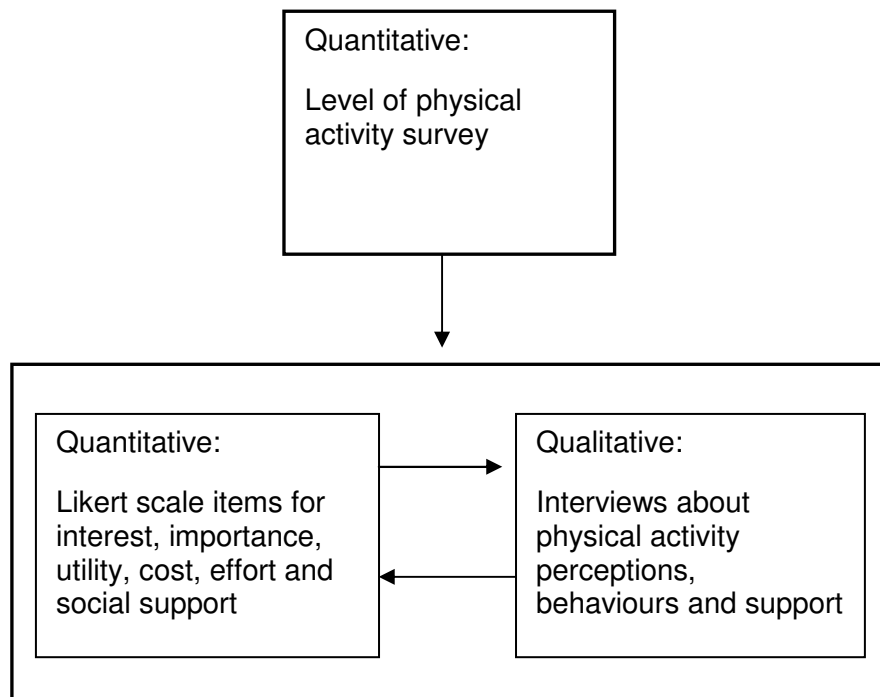


Figure 4: Flow chart of study design

Coleman (1990) tells us that “because data are so often gathered at the level of individuals it is natural to begin explanation of system behaviour by starting at the level at which observations were made, then ‘composing’ or ‘synthesising’ the systematic behaviour from the actions of these individuals” [pp. 3]. Further, he says that explanations of systematic behaviour based on the actions of individuals are likely to be more stable than explanations that remain at the system level. Based on these assertions, the aim in the present thesis was to examine the physical activity actions and perceptions of individuals within the communities under study in order to synthesise an overall view of behaviours. Further, the ultimate aim of the present thesis was to postulate on the nature and efficacy of future interventions and as Coleman states; “Interventions must be implemented at these lower

levels. Thus a successful explanation of system behaviour in terms of actions or orientations of lower-level units is ordinarily more useful for intervention than is an equally successful explanation which remains at the level of the system itself" [pp. 3].

Ethics

Ethics approval was obtained for this study from the Social Sciences Human Research Ethics Committee (Tasmania) Network, ethics reference number H10153. A copy of the ethics approval is included at Appendix A. Copies of all information letters, consent forms, survey and interview tools are included in the appendices (B – I).

Participants

Survey participants were convenience samples drawn from six locations within a 65 km radius of Launceston; one rural township, three suburban retirement villages, one rural retirement village and a suburban day therapy centre. These locations were selected to allow for maximum contextual variation in physical activity behaviours and attitudes across a range of rural locales and population densities. Additionally, the research questions in this thesis ask about the effect of environmental and social factors on older people's physical activity levels and perceptions. In order to answer questions such as the effect of access to resources and the built environment on activity levels it was necessary to select a cross section of residential locales reflecting the residential distribution of older rural Tasmanians.

Township A

Township A (population approximately 870) is 70km from its closest regional centre and 130km from Tasmania's capital city (University Department of Rural Health, 2007).

Approximately 170 people over 65 years of age live independently in the town (Australian Bureau of Statistics, 2007a). Facilities in the township include a supermarket, butchers' shops, service station, outdoor swimming pool, sports ground, town hall, health and community centre, golf course, bowls club and numerous coffee shops (popular due to

Township A's location along a major highway). The Township A Health & Community Service (TAHCS), located in Township A, services the rural catchment surrounds within the municipality (University Department of Rural Health, 2007).

There are numerous organised physical activity opportunities in Township A, many of which emanate from the TAHCS. These include: a walking group, fitness classes, Eat Well, Be Active program, men's and women's bowls and golf, aqua fitness class, ladies swim night, badminton, singing group and tennis. There are also social opportunities available in the town such as book club, trivia nights, painting group, garden club and creative group. A hospital auxiliary group also operates out of the TAHCS.

Village A

Village A is an independent living, retirement village developed in 2003. It has a population of approximately 150 residents who live in 91 three bedroom homes spread across the six hectare site. The village is accessible via a main gate and a small street network links the residences, many of which border a small lake system.

The village is located on the outskirts of the greater Launceston area approximately 10km from the city centre. Public facilities within 1km of the village include a supermarket, chemist, nursery and hairdresser. Facilities at Village A include a bowling green, tennis court, croquet lawn, swimming pool, gymnasium, function hall and formed walking paths. Residents can chose from a wide range of organised activities, all of which are advertised inside the front cover of the monthly newsletter. These activities include snooker, table tennis, line dancing, Tai Chi, singing group, outdoor bowls, indoor bowls, aqua fitness classes, exercise classes and croquet. Additionally, there are numerous intellectual activities available to residents such as a book group, painting and crafts.

Village B

Village B's independent living units are located at two sites across Launceston. The northern facility was built in 2006 and has 20 independent living units with private gardens that can be maintained by the residents if they choose. Recreational facilities at the northern facility include a chapel, library, meeting room and residents' lounge. The northern village is collocated with a residential aged care facility and residents are able to attend activities at that facility if they wish.

The southern village has 18 single bedroom and 15 two bedroom units. The southern village is also collocated with a Residential Aged Care facility (RACF). Village residents hold regular meetings and craft days at their centre and are able to participate in social and recreational activities provided by at the RACF. A bulletin of up-coming events is distributed to unit residents on a weekly basis. The total population of people living independently at the Village B complexes is 51. Pets may not be kept by residents at either of the Village B complexes.

Village C

The Village C complex in Launceston has a total of 125 independent living units across 4 sites. These independent living units, which house about 140 older people, are collocated with two RACFs. Residential facilities include an indoor heated swimming pool, flat walking paths between residences, meeting room, games room and access to activities at the Day Therapy Centre collocated at one of the sites. Regular residents' meetings and games afternoons are held and there is also a singing group. The Outreach Service operating from one of the sites also organises activity and exercise classes for residents. The Village C complex has flat sealed paths that appear to be well utilised by residents for exercise and visiting other residents.

Village D

Village D is an independently run residential community catering for people over the age of 55. Village D is located on the outskirts of a rural township in Northern Tasmania and is comprised of 68 two bedroom units and a residents' meeting hall / games room with an outdoor pool. The 96 residents maintain their own homes and gardens and, as well as the games room, have access to a number of walking tracks along the riverside and through the fields surrounding the complex. Village D residents are allowed to keep pets. The formed paths around the complex and walking paths in nearby fields appear to be well utilised. The residents' lounge is used for meetings, social gatherings and occasional fitness classes / dances.

Day Therapy

Day Therapy is located at the Village C complex in Launceston and caters for people aged 65 years and over. Attendees live independently in the Launceston area and are collected by bus from their homes, or transported by relatives, to attend day therapy one or more days each week. The centre operates 5 days a week, from 9am until 3pm, offering diversional activities such as quizzes, board games and entertainment as well as physical activities in the form of indoor bowls, snooker and gentle exercise to music. About 100 older people attend Day Therapy at least once each week. Day Therapy attracts federal funding therefore attendance costs are kept low (~\$8 per day including the bus service).

Quantitative Data

A survey was conducted of people over 65 years of age in all six locations. The survey gathered demographic data, physical activity levels, perceptions of the value and cost of physical activity, and number of physically active family and friends. Level of physical activity data was gathered so that comparisons could be made with results of national physical activity surveys. Likert scale data of perceptions of physical activity and number of active

family and friends was used to explore associations between these factors and activity levels. Level of physical activity was also used in the selection of interview participants at the two case study sites, Township A and Village A. Perception scales were also used to inform the interview structure and for comparison with themes arising from those interviews. The complete set of survey tools, information sheets, consent forms and interview outlines are attached at Appendices B through I.

Physical activity level

Level of physical activity was assessed using the Stanford seven-day recall questionnaire (J. Sallis, et al., 1985) (see Appendices D and I). The seven-day recall questionnaire was selected for this study because of several positive features:

- Its simple layout and ease of completion by the target population
- The form used gave a graphical prompt to recalling activities in the preceding seven days
- The ability to calculate total energy expenditure in METs from the results
- Research indicating that the total energy expenditure calculated from the results showed a strong correlation with doubly-labelled water results in older people (Bonney, et al., 2001)
- Test - retest reliability figures for the moderate and vigorous categories in the Stanford questionnaire, published by Sallis et al., show good reliability with a Pearson product correlation (r) of .75 and .83 respectively

Other survey tools under consideration were the International Physical Activity Questionnaire (IPAQ) (M. Booth, 2000) and the Physical Activity Scale for the Elderly (PASE) (Washburn, McAuley, Katula, Mihalko, & Boileau, 1999; Washburn, Smith, Jette, & Janney, 1993). The IPAQ was not selected for a number of reasons:

- The authors recommend the survey for young to middle aged adults (18 to 69 years) which precluded a large proportion of the potential population (IPAQ, 2011)
- Concerns about over reporting of physical activity due to the ambiguous nature of the questions concerning time usually spent in activities (this figure should be the mean time per day spent in the activity, but this is unclear and difficult to interpret from the text) (Rzewnicki, Vanden Auweele, & De Bourdeauhuij, 2003)
- The design of the questions was felt to be overly complex for an older population
- Total energy expenditure could not easily be calculated from the results

The PASE, although specifically designed for older people, was not selected because total energy expenditure could not be calculated from the results and because no significant correlation was shown between PASE results and total energy expenditure obtained by the doubly-labelled water method in the Bonnefoy et al. study. Therefore the decision was taken to use the Stanford seven-day recall questionnaire.

In the Stanford seven-day recall questionnaire respondents recorded in hours (or part thereof) on each of the preceding seven days that they spent in moderate, hard, or very hard physical activity. Examples of activities were included for each intensity category as a guide to completion. Respondents also recorded the number of hours they spent in bed on each of these days. Hours each day that were not ascribed to one of these four activity categories were deemed to have been spent in low intensity physical activity. J. Sallis et al. ascribed average MET values to each activity intensity level in the seven-day recall questionnaire as follows; bed rest was 1 MET, low 1.5 METs, moderate 3 METs, hard 5 METs and very hard 9 METs. There has been some debate of late about the use of MET values to quantify activity levels for older people with studies showing that normative values, such as those published by Ainsworth, et al. (2000), underestimated actual energy expenditure for older people for leisurely walking, brisk walking and making beds and overestimated energy expenditure for gardening and stair climbing (Jones, Waters, & Legge, 2009; Knaggs, Larkin,

& Manini, 2011). The average magnitude of the difference from normative values was reported to be about one MET. However, this variation from normative values may not be a problem restricted to older people with variations from the Ainsworth et al. compendium values being reported in 17 out of 21 activities of daily living tested in a study of 277 participants aged 20 to 60 years old (Kozey, Lyden, Howe, Staudenmayer, & Freedson, 2010). Fourteen activities were underestimated in the compendium when compared with subject metabolic data including leisurely walking, brisk walking, dusting, raking and mopping; again the average underestimation was reported to be about one MET.

In the present thesis the problem of under- or over-estimation of the MET value of individual activities of daily living is to some extent negated by the ascription of an average MET value to the moderate, hard and very hard activity categories as per the Stanford seven-day recall questionnaire protocol (J. Sallis, et al., 1985). MET minutes per week ($\text{MET} \cdot \text{min} \cdot \text{week}^{-1}$) were calculated by multiplying the hours (or part hours) spent in moderate, hard and very hard activities by 60 to obtain minutes per week of each intensity level (low intensity physical activity did not contribute to the energy calculations). These values were then multiplied by the MET figure ascribed to each intensity level and then the three values were summed to give total $\text{MET} \cdot \text{min} \cdot \text{week}^{-1}$ of physical activity. As an example, a person participating in the recommended half hour of moderate intensity physical activity each day of the week would score $30 \text{ minutes} * 7 \text{ days} * 3 \text{ MET} = 630 \text{ MET} \cdot \text{min} \cdot \text{week}^{-1}$. This $\text{MET} \cdot \text{min} \cdot \text{week}^{-1}$ value was used as an indication of adequate physical activity with values below $630 \text{ MET} \cdot \text{min} \cdot \text{week}^{-1}$ being deemed as inadequate physical activity. Physical activity data were used in the qualitative phase of the research to identify prospective adequately and inadequately physically active participants for face to face interviews. It is important to note that short term recall surveys such as the IPAQ, AAS, PASE, and Stanford will always be prone to the influence of acute events and the qualitative data bears this out. It is important to keep in mind that national surveys with which these results are being contrasted are also prone to this effect.

Subjective values

Interest, importance and utility of physical activity to participants was gathered using five self- and task-perception scale items originally developed by Eccles and Wigfield (1995) for an educational setting and later adapted to assess teenagers' perceptions of physical activity (Sabiston & Crocker, 2008). The five self- and task-perception scale items were condensed to form the interest, importance and utility values for analysis. The *cost* and *effort* of being physically active in terms of time, money and difficulty was assessed using scale items developed by Sabiston and Cocker. Sabiston and Cocker piloted their modified subjective values scales with an older adolescent sample and reported adequate internal consistencies for the five items ($\alpha=.78 - .92$). It is important to keep in mind that in the present thesis this tool is being used with a different target age group than that which was used in the Sabiston and Cocker pilot testing. A specifically designed tool to test older people's perceptions of physical activity was sought but not located and therefore the Sabiston and Cocker tool was first piloted with a group of older people to assess its suitability. Two final items in the subjective value section of the survey asked about role-modelled physical activity behaviour by friends and family members.

A further survey section exploring participants' perceptions of support from family and friends for them to be physically active was included in the surveys conducted in Township A and Village A. However, following a study redesign this section was removed from surveys at the additional sites in an effort to reduce the complexity of the survey and boost return rates. Data collected in this section of the survey from Township A and Village A was not analysed and is not presented in this thesis however both sets of surveys are presented in the appendices for completeness.

Pilot Survey

The survey was piloted with six people aged 65 to 85 (mean age 75.2 ± 7 years) to assess the appropriateness of this survey tool when used in this older age group. Verbal feedback

from the pilot group was used to improve readability and layout of the survey. The pilot group reported no difficulties with understanding and completing either the physical activity survey or the subjective values scale items.

Survey Administration

The initial surveys (see Appendix D) were carried out at the case study sites, Township A and Village A. Quantitative data from participants was gathered by reply paid postal survey. Demographic data (name, address, phone number, birth year, & accommodation type) were collected along with physical activity level, subjective value of physical activity, and perceived social support for physical activity. In Township A surveys were distributed through the community health centre, local businesses and sporting clubs and survey distribution was preceded by a written piece in the local newspaper.

Surveys at Village A were delivered to households by the internal mail contractor following a presentation by the researcher at the residents' meeting and publication of an article in the facility's newsletter. In both cases respondents mailed back their completed survey in a reply paid envelope. Follow up articles were published in the local newsletters at these two initial sites in an attempt to boost response rates.

In all, 99 surveys were distributed in Township A and 140 surveys were distributed at Village A. Response rates were 22 and 21 percent respectively. Difficulties completing the long form of the survey, reluctance to take the time to complete the survey and a misconception that the survey was only aimed at physically active community members were all factors that interview subjects later described as possible explanations for the low return rates. On reflection, for the present thesis, the researcher concluded that a more effective process may have been to administer the survey at the conclusion of the initial Village A residents' meeting where the concept was introduced; and, at community and social group meetings in Township A. This would remove the take home, fill in and post back option, the complexity of which seems to have contributed to the low return rates. This approach was employed at the

secondary study sites with a distinct improvement in return rates. Additionally the survey section pertaining to the perceived support for activity of family and friends was removed to simplify survey completion.

The shorter survey was subsequently administered face to face during residents' meetings at the four remaining survey sites by the researcher assisted by a group of trained volunteers. Residents were informed that their input was being sought through flyers and announcements circulated at each site prior to the survey day. This survey method was effective in lifting response rates to an average of 50 percent across these additional four sites.

Low survey return rates from the initial study sites would urge caution when drawing generalisations about the physical activity levels of older Tasmanians from the survey data. Results from these first two sites indicated that the percentages of inadequately active people were significantly lower than results reported in Australasian studies where it has been reported that nearly half of this population are insufficiently active (Armstrong, et al., 2000; Lim & Taylor, 2004; Mummery, et al., 2007). The higher return rates achieved by administering the survey face to face at the remaining four study sites allows for more reasonable generalisations about the physical activity levels of older rural Tasmanians to be made however the achieved return rates did not reach the 80 percent level recommended by Sackett (1979) to avoid non respondent bias.

Interviews

Physical activity data from the survey was used to select 12 adequately active (>630 MET.min.week⁻¹) and 8 inadequately active (<630 MET.min.week⁻¹) residents for interview from the case study locations of Village A and Township A. The selection of a mix of adequately and inadequately active interviewees from each location was in order to maximise the contextual variation between ageing in a suburban retirement village and in a rural township.

The one hour semi-structured interviews took place in residents' own homes and all interviews were completed within 3 months of the survey being issued. Residents were interviewed to gather their perceptions of physical activity, what their motivations and barriers to activity were, and how social support figured in their decisions about engaging in activities. They were also asked what social support they would offer to help friends to be more physically active or alternately what they would like from others to assist them to become more active. Interview questions were designed based on the research questions developed in the literature review for the present thesis. An outline of the interview questions is attached at Appendix G. The majority of interviews were conducted one to one however three sisters in Township A were interviewed together at their request. A narrative analysis approach allows for the use of interviews and focus groups to construct participants' views of the topic under discussion. Each of the sisters' interview content was transcribed to a separate file giving each an individual 'voice' within the research.

Additional environmental and demographic data was gathered anecdotally from retirement village management or health centre staff at each of the study sites to provide contextual data. This contextual information was not used as part of the qualitative discussion. A recorded interview was conducted with the Occupational Therapist in charge of the day therapy centre based on reports from the health centre staff that recent changes she had made to the design and operation of the centre had resulted in a dramatic increase in attendance rates. It was felt that the adaptations that had brought about this expansion warranted investigation within the scope of the present thesis. Signed informed consent was obtained for this interview.

Data Analysis

Quantitative

PASW Statistics 18 (Version 18) was used for all data analysis. Descriptive data is presented as mean \pm standard deviation. Demographic, physical activity and affective between-subjects factors were compared using one-way analysis of variance (ANOVA). Despite the anticipated non-normal distribution of age and physical activity data the use of ANOVA for these analyses was supported because each group contained more than 15 participants (Hair, Anderson, Tatham, & Black, 1995). An *a priori* power calculation was conducted using G*Power3 (Faul, Erdfelder, Lang, & Buchner, 2007) and it was determined that to detect a medium effect size between two groups on a one-way ANOVA then a total sample size of 210 would be required. Subsequent return rates from the two initial study sites yielded a much smaller sample size than this and therefore the four additional survey sites were included in the study in an effort to increase the power. Least significant difference (LSD) calculations were used in the event of a significant value of *F* being returned to ascertain the loci of any between group differences. For these analyses participants were divided into groups based on residential location, age decade and into quartiles based on their reported physical activity levels. Age difference between those selected for interview and the remainder of the survey cohort was tested using an independent samples *t* test, as was the age difference between adequately active and inadequately active interviewees (Green & Salkind, 2003).

Correlations between affective variables and activity level were detected using Spearman's rank correlation coefficient (*rho*). Spearman's *rho* was chosen because the affective variables were assessed using Likert scales that return ordinal rather than interval scale data (for which Pearson's *r* would have been more appropriate). The choice of Spearman's *rho* was further supported as it was anticipated that the use of these Likert scales would not return normally distributed data (Hair, et al., 1995). Effect size was reported based on the

value for *rho* with values less than .3 denoting a small effect, between .3 and .5 a medium effect and greater than .5 a large effect. For each of the statistical analyses described above an alpha level of less than .05 was used as an indication of a significant finding (Coakes & Steed, 2001).

Qualitative

Semi-structured interviews were conducted to gather qualitative data for the present thesis. These interviews lasted for approximately one hour and were digitally recorded before being transcribed for textual analysis. Coding of interview data was done using NVivo (Version 8, QSR International Pty Ltd, Melbourne, Australia). As part of the narrative analysis process the interview transcripts received multiple readings to identify major emerging themes (Fereday & Muir-Cochrane, 2006). These emergent themes, supported by themes identified in the literature review, were used to construct an upper level of coding nodes within NVivo to which pertinent phrases from individual interviews were coded. Phrases collected in these upper level nodes were then reread and used to construct more specific sub-nodes to which the pertinent phrases were copied. The resultant node / sub-node structure was used to guide the development of the discussion section and to provide in depth insights into the factors impacting upon physical activity behaviour within the health action model described by Browning et al. (2009). A diagram of the final node structure can be found in Appendix J. As a final step in the narrative approach the interview recordings were listened to again as a confirmatory analysis of the final node structure and to obtain an holistic overview of the interview material. Where quotes are presented in the qualitative findings the identity of interviewees has been protected by the use of pseudonyms. The acronyms AA (adequately active) and IA (inadequately active) are used to denote the physical activity status of the interviewee.

Study Design Process

An intervention phase was originally planned for this project involving the recruitment of peer support mentors whose planned role was the promotion and support of physical activity within their respective communities. The study design was modified when it became apparent that participants were reluctant to take on mentoring roles. This suggested that the motivations and barriers to activity were not well enough understood to design and implement an intervention. This experience prompted a review of the research direction and a redesign of the study to better address the complex issues of barriers and motivations for physical activity in an attempt to fill this identified gap in knowledge. A more complete understanding of these concepts was required to direct and inform future intervention studies and so the focus of the current research shifted to analysing activity levels and associations and to an in-depth analysis of interview transcripts to gain greater insight into older people's decision making with regards to physical activity. Experiences and insights gained during the recruitment process are reported in the findings section.

Chapter 4 Findings

Participant Age Profiles

The average age of survey participants was 82 ± 7 years; Table 3 shows the demographic and physical activity data from each of the study sites and overall. The results of a one-way ANOVA revealed a significant difference in age between the survey sites ($F(5,215) = 5.9$, $p < .01$); least significant difference (LSD) calculations showed that Village B, Village C and Day Therapy respondents were significantly older than respondents at the other three sites (Township A, Village A and Village D).

The mean age of the 20 people selected for interview was 77.3 ± 6 years. The age of interviewees was not significantly different ($p = .63$) from the mean age of survey respondents from the two case study sites (77.9 ± 5.5 years) and there was no significant difference ($p = .08$) between the mean ages of the eight inadequately active (IA) and twelve adequately active (AA) interviewees (80.1 ± 3.9 years and 75.7 ± 6.5 years respectively).

Physical Activity Levels

The percentage of inadequately active respondents (19% overall) was low compared to national survey figures of 50 percent with a mean activity level of 1919 ± 1784 MET.min.week⁻¹ and a median physical activity level of 1260 MET.min.week⁻¹. There was a significant association, with a medium effect size, of younger age with higher activity levels across the whole cohort ($\rho(219) = .33$, $p < .01$ (Spearman's ρ was used for this analysis as the physical activity data did not show a normal distribution)). One-way ANOVA results indicated a difference in physical activity levels between survey sites ($F(5,215) = 9.1$, $p < .01$) with LSD calculations indicating that Township A respondents were significantly more physically active than respondents from any other study site. The percentage of people who were adequately active varied across age decade with the 60 to 69 year old group having the highest percentage of adequately active participants as shown in Table 4.

Table 3: Demographic and activity data from the study sites

Location	Return rate	Female	Mean age (years)	Mean activity level (MET.min.week ⁻¹)	Inadequately active
Township A (n=99)	22%	73%	76 ± 6	3748 ± 2402*	9%
Village A (n=140)	21%	60%	78 ± 5	1706 ± 1083	10%
Village B (n=51)	61%	74%	82 ± 9**	1916 ± 2126	23%
Village C (n=140)	35%	69%	83 ± 5**	2229 ± 2022	14%
Village D (n=96)	28%	81%	79 ± 8	2031 ± 1350	17%
Day Therapy (n=89)	72%	58%	83 ± 7**	1101 ± 849	33%
Overall (N=615)	36% (n=223)	67%	82 ± 7	1919 ± 1784	19%

Note: Inadequately active is deemed to be less than 630 MET.min.week⁻¹

* = significantly more active than all other survey sites at $p < .01$

** = significantly older than Township A and Village A respondents at $p < .01$

Table 4: Physical activity level by age decade

Age decade	Total Respondents	Mean activity level	
		(MET.min.week ⁻¹)	Adequately active
60 - 69 years	13	2880 ± 2696	92%
70 – 79 years	65	2390 ± 1843	89%
80 - 89 years	114	1632 ± 1580	66%
90 - 99 years	29	1560 ± 1625	72%

Perceptions of Physical Activity

Interviewees conceded that perhaps some older people may interpret the term physical activity as meaning exercise but they were personally able to describe physical activity as encompassing exercise as well as many other planned and incidental activities. When Village A residents were asked by the interviewer, “Tell me what comes to mind when I say physical activity” the most common responses were ‘walking’, ‘movement’ and ‘activities’. Paul (IA, 84 years) felt that some people may interpret physical activity as meaning exercise but stated that “even getting up off your chair is important. An hour is about the longest you should sit.” Mavis (AA, 74 years), when asked what came to mind when the term physical activity was mentioned, said, “I suppose exercise, but I don’t exercise, I walk and that is my most regular thing.” Carol (IA, 83 years) agreed saying, “It [physical activity] means walking and swimming and general mobility around the house.” Township A interviewees expressed similar opinions, “Energetic things I suppose. I do all my own gardening” [Dina (AA, 81 years)]. “Movement! If you are moving, if you are doing things, gardening” [Rachael (AA, 68 years)]. “Walking, golfing, gardening and those sort of things” [Dolcia (IA, 78 years)].

However, Maude (IA, 80 years) came closest to describing exercise rather than physical activity, “I don’t count my housework. I count going for walks, playing sport, and going to exercise classes.” Although Maude did concede, “If I had a hard day in the garden I would say that is physical activity. But I wouldn’t count watering the pots.”

I suppose anything physical, this is not physical sitting on my bottom like this but anything else is physical. If you are moving; if you are doing things; gardening. [...] I don't think older people perceive physical activity so much as 1 2 3 4 1 2 3 4 [star jumps] sort of exercise but gradually I am walking better and we walk down to shop or we walk down to the post office, that is exercise. My legs are pretty strong and my upper body strength is pretty good so I can do most things. [Jack (AA, 73 years)]

It appeared that interviewees were able to distinguish between physical activity and exercise and they acknowledged the contribution that being physically active, as distinct from exercising, made to their health.

Perceptions of physical activity were recorded in the survey using Likert scale items, as were the number of friends and family participating in physical activity. Spearman’s rank correlation coefficient (ρ) between MET.min.week⁻¹ and the Likert scale items showed significant associations with small to medium effect sizes for all affective variables (see Table 5). One-way ANOVA calculations between the six study sites showed a significant difference only in the *cost* of being physically active (in terms of time and money), $F(5, 211) = 2.56, p < .05$. Township A respondents reported the highest costs associated with being physically active and post hoc tests (LSD) revealed that Township A respondents reported significantly higher costs than Village A, Village C and Day Therapy respondents. The affective scale item *cost* was made up of two questions; namely the cost of being physically active in terms of time and of money. Individual analysis of these two items revealed that both items had a significant positive association with MET.min.week⁻¹ (for time $\rho(215) = .32, p < .01$; for money $\rho(217) = .28, p < .01$).

Table 5: Correlation between physical activity and subjective values

	Interest	Importance	Utility	Cost	Effort
<i>rho</i>	.14*	.15*	.22**	.36**	-.25**
<i>df</i>	213	213	215	215	216

Note: * = significant at $p < .05$

** = significant at $p < .01$

Day Therapy attendees (the location with the highest percentage of inadequately active respondents at 33 percent) recorded the highest percentages of scores above the mid-point (score > 3) on the Likert scales for *interest*, *importance* and *utility* (85%, 100% and 93% respectively). Three was the mid-point between 1- Not at all important and 5 - Very important. That is to say, when asked, “How important is being able to participate in physical activity to you?” 100 percent of Day Therapy attendees who completed the survey recorded a Likert score indicating that it was important.

Interviewees, too, expressed awareness of the importance and utility of regular physical activity to them and its contribution to healthy ageing. They reported believing that being physically active made them feel better, led to a longer healthier life, kept their minds healthy and their limbs moving. As Cate (AA, 69 years) and her sister Lisa (IA, 73 years) stated emphatically, “You’ve got to move it or lose it!” Barb’s (AA, 81 years) description when asked “What do you think the benefits of being active are?” is indicative of the responses from all interviewees (adequately and inadequately active),

Oh my dear girl, if I didn’t I reckon I would just settle down in this chair and have books all round me. It just sort of keeps you living, and doing all those things is making you eat what you should and it is keeping you alive ... But I think if I did do

nothing it would take me down, you would let yourself go right down doing nothing and thinking, “Oh I can’t be bothered.” I think it makes life possibly longer for you.

Maintaining the ability to carry out activities of daily living through continued participation in physical activities was a common theme in interviews when people were asked about the importance of physical activity to them. This was typified by the aforementioned extract from Jack’s (AA, 73 years) interview. For Jack, who was recovering from a severe stroke, the ability to engage again in day to day activities such as walking and gardening was an important motivating force in his recovery.

Collectively, interviewees were able to identify the integral role that physical activity played in maintaining strength and promoting good health in later life, thus enabling them to continue to carry out their daily tasks. Further, interview findings reinforced the high mean survey scores for interest (3.8 ± 1.1), importance (4.2 ± 0.9) and utility (4.1 ± 1.0) of physical activity. These findings suggest that the older people in this study did understand the contribution that physical activity can make to health and wellness. However, although the survey participants and interviewees perceived physical activity as important, and were able to differentiate between exercise and physical activity, this did not always translate into adequate levels of activity with 19 percent of survey participants being deemed inadequately active. As Adam (AA, 77 years) commented, “I suspect that even when people hear that exercise can benefit them they think, ‘Well that doesn’t apply to me.’ [...] somewhere along the line you have to refine it into an action plan for yourself.”

Discovering the utility of physical activity coupled with understanding its importance may increase the likelihood of participants being active. As Irene (AA, 92 years) put it...

Well it, sometimes it [my hip] hurts a bit to start off but I am determined to keep going and it seems to improve a bit. As a matter of fact it’s worse lying in bed at night than what it is on the move. Some mornings it is nothing for me to get up at 5 o’clock, because if it is starting to be uncomfortable then I am better to be up and moving

around. And I have also had a fractured spine. I can manage the walking, I like to keep going, sometimes I start off and I wonder if I can keep going but I do and it improves really, the walking helps it after I get going. I am quite a determined person to do what I should do and what is right to do.

For Irene physical activity was both a way to stay fit enough to continue participation in daily activities and an effective method for relieving her hip pain. But as Irene noted, “Everyone is different. They all have their own special ways, the things they like to do and the things they don't like to do.”

The reasons given for ongoing participation in physical activities varied between interviewees but had the common overarching themes of being part of their daily routine and of being activities from which they derived pleasure. Being ‘exercise minded’, having a task orientation, and making exercise ‘part of the weekly routine’ provided interviewees with the motivation for ongoing participation. As Rachael (AA, 68 years) from Township A said, “I get quite excited about getting something achieved. I’m motivated by the task itself.” Jim (IA, 85 years) from Village A also felt that regular participation was beneficial and regular walking gave him time alone with his thoughts, “[Regular activity] makes you feel a bit better. I walk about 3.5 km before breakfast and when I can't do that I feel not as good. I do that every day. [...] I feel good when I get back, revitalised.”

For the purpose of comparison between activity level groups physical activity survey scores were divided into quartiles with the percentile breaks being 645, 1260 and 2610 MET.min.week⁻¹. Means and standard deviations for the Likert scale items for each quartile are displayed in Table 6.

Table 6: Subjective value means by physical activity quartile

Item	1st quartile (< 645) [‡]	2nd quartile (645 to 1260) [‡]	3rd quartile (1261 to 2610) [‡]	4th quartile (> 2610) [‡]
Interest	3.5 ± 1.1	3.9 ± 1.0	3.9 ± 1.0	4.0 ± 0.8
Importance	4.1 ± 1.0	4.2 ± 1.1	4.3 ± 0.9	4.4 ± 0.8
Utility	$3.7 \pm 1.0^*$	4.1 ± 1.0	4.2 ± 0.9	4.3 ± 0.7
Cost	2.0 ± 0.8	2.2 ± 0.8	2.2 ± 0.7	$2.8 \pm 0.9^{**}$
Effort	$3.3 \pm 1.2^{***}$	2.72 ± 1.2	2.7 ± 1.1	2.6 ± 1.1

Note: [‡] quartile ranges expressed in MET.min.week⁻¹

* = significantly less *utility* than quartiles 3 and 4 ($p < .01$)

** = significantly greater *cost* than quartiles 1, 2 and 3 ($p < .01$)

*** = significantly greater *effort* than quartiles 2, 3 and 4 ($p < .01$)

One-way ANOVA tests showed a significant difference amongst the quartiles on the *utility*, *cost* and *effort* scale items. LSD calculations showed that those in the lowest quartile perceived physical activity to be less *useful* than those in the upper two quartiles and they perceived physical activity to require significantly more *effort* than those in all the other quartiles. Additionally those in the upper quartile perceived participation in physical activity to *cost* more in terms of time and money than those in the lower three quartiles.

The lowest percentile in this analysis (<645 MET.min.week⁻¹) closely corresponds to the level used in this thesis to indicate adequate physical activity (> 630 MET.min.week⁻¹)

therefore this first quartile could be said to represent the inadequately active respondents.

There was a trend toward significance for *interest* in physical activity ($p = .06$) with respondents in the lowest quartile being less interested in physical activity than those in any other quartile.

Barriers

Health concerns

Inadequately active interviewees, who were selected because they reported less than 630 MET.min.week⁻¹ of activity, outlined very specific and individual barriers to their recent participation in physical activity in addition to the more general long term barriers which are reported next and which were common across both the adequately active and inadequately active interviewees. The barriers to activity described by the inadequately active group were all health related and included an acute respiratory infection, foot surgery, back surgery, heart surgery, gout, vascular dementia, lupus, caring for a very ill relative and nursing a partner with dementia. All of these health related barriers had precluded regular participation in physical activities. For inadequately active interviewees these barriers would increase the effort required to be physically active. The survey results supported this in that they showed that increased perceived *effort* was significantly associated with lower *interest* in and *utility* of physical activity to respondents (see Table 7).

Table 7: Correlation between perceived effort and remaining subjective variables

	Interest	Importance	Utility	Cost
<i>rho</i>	-.32**	-.13	-.29**	-.19**
<i>df</i>	212	212	214	214

Note: * = significant at $p < .05$

** = significant at $p < .01$

In interview Village A and Township A residents described a number of reasons for non-participation in physical activities, either for themselves or as they perceived for others. Health concerns, inexperience and a lack of time were the most commonly discussed barriers. In neither location were a lack of access to facilities and / or a lack of physical activity opportunities described as a barrier to participation. Conversely interviewees in both locations were able to describe numerous opportunities for being physically active that were available to them.

Joint problems were the most commonly mentioned barrier to increased physical activity; injuries or arthritis in hips, knees and backs, or the fear of injury to same. Bob's (AA, 71 years) comment was fairly indicative of the fears for self that were expressed, "table tennis used to be strong, but of course that is a fairly physical sport and I played a lot and then my hip got crook and that put me out of it and I don't think I would be brave enough to play it now. I would end up popping a hip and I really wouldn't want to do that." Mavis (AA, 74 years) too expressed fears about exercise and injury, "I played tennis but I have stopped that now because I think it is more important for me to be able to walk, I don't want to hurt my joints too much." Jane (IA, 79 years) felt that tennis might be associated with a fear of falling for some, "Some of them we know, or I know, have played tennis in the past and we have a

good tennis court but nobody is using it now because that it is a little bit too active for a lot of people and of course a lot of people are frightened they will fall.” Cath (AA, 69 years), on the other hand, had experienced the benefits of aqua aerobics following joint surgery and saw joint pain as a barrier that could be overcome, “See a lot of them have got a lot of things wrong with them that you don’t realise. A lot of them are having knee operations or hips or something. If they could just be encouraged to come [to aqua aerobics] after surgery, it is a help!”

Inexperience

A lack of proficiency or inexperience in an activity was also cited as a barrier to getting involved in the wide range of activities available to interviewees at both locations. When describing this barrier, interviewees used phrases such as, “making a fool of themselves”, “staying in their comfort zone” and “some never have done that and they won’t start now”. Bob (AA, 71 years) felt that for some older people there was a tendency to, “close their minds off as they age and stop thinking outside the square”. As Cath (AA, 69 years) at Village A said when speaking about her desire to join the Tai Chi class, “It is hard walking into something that they are already proficient at and you are coming in as a complete newcomer. Not knowing much about it except what you have seen on TV.” Croquet too was seen as presenting quite a daunting prospect to the inexperienced, as Paul (IA, 84 years) said, “There is nothing refined about it [croquet]. It certainly looks very refined. I think that’s why it is never on TV. Well if you don’t know the rules of course you’d be completely lost.”

Lack of time

Time emerged as a third major barrier to engaging in more physical activity. Village A interviewees talked of very active social lives, commitments to relatives, volunteering activities and participation in intellectual pursuits, as reasons for not being more physically active. As Carol (IA, 83 years) explained, “I’m a little freer because I haven’t got any family close by. [...] This makes me freer as others have obligations to family.” However, many of

the time commitments that interviewees felt kept them from overt physical activities involved being physically active. As Nell (AA, 80 years) explained, “I do try and walk and if I go anywhere to anyone in the village, or if I go over to the shop, I walk. If I am going over to [the local hardware store] for potting mix I couldn’t carry those back but normally I would walk”. Jane (IA, 79 years) often visited her sister outside of the village and would walk with her, “... just a short distance and walk back. Keep her active.” Formal and informal volunteer work such as cleaning and decorating the church for services, helping look after grandchildren and delivering meals on wheels all required the volunteer to be physically active and yet this was neither the overt aim of the volunteering activity nor the motivation for being involved.

Motivational Influences

When asked, “What motivates you to be active?” the main factor reported by interviewees at both locations was support and encouragement from enthusiastic others such as community workers, allied health professionals, active friends and family. Interviewees also reported that access to a range of physical activity programs and pursuits was important but went on to say that many of their local programs were under subscribed. Leadership emerged as a factor that greatly influenced the motivation of those attending these programs and organised activities.

Support & Encouragement

In both locations there was an apparent conflict between the survey findings about number of active friends and the emerging themes from interviews. The survey data indicated that in both locations where interviews were later conducted there was no significant correlation between physical activity level and the number of active friends (a significant positive association was found with number of physically active family members). However, during interviews participants consistently reported that friends and enthusiastic others were a major motivation for getting involved in activities. Mavis’ (AA, 74 years) response, when asked if she enjoyed the social side of activities, was a common theme,

Yes, very much. Oh I guess it just... enjoying people. I have decided that I like the classroom situation, I don't like doing things on my own; it took me a while to learn this. I'd start off doing something but I'd never carry it on, on my own. So I am much better off doing things with people, and yes I enjoy it, I enjoy being with them, it's interesting because you meet all sorts of people that are different but because you've got a common interest it is great meeting up with them.

Dolcia (IA, 78 years) too enjoyed the company of active friends,

[...] although I like my time by myself doing my own things, but yes I enjoy having the company. Yes I seem to have different groups of friends such as golf club friends, hospital auxiliary friends who are different again and singing ones and church although some of them double up.

Maude (IA, 80 years) described a new participant to their walking group,

The lady who lives up here three doors up, she is well in her 80s and very keen, and it has made a difference to her since she was widowed in that she is joining in absolutely everything. A couple of times she has walked further than she should have, and it worried us a bit. But she absolutely loved it and it has changed her around.

Maude expressed her view of social support for activity as,

Being surrounded by active people is a catalyst, isn't it? It is not an effort to get up and go for a walk with someone you enjoy being with, or going somewhere you like. People who enjoy company do seem to do more. [...] if you want to be out with people and someone says, 'come for a walk'. It is all a cycle, isn't it, one thing bounces off another.

Anecdotal evidence from the trained volunteers who helped to administer the surveys at the secondary study sites suggested that respondents tended to focus on the number of friends

who were no longer living when asked “How many of your friends participate in regular physical activity?”

Enthusiastic others were also a source of inspiration as Maude (IA, 80 years) from Township A indicated, “[I get encouragement] from Susan [social worker] or Steve [health worker] up at the hospital; yes. Steve is good, he sets a good example, he walks up and down, up and down to work.” The exercise instructor at Village A was also described as a source of motivation,

Our exercises on Monday are very good. An outside person [physiotherapist] comes and takes that and that’s the kind of person I think would have the energy to motivate people to do activities. [...] we are all very fond of her. And she keeps us going for an hour, but I think everybody enjoys it. You know it is not a hardship, not a hardship at all. [Adam (AA, 77 years)]

Other allied health workers were also serving as supporters of people’s changing physical activity behaviours and attitudes,

I have always walked. I was diagnosed with diabetes last year and I am controlling it without medication. That made me more aware of the walking and how important it was. That reinforced it. [That information] came from the Diabetes Association. [They said walking was important] just to keep your weight down and I have lost quite a bit of weight. It is an incentive to keep walking. [...] Yes, [walking was] part of it and watching what you eat. No chocolates and sweet treats and things like that. That [dietary] information came more from them [the Diabetes Association] than from the Doctor who referred me to the Diabetes Association. [Dolcia (IA, 78 years)]

Only one interviewee said that his decision to become more active was prompted by a consultation with his general practitioner.

Opportunities for Physical Activity

Interviewees at both locations could identify many opportunities available to them to be physically active, at times reeling off long lists of activities available in their area. In many cases this list was followed by an explanation that the interviewee was too busy with existing commitments to explore many of these options. Further, interviewees reported that many of the activities on offer in their respective communities, although being offered for free or at a small cost, were under subscribed.

At Village A, which was populated in 2003 and which has not seen a large turnover of residents to date, there was initially a large uptake of available activities at the complex. Over time the attendance at activities, in most cases, has dwindled to the point where some activities have ceased and others are threatened due to poor viability. This reduction in numbers is despite frequent announcements at residents' meetings and in the village's newsletter that groups are always looking for new members.

There was an initial policy at Village A that they would limit participation in activities to residents within the complex but this policy has been rescinded in an effort to keep some of the groups viable, such as Tai Chi and table tennis. The exception to declining numbers was the indoor bowls group which was run and promoted by Cath (AA, 69 years) whose approach was to invite people along for a cup of tea, a chat and perhaps a game of bowls if they felt like it. As Cath put it, "With indoor bowls we just keep asking people and saying what a good time we have and it doesn't matter if you haven't played before. Really it is by word of mouth and asking them to come along with me and give it a go and if it doesn't suit you at least you have tried." When asked if there was someone at Tai Chi who did a similar thing to try and draw new people in, Cath replied, "Not that I know of. Perhaps that is what they should be doing. I mean they have had pleas for people to go because the numbers are getting down and it might have folded." As discussed in greater depth in the following thesis

chapter this social approach to engaging people in activities may help to alleviate fears associated with lack of experience.

Bob (AA, 71 years) from Village A was concerned about the drop in physical activity level associated with entering a retirement village, brought about by no longer being required to tend gardens, wash windows or maintain the house. He felt that that was “a reasonable or big factor of reduction in physical activity of people that go into any retirement village”.

Survey results returning significantly lower physical activity levels for Village A residents than for Township A residents lend support to Bob’s assertion. Further, in interviews with Township A residents comments about house maintenance, gardens and the hours they spent tending them occurred with much higher frequency than with Village A residents. House and garden comments from Village A were more often focussed around the management policies dissuading residents from taking an active role in their care and maintenance. Village A’s interviewees also felt that being able to keep a pet (in particular a dog), which is not allowed under management policy, might boost activity levels at the complex. A common theme from the Township A interviews was the incentive for exercise provided by having a dog and taking it for walks.

Leadership

Leadership emerged as a recurring theme when support and encouragement for physical activity were discussed, with interviewees suggesting that the quality of leadership greatly influenced the level of engagement. One example of good leadership leading to enhanced participation came from the Day Therapy centre which had suffered low numbers for some years prior to the appointment of a new coordinator early in 2008. In interview after 15 months as centre coordinator Susie, a trained diversional therapist, outlined the problems Day Therapy faced when she took up the role:

We were only averaging around 11 people a day when I arrived. Mostly because it was not meeting their needs. [...] the clients’ needs had changed and we did not

move with the times. They were still coming in and then just sitting having a cup of tea, but nothing to inspire them, nothing to make them really want to come, they could do that at home. [...] Before it was medical. They were coming in here because they were old and the next step was into a nursing home. [...] it had a very bad reputation actually. And so we had to change their minds.

The centre now has more than 40 attendees each day and many people attended more than once a week. There were a high proportion of men attending day therapy and there appeared to be a high degree of camaraderie amongst attendees. The indoor bowls group was very popular and provided opportunities for social participation for attendees, many of whom were living alone.

Prior to Susie's arrival the atmosphere at Day Therapy had been very clinical with green walls and linoleum floors. The rooms were refurbished to create a more welcoming and homely environment. This redesign was followed by a survey of Day Therapy attendees and residents at the neighbouring independent retirement village (Village C) to find out what activities might attract them to the centre.

We surveyed most of the clients who were here and also did the village people which was a very big plus to us because they were the ones who were very picky. So that was enough to tell us that we were off the mark. Then we sat down and did a lot of brain storming and thought about how we are going to change it. A lot of hard work, some very hard work, to get to where we are now.

Staff at the Day Therapy centre maintained a very upbeat environment for attendees and encouraged them to participate in activities. There was a wide variety of activities available and many people attended the centre on multiple days each week. There is a whiteboard displaying activity starting times and the choice varies each day with bowls, crafts, painting, bingo, singing and scrabble forming the core activities. Lunch is included in the \$8 per day charge and there is also an optional lunchtime bus trips some days. There are guest

appearances in the afternoon from a variety of entertainers. Susie commented that most people are quite tired by the afternoon session so they do not schedule anything too active for this time slot. The environment at Day Therapy brought to mind an interview with a Township A resident in which he stated, “People, it is all to do with the people.” This was reinforced by Susie, who said of her staff,

They have to be [high energy people]. You’ve got to be because as you know they [attendees] can be very demanding. So it is a very demanding position to be in and you’ve got to be quite happy go lucky really. And you always have to have a smile on your face when they come in, that is the first thing they see.

The slogan on the Day Therapy promotional brochure is “Great Company! ...plus lots more” and this highlights the potential importance of social engagement in attracting people to the service.

The transformation achieved at Day Therapy has been responsible for a substantial increase in the number of clients accessing the service. As outlined in the previous paragraphs, changes to the population dynamics and expectations of attendees have driven this transformation. By polling and talking to members of the target population for Day Therapy the organisers were able to successfully change the environment, the activities and the culture of the centre to make it more attractive.

In contrast to Day Therapy, activities at the Township A hospital auxiliary were poorly attended and at times there were “more volunteers than clients” [Lisa (IA, 73 years)]. Interviewees attributed this poor attendance to demographic changes, bureaucratic red tape and poor leadership. As Lisa explained, “... it’s just that they died out, they moved away, they went as patients to hospital and no new ones came through. [...] No one new wants to come.” Part of the problem with low attendance numbers is that although the interviewees were in the target age range for activities they saw themselves as too young to wish to participate as recipients. As Barb (AA, 81 years) put it,

I suppose at my age that I should be there, but I feel more capable of doing more active things than sitting down doing bingo [...]. Yes, you see at my age my mother would have been going every week, but I wouldn't. I went, I've been with them but it didn't interest me because I thought that I wanted to do different things to that, so I thought –Well don't go if you feel like that.

Irene (AA, 92 years) said, "They have bingo and different things over there for people who are interested." But when asked if she had got involved in many of the activities she replied, "Well I haven't much yet because I seem to be busy with other things, going for a walk or writing letters [...]. Then I do quite a lot of visiting at the hospital."

Current and potential volunteers were also being put off by the amount of red tape, rules and paperwork that had become involved in the positions. As Mary (AA, 80 years) commented, "Some of the volunteers, they won't do the things these days because of too many rules and regulations. They have been doing it for 20 years without a police check, so why do they need one now?" Increasing amounts of paperwork are also proving a disincentive with meals on wheels volunteers now having to document arrival and departure times for each residence to whom they deliver.

Interviewees also reported that mealtimes at the hospital auxiliary have also changed. Whereas in the past the volunteers would cook the midday meal together it is now supplied by the hospital kitchen. New health rules have also put a stop to volunteers taking surplus vegetables and baked goods in for gatherings. The loss of this sharing of produce and participation in food preparation has led volunteers like Lisa (IA, 73 years) to remark that, "it is just not as fun as it used to be. [...] it has all changed, it is awful."

Poor leadership was specifically identified as an area contributing to low attendance at the centre and low volunteer morale. Rachael (AA, 68 years), who has a long history of volunteer work in another state, decided against continuing as a volunteer in Township A saying,

I went to an all day training day. Devastated about the way it was run. Devastated! But that's me, that's the background I come from. I've had lots of experience with volunteering and group work. What I think, forgive me for being so judgemental, I get excited about professionalism and when I deem it to be lacking I'm basically a waste of space in the group.

Mary (AA, 80 years) felt that, "They [the hospital auxiliary organisers] haven't got enough interest in it. They seem to have lost a lot of interest in it. [They] might organise a day but don't sort of follow up with interest in it sort of thing." Lisa (IA, 73 years) added, "And then other days [they] don't plan anything and we sit up there having a cup of tea, looking at each other and then it's –what does yous [sic] want to do?"

In contrast to falling numbers at the hospital auxiliary activities the Men's Shed was maintaining a strong membership. Men's Shed coordinator Ben's (AA, 71 years) comments on good leadership are particularly pertinent here,

Someone has always got to lead something, and that someone has the ability to make or break, and I really believe that that is it; you've got to have the spirit not to give up. [...] Crook leader; won't work! [...] so it is all about leadership, absolutely! [...] And if someone is enthusiastic ... You see it in the Men's Shed, what we are trying to do, and it is working, is that when you come in in the morning go and shake everybody's hand. Nothing effeminate in it, "Hey, how are you going? Haven't seen you in a week. Go and have a cup of tea, you don't have to do any work."

One feature of Township A that did appear to be positively contributing to higher activity levels was the support for physical activity that township residents received from the Township A Health and Community Service (TAHCS). Staff at the TAHCS organised walking groups, exercise classes, healthy eating programs and outings for township residents. Rachael (AA, 68 years) described the fitball classes offered at the TAHCS as "an absolute hoot", while Ben's (AA, 71 years) description of the front office staff was that they were

“welcoming and enthusiastic [...] as bright as buttons”. TAHCS staff maintained close links to the community and promoted their activities widely and enthusiastically through the centre, the local social worker and via regular newsletter mail outs.

Motivating Others

In contrast to the numerous comments made about the motivational effects of friends, family, activity leaders and allied health professionals, when asked “How would you encourage a friend to become more active?” interviewees at both locations expressed a lack of hope that they could influence another’s physical activity choices. As Adam (AA, 77 years) said, “I suspect that even when people hear that exercise can benefit them they think, ‘Well that doesn’t apply to me.’” This theme of hopelessness emerged consistently in interviews when the topic of how to help others to become more physically active was discussed.

This perception of being unsure how to influence the activity choices of others was furthered observed at Village A where three people were approached to be physical activity mentors at the complex as part of the original study design (a detailed discussion of the study design process is contained in the methods section). The subject was broached during interviews and while all were initially keen to be mentors, two withdrew their support shortly afterwards. The three prospective mentors were already involved as contact people for existing activities at Village A. They also expressed a belief in the benefits of being regularly physically active and that older people should be encouraged, or even compelled, to be active as a way to enhance their quality of life. As well as expressing doubts about their ability to motivate others both the participants who withdrew their expression of interest mentioned that they did not have enough time to commit to anything else, and also that they felt they were involved in enough things already. Concerns expressed by interviewees about their ability to promote participation to others, while still recognising the motivating effect of others on their own participation, suggested that the premise which prompted the original study design underestimated the complexity of factors involved in decisions to increase physical activity. A

more exploratory approach was indicated in order to better understand these factors before designing an intervention involving peer mentors to promote increased participation amongst community members. In the following discussion section factors which promote engagement are explored with a view to better understanding their underlying mechanisms and strategies that might be adopted by those promoting engagement are discussed.

In summary, the findings presented in this thesis indicated that a lower proportion of the survey population were inadequately physically active than would be predicted from the extant literature. Survey results also indicated that importance, interest and utility of physical activity were perceived to be high and that increased effort required to be active was associated with lower levels of activity. Specific barriers to physical activity were reported by interviewees to be health concerns, inexperience and a lack of time. The findings from activities at the hospital auxiliary, volunteering group, Men's shed and Day Therapy speak to the importance of leadership and social interaction in engaging older people in physical (or any) activities.

Chapter 5 Discussion

This discussion begins with the survey results which showed that overall physical activity levels in the study population were higher than reported in the extant literature and outlines possible reasons for this difference. This is followed by a comparison of physical activity levels between the survey sites and associations between activity levels and affective variables from the survey. Results from this mixed methods study also uncovered several specific barriers and motivators that influenced participants' physical activity decisions and behaviours which are discussed here in depth and used to create a revised version of the health action model. The interview findings revealed that social engagement worked to positively enhance perceived factors within the model and the chapter concludes with a discussion of theories of engagement that can be employed to encourage and support regular participation in physical activity. This study adds to the literature on active ageing by exploring and describing barriers and motivators to physical activity in a sample of older Tasmanians and identifies current engagement theories and psychological therapies that may be effective in addressing these barriers and enhancing motivation for regular participation.

Overall Physical Activity Levels

The percentage of inadequately active participants overall, and individually at five out of the six survey sites, was significantly lower than the 50 percent which has been widely reported in the literature for this age group (Armstrong, et al., 2000; Australian Bureau of Statistics, 2007b; Lim & Taylor, 2004). Two possible reasons for this difference exist, either: this sample of older Tasmanians was unrepresentative of the wider population; or that the tools and sampling methods used in other surveys failed to detect the contribution of significant physical activity. One reason for this sample being unrepresentative is respondent bias, with the more active people at each site completing the survey. Indeed, this may have been the case for the two initial study sites where only the more motivated and active appeared to

have responded; a view which was later supported by interview participants at these two sites who agreed that this may have been the case. However, higher return rates and an improved mode of survey administration at the subsequent study sites make it less likely that only the more physically active people at these sites completed the survey. Additionally, the only study site where the percentage of inadequately active people approached figures reported in the literature was Day Therapy. Day Therapy attendees, while still living independently in the community, were in many cases frail or approaching frailty. This makes the significantly lower than expected percentages of inadequately active respondents at all sites other than Day Therapy worthy of discussion.

It is more likely that national surveys may have missed significant activity because of:

- Differences in perceptions of intensity
- Exclusion of the contribution of some walking and activities of daily living
- Differences in the modes of survey delivery

Perceptions of Intensity

Differences between percentages of inadequately active older people reported in the literature and the findings reported in the present thesis could be due to respondents' perceptions of intensity of physical activity. According to Armstrong, Bauman and Davies (2000) intensity is the "self-perceived and self-reported intensity at which a respondent participated in physical activity" [pp. 54]. Further, these authors note that in order to obtain a health benefit that activities should be at, at least, of moderate intensity. They go on to state that brisk walking is an example of a moderate intensity physical activity. For older people with reduced functional capacity, joint problems and mobility issues this example of moderate intensity physical activity may be inappropriate. If indeed intensity is something that is self-perceived then providing an example of brisk walking, while being an appropriate representation of a moderate intensity activity for some in this age group, may represent

vigorous activity to others. Rather, a better definition of moderate activity may be those activities that raise the heart rate noticeably. Indeed, there is an Australian health initiative that describes activities that raise the heart rate noticeably as being moderate intensity activities (Commonwealth of Australia, 2009). For older people, activities that raise the heart rate may vary from just getting up out of a chair for some to vigorous walking for others. This view is supported by the latest ACSM guidelines on activity for older people where moderate activity is described as “a moderate level of effort relative to an individual’s aerobic fitness. [...] and produces noticeable increases in heart rate and breathing” [pp. 5] (American College of Sports Medicine & American Heart Association, 2007). It is also supported by Exercise & Sports Science Australia (Norton, Norton, & Sadgrove, 2010) in their recent position stand on intensity of exercise in which they use the following criteria to define activities of moderate intensity:

- Ranges from three to less than six METs
- Has a relative intensity between 55 and 70 percent of maximum heart rate
-estimated at between 87 and 111 beats per minute for a person aged 70 (Tanaka, Monahan, & Seals, 2001)
- Having a rating of perceived exertion (RPE) of between three and four (Borg, 1998)
- An aerobic activity that is able to be conducted whilst maintaining a conversation uninterrupted
- An intensity that can be sustained for between 30 and 60 minutes

Norton et al. give examples of moderate intensity activities as mopping, vacuuming, walking and low impact aerobics.

In surveys that attempt to quantify sufficient levels of activity these individual variations in the definition of moderate level activity need to be taken into account in order to obtain a clearer picture of the adequacy of older people’s physical activity behaviours. Another possible

reason for the difference in reported rates is the failure to take into account some walking (planned and incidental) and activities of daily living when calculating physical activity in national surveys.

Walking

Walking was the most prevalent physical activity reported in Australian population surveys (Australian Bureau of Statistics, 2003, 2007b; Australian Sports Commission, 2009).

However, some walking was discounted from physical activity calculations in national surveys which may provide a further explanation for the differences between the percentage of inadequately active older people reported in these surveys and in the present thesis.

Armstrong, Bauman and Davies (2000) identified walking as a specific activity that was carried out in several contexts such as for exercise, recreation, transport, or as part of work.

However, they stated that although some occupations, such as traffic warden, involved considerable amounts of walking there was insufficient evidence to assume that self-reported walking at work would provide population health benefits. To this end they did not include walking as part of work as contributing to overall physical activity. For older people who participate in volunteer work, and possibly still paid work, this would potentially discount a large contribution to their overall activity levels. In contrast to the assessment tool used by Armstrong et al., the Stanford 7-day recall questionnaire used in this study includes all walking done in its calculation of activity levels. Another common assessment tool the Physical Activity Scale for the Elderly (PASE) (Washburn, et al., 1999; Washburn, et al., 1993) also takes into account walking outside of the home and paid or unpaid work in its calculations of older people's activity levels.

Activities of Daily Living

Gardening and yard work were also commonly reported physical activities in both the surveys from the six study sites in the present thesis and in the Armstrong, Bauman and Davies (2000) survey. However, Armstrong et al. did not include these activities when

calculating activity levels as they felt that more information on these specific activities was required because it was unclear whether they contributed to achieving a 'sufficient' level of physical activity for health benefit. They stated that the energy expenditure associated with these tasks needed further validation for their use in population surveys. However, other researchers have looked at the contribution of household activities to energy expenditure (Gunn, et al., 2002) with the finding that "energy expenditure during self-paced moderate intensity walking and self-paced sweeping, window cleaning, vacuuming, and lawn mowing can be measured with reliability and precision" [pp. 901]. The Stanford 7-day recall questionnaire used in the present thesis does take into account household chores and gardening activities as does the PASE (Washburn, et al., 1999; Washburn, et al., 1993). One recommendation from the present thesis is that more appropriate and sensitive measures are needed to accurately quantify older people's physical activity levels.

Mode of Survey Delivery

Mode of survey delivery may also account for differences in reported percentages of insufficiently active older people. Mummery, Kolt, Schofield, and McLean (2007) employed a postal survey with a 3-stage postal follow up in their study. Their 26-page survey included a question about regular physical activity and they stated that "individuals were classed as being regularly active if they reported a minimum of 150 min of activity in at least 5 sessions, with the min[utes] of vigorous activity being weighted by a factor of 2" [pp. 413]. Without the prompting of an interviewer, as was provided in the Armstrong, Bauman and Davies (2000) survey and at the last four sites in this study, it is possible that older people would under-report their activity levels by disregarding some aspects of everyday life such as walking for transport and activities of daily living. In support of this, in a series of recommendations for future surveys to gauge physical activity levels in older people, Stephens, Jacobs and White (1985) stated that obtaining frequency, intensity and duration improved accuracy but required probing by interviewers to determine the actual amount of physical work done. They also noted that providing the respondent with a list of the activities of interest was essential

to ensure reporting of such important activities as walking, gardening, and dancing. In sum the differences between rates of inadequately active respondents reported in national surveys and those presented in this thesis may be explained by the an inappropriate definition of moderate intensity activities, discounting of some walking and activities of daily living, a lack of prompting and a lack of examples of activity intensities. These disparities suggest the need to develop a standardised tool for assessing older people's levels of physical activity. The results presented in the present thesis suggest that present methodologies for assessing older people's level of physical activity likely underestimate their level and may need to be revisited and / or revised.

Comparative Physical Activity Levels

Township A respondents were significantly more active than respondents at all other survey sites however there was no significant difference in age between Township A, Village A and Village D respondents. If age is not the reason for this difference in activity levels then other explanations must be sought. Village A residents had free access on-site to a range of activities including a swimming pool, tennis and croquet courts, indoor and outdoor bowls, table tennis, gymnasium and walking trails. It might have been expected that this access to free resources would enhance activity levels at this site but this was not the case and interview comments suggested that utilisation of these resources was low. This under-utilisation of available retirement home resources is supported by the findings of other researchers (M. Bernard, et al., 2007) and indicates that the provision of the infrastructure for physical activity does not necessarily led to increased activity levels. Ongoing support and encouragement for residents to engage in the available activities appears to be required.

Additionally, and in contrast to Township A residents, Village A's residents were not required to carry out home or garden maintenance and although research suggests that this is one of the initial attractions of this type of accommodation (Buys, 2001) the loss of these activities

of daily living may be one element that contributed to their lower physical activity levels.

Village A's residents were actively dissuaded by management from maintaining their own gardens and were not allowed to keep pets. Conversely, township residents ageing in place had gardens to tend and house maintenance tasks to carry out and these tasks were mentioned in interview with township residents as a source of regular physical activity.

Unlike Village A, at Village D residents are allowed to maintain their own gardens and may also keep pets. So for Village D residents these two activities would contribute to their overall activity levels. As Township A and Village D residents were both maintaining their homes and able to keep pets it is necessary to look at other differences between Township A, Village A and Village D residents that might aid to the explanation of the observed differences in physical activity levels.

Differences in activity levels may also be accounted for by the fact that Township A residents live within walking distance of shops and services, indicating that walking for transport could be a contributor to activity levels. However, Village A and Village D are both located in outlying areas away from major shops and services, necessitating a car journey to access these facilities. Further, visiting friends within a retirement village requires only a short walk whereas around Township A walking distances for the purpose of visits are longer but still achievable. This suggestion, that Township A residents often walked for transport, was supported by interview data gathered.

Ageing in place, as is the case with Township A residents, may also provide the benefit of maintaining ongoing links within the community to activities and organisations such as the bowls and golf clubs. This continuity of involvement may not be possible for residents relocating to a retirement village because of the extra travelling distance required to maintain links with their old neighbourhoods. If new, more local, links are not established then activity levels might be expected to fall as the result of residents' relocation. There is research to suggest that an individual's level of community involvement is positively associated with

health and wellbeing (Veenstra, et al., 2005) and that greater community wide social capital has a modest protective effect on obesity and physical inactivity levels (Kim, Subramanian, Gortmaker, & Kawachi, 2006). Community ties and social capital are variables that are built up over time and for those who relocate later in life it may be more difficult to maintain or recreate these connections leading to a decrease in associated activity levels.

Physical Activity Associations

There was a significant association between older age and lower physical activity levels. This is not an unexpected finding because with increasing age comes lower physical capacity and increasing barriers to activity through illness and injury. However, Hebert (1997) makes the point that functional decline (which in an autonomous population over 75 he reported to be about 12 percent per year) is a dynamic process amenable to improvement through intervention. Hebert notes further “that the traditional defeatist attitude toward this condition is unjustified” [pp. 1041]. Hebert’s observation that functional decline is not inevitable is supported by findings reported in the present thesis that 67 percent of those over the age of 80 were exceeding minimum physical activity level guidelines, with the mean score for this age group equivalent in activity level to approximately 8 hours walking per week.

Significant positive associations were observed between physical activity levels and interest, importance and utility of physical activity albeit with small effect sizes. This too appears to be a self-evident finding, that being interested in activity, thinking that it was important and finding it useful would result in higher levels of physical activity. What is interesting is that Day Therapy attendees, the least physically active group, recorded the greatest percentage of positive scores on the interest, importance and utility scales. This suggests that while this group was experiencing a dwindling capacity to be active that this decline was possibly leading to a greater appreciation of what they were in the process of losing.

There was also a significant positive association between physical activity levels and the cost of being active. This seemingly counterintuitive finding came from the subjective scale item cost which was made up of two questions asking about the cost of being active in terms of time and money; individually higher costs in both time and money were significantly associated with higher levels of physical activity. A potential reason for this finding is that a respondent with a higher level of physical activity would likely spend more time in activities contributing to the overall cost scale. For Township A respondents, who reported significantly higher costs associated with being active than respondents at the other sites, later interview analysis revealed that this time was spent in the garden, walking for health and transport, and participating in organised activities such as bowls and golf. Further, participation in organised activities usually incurs a monetary cost through affiliations with clubs such as the golf club, indoor and outdoor bowls, health centre activities and swimming pool entry. The more active a respondent in these organised pursuits the higher the cost they would incur and the more aware they would be of the costs involved.

There was a negative association between physical activity level and amount of perceived effort required to be active. This affective variable had two parts, how much effort does it take and how difficult is it for you to participate in regular physical activity? The more effort required and the higher the difficulty the lower the likelihood of engaging in physical activity. Greater effort was also significantly associated with lower interest in and perceived utility of physical activity. Further, respondents in the lowest physical activity quartile (sedentary respondents) reported that physical activity was less useful and required significantly greater effort than respondents in other quartiles. There was also a trend towards these respondents having significantly less interest in physical activity although they reported that for them physical activity was as important as respondents in other quartiles. For sedentary older people, this perceived effort represents a significant barrier to increasing their levels of physical activity and appears to influence the way they think about activity, although they still report a belief in its importance. Perceptions of effort and utility are amenable to change and

several interview participants in this study described strategies they used to overcome barriers to physical activity. It is likely that older people in this lowest quartile have physical restrictions that would need to be taken into consideration when designing activities. Gentle activity that emphasised enjoyment and participation may help to overcome negative perceptions of physical activity. Later in this discussion theories and therapies are discussed which may assist older people to move past these negative perceptions and engage in physical activity. Research in an educational setting has found that increasing the perceived value of a course leads to deeper learning strategies and greater engagement by students (Floyd, Harrington, & Santiago, 2009). Similarly, and based on the findings presented here, it could be hypothesised that for older adults increasing the perceived utility of physical activity could lead to greater engagement.

Having a number of active family members was significantly associated with higher activity levels but having active friends was not. There are two possibilities here; that active older people encouraged their offspring to be active when young and they have continued to follow their parents' example, or that family members who are active might be encouraging their older relatives to continue their engagement in activities. When completing the survey face to face many participants commented that the size of their friendship groups were declining markedly due to death and this focusing on a dwindling friendship group may also help to explain why there was no significant association found between the number of active friends and physical activity levels.

In sum, although increasing age was associated with a decline in physical activity levels in this sample of older Tasmanians their interest in activity, its importance and utility to them remained high and was positively associated with activity levels. Being more active appeared to incur more monetary costs and a greater investment of time, while a higher perceived effort required to be active was associated with both lower physical activity levels and lower perceived utility of that physical activity. Having a greater number of active family

members also appeared to support higher levels of activity although the mechanisms of this association were unclear.

Engaging Older People in Physical Activity

Older people's physical activity behaviours are influenced by a range of external and internal factors as depicted in the health action model used by Browning et al. (2009) (Figure 3 in the literature section). It could be predicted that a change in the direction and / or magnitude of one or a combination of these factors will result in a change in physical activity behaviours. Each of the areas in the health action model was spoken of by participants interviewed for the present thesis and the model in its present form is partially supported by these interview findings and represents a good starting point for a discussion of the factors involved in older people's physical activity behaviours. Work in the present thesis seeks to expand and modify the model as a first step toward a better understanding of the factors involved however it is likely that there are strong interactional effects between these factors that will need to be explored in the process of developing a robust model.

Discussion in the following sections is structured around the elements that will be used to develop a revised health action model. Under discussion will be older people's perceptions of the importance of physical activity, barriers to their participation and, importantly, perceptions of what motivates them to be involved in regular physical activity.

Perceptions of Importance

Interviewees in this study were able to articulate the perceived importance of physical activity in their daily lives. They described physical activity as playing an integral role in maintaining strength and promoting good health; enabling them to continue to carry out their activities of daily living. These interview findings were supported by the survey results where importance, utility and value of physical activity were rated highly and positively associated with greater participation in physical activity. However, for some, this belief in importance did

not appear to translate into adequate levels of activity with the least active quartile of respondents also reporting a high mean importance score that was not significantly different from the scores for the other quartiles. This quantitative finding was supported by comments from inadequately active interviewees who also often spoke of the importance of physical activity. A phenomenon known as cognitive dissonance may explain some of this disparity between knowledge and action. *Cognitive dissonance* can be defined as the uncomfortable tension which comes from holding two conflicting points of view in the mind at the same time (Straker, 2008). Therefore, for some people, it is possible to believe in the importance and efficacy of physical activity in maintaining good health while at the same time choosing not to participate in adequate levels of activity to achieve these health benefits. Support for this finding comes from a study that found that 64 percent of their survey participants who rated physical inactivity as a very important health risk factor did not meet minimal ACSM guidelines for physical activity (Martin, Morrow, Jackson, & Dunn, 2000). So it would seem that while rating physical activity as important is obviously a positive start it is often not enough to promote behaviour change. This ambivalence (feeling two ways about something) toward regular participation in physical activity provides a point from which a discussion about behaviour change might begin. Techniques such as motivational interviewing aim to resolve ambivalence by supporting feelings of importance and allowing the client to explore their motivations to translate these feelings into action. In effect the practitioner is assisting the client to move themselves from pre-contemplation through contemplation to the preparation and action stages in the transtheoretical model (Norcross, et al., 2011). Therefore, when investigating ways of helping older people to become more active it is necessary not only to demonstrate the importance of being active but also to assist people to explore their feelings of ambivalence towards physical activity. In the next sections the discussion focuses on barriers to, and motivations for, engaging in regular physical activity. It is reasonable to assume that overcoming barriers and maximising motivations coupled with the high perceptions of importance reported by participants in the study for this thesis would facilitate increased regular participation.

Barriers to Physical Activity

Health problems (predominantly arthritis and joint injuries), inexperience and a lack of time emerged from interviews as the main barriers preventing respondents from being more physically active. Two of these barriers, health problems and lack of time, have also been reported as significant barriers to further physical activity in large population surveys (Australian Bureau of Statistics, 2007b; M. Booth, et al., 2002; M. Booth, et al., 1997; Lim & Taylor, 2004). However the third barrier, inexperience, does not appear as an independent barrier in these population surveys but may be a sub-component of other significant barriers identified such as 'being too old' or 'not being the sporty type'. Each of these barriers is discussed in detail in the following sections framed by what is already known from the literature.

Health Problems

Interviewees identified pre-existing injuries and arthritic conditions, as well as a fear of potential injury, as significant barriers to them becoming more involved in physical activities. Worse, these fears had led many to curtail existing activities that they perceived to be risky, while others expressed reluctance to try new activities of unknown demand and risk. O'Brien Cousins (2000) described similar findings in her study of older women where the women's beliefs about the risks of activity were 'strong, anatomically specific and sometimes sensational in description' [pp. 283]. To cover their feelings of physical vulnerability and their uncertainty of the actual risks involved in the activity, the women reported medical reasons why they should be excused from the activity.

Other research also illustrates how attitudinal factors such as fear of injury and a belief in the inevitability of functional decline with age can limit an older person's engagement in physical activities (Lachman & Jette, 1997; L. Lee, Arthur, & Avis, 2008). Lachman and Jette said that the beliefs older people hold about the costs and benefits of later life activity can influence their activity level. They go on to say that motivation may be lowered 'because it is

assumed that the activity will do more harm than good' [pp.252]. In part this assertion is supported by interviewees' comments in the present thesis in that they avoided involvement in perceived risky activities. However, the majority maintained a strong belief in the efficacy of physical activity in maintaining functional capacity and general health. Among the survey participants, too, even those deemed to be inadequately physically active displayed an interest in physical activity and expressed beliefs in the importance of it in their daily lives. Crombie et al. (2004) reported a similar finding in their study of 409 Scottish residents over 65 years of age, saying that 95 percent of their participants believed that physical activity was beneficial to their health, despite the fact that 53% were deemed to be inadequately active. Physical symptoms (shortness of breath, lack of energy, painful joints) came high on the list of deterrents to physical activity in the Crombie et al. study; 27 percent of respondents reported suffering painful joints on most days or every day. These researchers suggested that those suffering osteoarthritis may need reassurance that physical activity is beneficial and may relieve some of their symptoms. Indeed, this is what several interview participants in the study for the present thesis were able to do; to participate in physical activity despite initial joint pain with a resultant reduction in painful symptoms. This ability to deal with initial discomfort and continue to participate will be discussed in depth in the section on overcoming barriers.

What is interesting about the findings presented in this thesis is that they challenge previously reported misconceptions that older people who limit their activities due to health problems or a fear of injury may also begin to discount the personal relevance and importance of being physically active (Campbell, et al., 2001; L. Lee, et al., 2008). One reason that this may not be the case for the older Tasmanians in this study is that they are more aware of the public health promotion messages about the benefits of physical activity in later life; and, if concerns about health risks can be allayed we may observe a resultant increase in regular participation.

Inexperience (Fear of Failure)

From the interviews it became clear that inexperience was a factor in the low participant numbers at some Village A activities such as Tai Chi, croquet and outdoor bowls.

Participants in the Tai Chi class had been attending for many years and were very skilled.

There was a reported reluctance amongst other interviewees to take up the practice of Tai Chi due to their inexperience even though they found the idea of doing Tai Chi very appealing. They expressed concerns about appearing incompetent, unskilled and foolish.

This was also the case for outdoor bowls and croquet where there was a core group of very skilled participants who played competitively. Again, some residents found the idea of playing croquet appealing and felt that they could handle the physical intensity of the sport; however their interest waned after attendance at open days on the croquet lawn where they observed the skill level of current players.

Similar concerns about being inexperienced and appearing foolish have been expressed by older people in other studies. Crombie et al. (2004) reported that not being a current group member, being embarrassed to join a group and a reluctance to meet new people all had a significant effect on older people's physical activity levels. In a review of the qualitative literature Allender, Cowburn and Foster (2006) found that, for adults and older adults, anxiety and a lack of confidence in new settings was a major barrier to participation in physical activity. This reported reluctance to take up new activities or as Bob (AA, 71 years) put it, "to stop thinking outside the square", poses a potential stumbling block to engaging older people in healthy physical activities, particularly if they have had limited experience of activities during their lives (Rhodes, et al., 1999). Further, 'not being the sporty type' was equal first in perceived barriers to physical activity for European Union survey participants aged 55 plus, on a par with 'being too old' at 22 percent of responses each. Australian survey results have also returned being 'too old' and 'not the sporty type' as significant reasons why participants were not more physically active (Australian Bureau of Statistics, 2007b; M. Booth, et al., 2002; M. Booth, et al., 1997). Not being the sporty type could

certainly be interpreted as not having the prerequisite skills to participate successfully; as Rhodes et al. reported “one of the most important factors associated with future behaviour is past behaviour” [pp. 400]. Similarly, describing oneself as ‘being too old’ to take up or maintain regular participation in physical activity may cover a multitude of barriers including health problems and feelings of incompetence.

Researchers suggest that underlying interviewees expressed concerns about appearing incompetent, foolish and unskilled was an unvoiced desire to avoid failure (Conroy & Elliot, 2004; Kaye, Conroy, & Fifer, 2008). As far back as 1938 psychologist Henry Murray identified this need to avoid failure, or fear of failure, as an energising agent for human behaviour (Murray, 2008); Murray coined the term *infavoidance* which he described as, “To avoid failure, shame, humiliation, ridicule. To refrain from attempting to do something that is beyond one’s powers” [pp.81]. This fear of failure, like the fear of being injured or in pain, would likely need to be overcome in order to initiate and maintain regular participation in physical activity.

Fear Development

Health problems and inexperience both limit participation in physical activity because of fear; a fear of injury or a fear of failure (appearing foolish, incompetent, losing face). It follows that a reduction in fears may lead to an increase in participation. But before looking at ways to reduce fears it is necessary to understand the nature of fear and how fears develop.

Fear means ‘to be afraid of’, ‘to expect with alarm’ (“fear,” 2010). Fear can be both beneficial and restrictive; it is a matter of the form that the fear takes. A degree of functional fear prevents us from engaging in activities likely to damage our health, but maladaptive fears can prevent us from engaging in activities that may be enjoyable, health-giving and that represent minimal true risk (Poulton & Menzies, 2002). Functional, and some may say rational, fear prevents most people from attempting feats such as base jumping, swimming out of their depth and high rise parkour (Australian Parkour Association, 2008). However,

maladaptive fears such as an undue fear of injury or a fear of failure can limit involvement in activities with the degree of limitation being dependent upon the strength of the fear.

Rachman (1977) suggests that maladaptive fears can be acquired via three different pathways: conditioning, vicarious exposures and by the transmission of information. Further he states that no direct contact with the fear stimulus is required in the vicarious and informational transmission pathways. In a community of older people who are experiencing, personally and vicariously, a range of functional health problems these last two pathways may be very important in the way that fears about physical activities develop around activities perceived to be risky. Indeed, the interview data collected for the present thesis supports Rachman's view in that several interviewees did limit their physical activities due to fear of injury merely through the observation of, or discussions about, other community members who were experiencing injury pain.

Fear of failure is a more complex construct than the more specific fear of injury; and while fear of failure can be acquired via the same three pathways, there is the added complexity that fear of failure also depends upon the demands of the environment within which the task is being performed (Conroy, 2003). However, as Conroy notes, it is not failing itself that is feared but the consequences of failing. In his hierarchical, multidimensional model Conroy lists these adverse consequences as; "shame and embarrassment, devaluing one's self-estimate, having an uncertain future, having important others lose interest, and upsetting important others" [pp. 759]. According to Zeidner (1998) these fears emerge from childhood experiences and biological constitution (conditioning), social and learning experiences (vicarious exposure), and the instructional environment (information transmission). In addition, the structure of the performance environment and its effect on performers' goals also impact on the emergence of fear of failure. Stratagems for overcoming fears are discussed in the upcoming thesis section on overcoming barriers.

Lack of Time

In a similar fashion to being 'too old' to be more physically active, 'lack of time' too may cover for a multitude of barriers to physical activity, as well as being a literal barrier. Or, as one group of researchers put it, "although lack of time is often given as a reason for not exercising, this can represent a true barrier, a perceived barrier, a lack of time management skills, or merely an excuse" [pp. 640] (I. M. Lee, Sesso, Oguma, & Paffenbarger, 2004).

For some interviewees in the current study, it appeared that lack of time represented a true barrier to increased participation. However, these busy participants described being involved in a variety of activities many of which involved a large physical activity component, such as cleaning the local church, volunteering in the nursing home laundry or assisting more frail community / family members with shopping and housework. For these older people they apparently did have little time left to do additional physical activities. But, given the level of energy expenditure involved in their current activities, they appeared to be already meeting physical activity guidelines. Further, by being involved with community activities that included incidental physical activity they were staying engaged and improving their social capital. This, of course, offers a powerful and acknowledged path for engaging older people in physical activity. This concept of engaging older people in overt social activities with the covert benefit of increasing their physical activity levels is discussed in more depth in the section on motivational themes.

If lack of time is not a true barrier then it may reflect a failure to structure available time; more a case of not making time than not having enough time available. This failure to make time may come from placing a low importance on physical activity and therefore not ranking activities highly enough to spend time on. However, survey and interview data suggested that this was not the case, with high importance ratings being observed across all quartiles of activity level. Research tells us that the ability to structure available time varies from one person to another. For example in one study, adolescents involved in productive sedentary

behaviours such as studying were better able to make time for physical activity than those involved in less productive sedentary activities such as television watching. Therefore, because some students could 'do it all' (productive sedentary leisure pastimes and physical activity), the authors suggested that a true lack of time was more a perceived barrier or an excuse (Feldman, Barnett, Shrier, Rossignol, & Abenhaim, 2003). Alternately, while some older people may still perceive physical activity as important they may not prioritise it ahead of other activities and pursuits. For inadequately active older people wishing to overcome lack of time as a barrier to physical activity would require clarification of whether the barrier is a true lack of time, a lack of time management skills, a failure to prioritise or an excuse which masks other barriers such as health fears or a fear of failure.

Overcoming Barriers

Health Problems

Those interviewees who were able to put health concerns 'to one side' and continue to participate in appropriate activities felt that these activities were beneficial to their overall health. Moreover, continued participation in physical activity led to a reduction in symptoms for some. To do this required interviewees to acknowledge and accept these health concerns while at the same time exploring alternate ways of behaving within these limitations. In essence this is what some interviewees were able to do when they described 'getting on' with activities despite bodily discomfort from injuries or arthritis. This approach to remaining physically active is supported by literature references that state that the health benefits for older people of low to moderate intensity activity far outweigh the health risks associated with that activity (American College of Sports Medicine & American Heart Association, 2007; Cress, et al., 2006). Cress and colleagues go as far as to say that for asymptomatic older people a low intensity exercise program can go ahead regardless of whether they have had a recent medical evaluation.

Comments from interviewees and reports in the literature suggest that participation in physical activity need not be limited by perceptions of level of disability due to injury or illness. Further, perceived health and functional status shows a greater association with physical activity behaviours than actual health and functional status (Browning, et al., 2009). There is evidence that even a short term exercise theory and practice intervention was sufficient to alter perceptions that physical activity ‘might damage health’ and ‘was not enjoyable’ (L. Rowland, et al., 1994). It is also possible to structure low intensity activities that take into account physical limitations and deliver health benefits to participants. The difficulty in engaging participants in these activities is in overcoming their negative health perceptions and fears.

Overcoming Health Fears

Work in the area of overcoming fears is not new; in pertinent research from the 1930s the author describes her method for overcoming fear of the dark in young children as “helping and encouraging the child to learn various ways of coping actively with the fear situation” [pp. 10] (Holmes, 1936). Holmes’ method required that the child be an active participant in the procedure and she noted that the factors within the child himself supplied the tools to overcome his fears. Holmes’ employed a combination of verbal encouragement, physical support, modelling and reward. From the results of Holmes’ experiments it appears that fears which can be acquired via conditioning, vicarious exposure and the transmission of information (Rachman, 1977) can also be overcome via these same pathways.

Social interaction and participation in physical activity for the sake of enjoyment provide each of the elements that Holmes (1936) employed in her study and these link well to the pathways described by Rachman (1977). There is the transmission of information from other participants through verbal encouragement and physical support. There is also the vicarious exposure to the safety of the activity modelled by others of a similar age, health status and ability level. Finally there is the conditioning of new responses linking thoughts about

physical activity with the reward of participation, fun and achievement rather than with fears of injury or illness.

Published recommendations for encouraging older people's participation in physical activity also describe behavioural factors as being closely associated with initiating and maintaining behaviour (Cress, et al., 2006). The use of positive reinforcement, feedback, active choices and social support are all recommended and would aid in overcoming health fears by the pathways previously described. However, the setting within which these factors were implemented in the Cress et al. study was overtly health professional / exercise class oriented. Based on comments made by interviewees in this study, a more realistic, workable and effective setting is to take these factors out into communities and invest in their implementation there. This is because visiting a health professional or attending an exercise class is an artificial construct based on the medical model; a waiting stance is assumed (King, 2001). The motivation required to attend potentially limits the number of people accessing the facility to those with high initial motivation for physical activity and lower levels of fear about participating in the program. If the aim is to increase participation amongst less active, less motivated and more fearful older people then the activity needs to come to them and be presented, by community members or activity leaders, as something from which they can safely gain enjoyment and fulfilment.

Overcoming Fear of Failure

One way to overcome a fear of failure is to not participate in activities and some interviewees were using this effective strategy to avoid the negative feelings associated with not being skilled at the activity. Research data suggests that a fear of failure is antecedent to the motivational style that people will employ and that fear of failure is positively associated with avoidance strategies rather than approach strategies (Conroy & Elliot, 2004). That is to say, the greater the fear of failure the more likely it is that a person will be motivated to avoid the

negative consequences of the activity rather than approach the activity with a view to the potential positive outcomes. According to Elliot (2006) [pp.115],

...avoidance motivation is designed to facilitate surviving, whereas approach motivation is designed to facilitate thriving. Individuals often utilise survival mode even when danger is not imminent, thereby missing positive opportunities for development and growth. Importantly, the over-utilisation of avoidance motivation not only leads to missed opportunities, but it also, in self-fulfilling fashion, often produces the very negative outcomes that it is designed to avoid.

It follows that interventions or leadership styles that work to reduce older people's fear of failure with regard to physical activities will improve the chances of approach rather than avoidance motivations being employed. But as fear of failure is of itself a nebulous concept it would be more effective to address the component parts of fear of failure; embarrassment, devaluing of self-estimate, having an uncertain future, the loss of important others' interest, and upsetting important others (Conroy, 2003). In the following section on motivational themes it can be seen that charismatic leadership, fun and social engagement positively impact on these component parts of fear of failure. Charismatic leadership, in particular, has the potential to allow older people to experience the arousal of novel situations with feelings of enjoyment rather than anxiety.

Motivational Themes

Major motivational themes that emerged from transcript analyses were the impact that building strong relationships with enthusiastic others and active people had on the physical activity choices of older people. Respondents also felt that having fun and being fully engaged in the activity greatly enhanced their motivation to continue.

Social Support

Social support for activity emerged as an important moderator of participation. Exemplars from this study would be the fit ball class being described as a 'hoot' because of the presence of upbeat individuals; and, the welcoming, all inclusive atmosphere created at the indoor bowling where the emphasis was on participation and friendship. These findings are supported by the work of McAuley et al. (2003) who reported that the extent to which an exercise experience is perceived as pleasant is influenced by the level of social support associated with the activity. Specifically these authors found that,

[...] participants who exercised more frequently during the 6-month structured program had higher levels of social support and had a more positive exercise experience. In turn, these social, behavioural, and affective factors enhanced self-efficacy at program end, resulting in higher levels of exercise participation at 6- and 18-month follow-up [pp. 115-116].

People who lead activities and the relationships they build with their participants play a major role in establishing and maintaining physical activity behaviours. Interview participants often described the motivating influence of happy and enthusiastic activity leaders and health centre staff. The Day Therapy coordinator supported these views with her comment that all her staff had to be very 'up', very positive in their roles in order to engage and motivate their clients. The importance of this person-centred approach is supported by Wilson and Davies (2009) who reported that in a long term care environment it was found that using a resident- or relationship-centred approach resulted in better quality interactions with residents and their families than using a task-centred approach.

Fun and Engagement

Having fun and being fully engaged in activities enhanced participants' motivation to be involved. Interviewees also reported that social interaction and participation for the sake of enjoyment also helped to overcome the fears associated with inexperience. At first glance it

appears to be a banal statement, of course people want to have fun and be engaged.

However, fun is a multidimensional concept with underlying component parts, each of which can be enhanced to maximise engagement.

According to Read et al. (2002) fun has three component parts; durability, expectation and engagement. Maximising the fun associated with an activity greatly increases the likelihood that the activity will be repeated. This occurs when there is an enduring memory of the experience because it has been enjoyable, when performance expectations have been met (by matching ability with the skill level required for success) and when the atmosphere has allowed for total engagement with the activity.

Where fun is emphasised and the goal is participation rather than performance expected outcomes could be social interaction, feelings of well-being and enjoyment of the experience for its own sake. This was the case with indoor bowls, one of the few Village A activities with increasing attendance numbers. The coordinator at this activity stressed the importance of the social aspect over the skill aspect, encouraging new people to come along for a cup of tea and a bit of fun and maybe a game of bowls. At Day Therapy too, the emphasis was on participation by all in the available activities regardless of skill level.

Participants at indoor bowls, Day Therapy sessions and the Township A fitball classes were engaging in adult play (Apter & Kerr, 1991; Kerr & Apter, 1991). As such they were enjoying the activity for its own sake and were able to be spontaneous without regard to fear of failure. Adult play and other theories that might be used to promote engagement will be discussed in the coming sections of the present thesis.

To summarise, if the aim is to engage older people in physical activities then this will require understanding and incorporating into activities those factors that we know to contribute to promoting engagement. As much care and planning needs to go into the design and delivery of activities for older people as for any other age group. The findings from this research

suggest that emphasising fun, participation and social engagement are all likely to contribute to enhancing activity levels.

The Importance of Social Engagement

“People like people” said Ben (AA, 71 years) in interview, “even if a person just sees one other person in a day, that person is important to them.” Throughout the interviews conducted for this thesis interviewees returned again and again to the importance of human interaction in their day to day activities. It provided the motivation to get up and start the day, to continue attendance on committees and at voluntary organisations and to ‘have a go’ at a new activity. For older people, whose social networks tend to contract as they age due to death, relocation or decreased physical capacity, the power of this need for engagement with others and the opportunities for activity that may flow from that engagement cannot be overlooked.

Simplistically, this need for human company could be defined as a basic human trait. This trait is evident because *Homo sapiens* are a gregarious species; we congregate together in both temporary and permanent groups that allow for cooperative interactions (Birtchnell, 1993). This evolutionary interdependence and aggregation has served us well as it has provided us with increased chances of sexual reproduction, greater ability to locate food and protection from predators. It has also allowed us to develop as an empathic species, able to understand the primacy of connectedness (Birtchnell, 1993; de Waal, 2006).

Neurogenetics is also making significant inroads into a molecular understanding of social behaviour through the study of the neuropeptides oxytocin and vasopressin (Donaldson & Young, 2008). Oxytocin, a hormone primarily associated with its peripheral action in childbirth and lactation, also exerts a central influence on areas of the brain associated with bonding and social interaction (H. Lee, Macbeth, Pagani, & Young, 2009). Researchers postulate that genetic variations in the central receptors for both oxytocin and vasopressin may underlie the range of observed social behaviours within a species (Donaldson & Young,

2008). Additionally, differences in the expression of oxytocin in response to positive and negative emotional experiences have been associated with the incidence of relationship difficulties and social boundary setting in women (Turner, Altemus, Enos, Cooper, & McGuinness, 1999).

The biological definition of man as a gregarious species seeking engagement with others as a means of protection and knowledge sharing better supports Ben's (AA, 71 years) statement about people liking people than sociological views such as Coleman's (1990) where actors within social systems engage in transactions with one another over their interest in resources they wish to control. This view depicts man as essentially selfish and driven by the need to gain for oneself through the manipulation of others rather than seeking nurturing interactions through the giving and receiving of love. Indeed, advances in neurogenetics are taking us closer to being able to provide a scientific explanation for Maslow's (1943) lower level "love needs"; the longing that a person feels for belonging and connectedness with others.

Within communities hoping to increase the physical activity levels of its older citizens this need for connectedness must not be ignored and, more importantly, may become a powerful motivator for behaviour change. In her research work on informal community learning in country Victoria, Australia, Phoenix de Carteret (2008) suggests that "social dances and local markets are examples of resilient practices of place making and community that involve active participation" [pp. 502]. And although de Carteret's work is in community education her assertion that, "even with recognition of the importance of informal learning to the development of social capital and community sustainability, attention has remained largely on settings where education and learning are overtly part of the agenda" [pp. 503], could also be applied to physical activity. Much of the research in the area of older people's physical activity behaviours has been into overt activity and tended to discount that activity which is incidental to other community involvement. With reference to the findings section of this thesis, much of the activity that contributed to the overall activity levels of older people

surveyed was incidental, walking for transport, gardening and being involved in community activities. Where those community activities were being stifled, particularly by bureaucracy (as was the case with the hospital auxiliary), participation was on the wane. However where participation was being nurtured and made easily accessible, such as at Day Therapy and at Village A's indoor bowls, the groups were thriving.

Revising the Health Action Model

The findings reported in the present thesis support and expand upon the factors presented in the health action model used by Browning et al. (2009). A revision of the model's structure, coupled with a more detailed exploration of the areas covered by the health action model, has the potential to more comprehensively describe the factors that impact upon older people's physical activity behaviours. A revised version of the health action model follows (Figure 5) which better models the findings and associations reported in the present thesis and those described by Browning et al. and other researchers (Allender, et al., 2006; Australian Bureau of Statistics, 2007b; M. Booth, et al., 2002; M. Booth, et al., 1997; Brassington, et al., 2002; Davis-Berman, 1990; Y. Lee & Laffrey, 2006; Umstattd & Hallam, 2007; Umstattd, Wilcox, Saunders, Watkins, & Dowda, 2008; Wesch, et al., 2006).

One of the main features of the revised model is that motivators and barriers have been removed as a combinational factor. These individual motivators and barriers have been redistributed from a single factor to multiple individual factors which more accurately describe the phenomenon. The redistribution of motivators is summarised in Table 8 and the redistribution of barriers in Table 9.

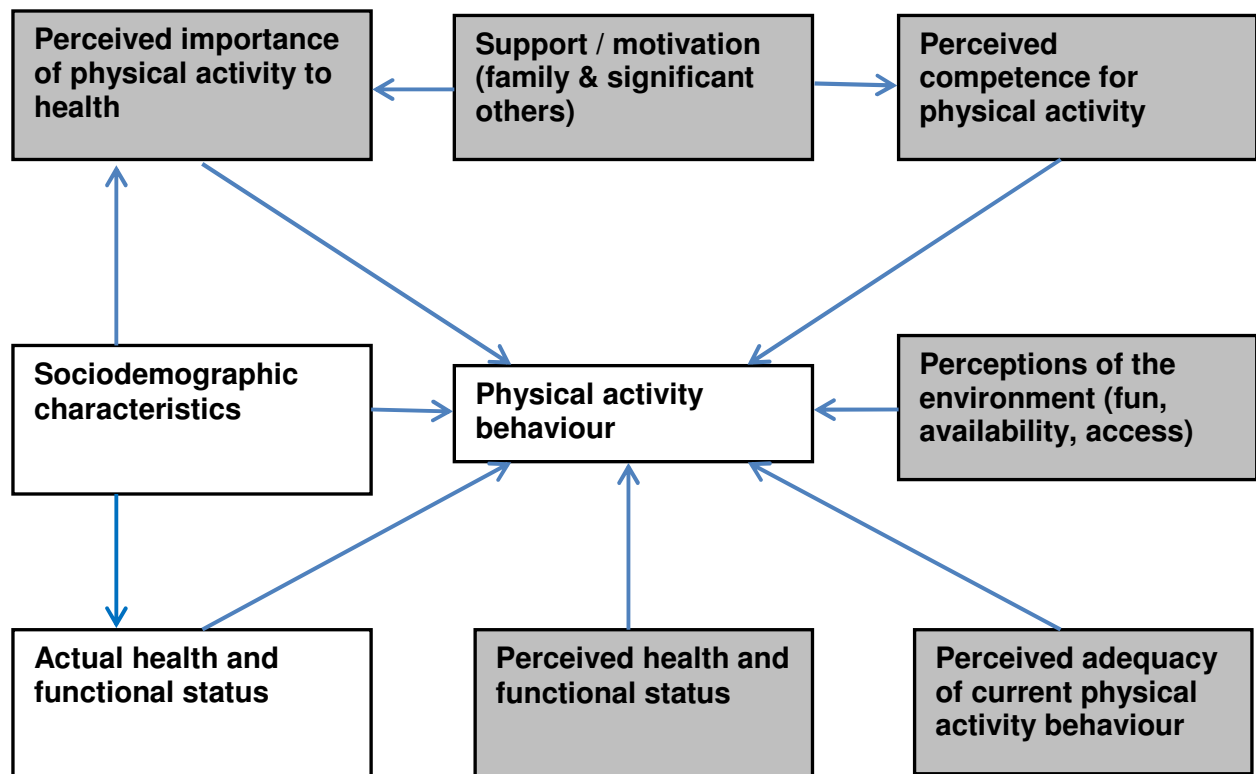


Figure 5: Revised health action model of physical activity behaviour.

(NB: Boxes highlighted in grey show areas where social engagement can potentially influence perceptions and enhance physical activity behaviours.)

Additionally, the work of Sabiston and Cocker (2008) has been incorporated into the revised model in the expectation, and with partial support from the findings presented in this thesis, that what these researchers found for teenagers holds true for an older population. That is, that support from family and friends positively affects an individual's perceived competence for activity and their perceptions of the importance of activity. The revised model also makes allowance for the findings from the present thesis, and other research, that perceived and actual health and functional status are factors that individually exert influence on physical activity behaviours (Browning, et al., 2009; Davis-Berman, 1990).

Table 8: Redistribution of motivators for physical activity

Factor	Example source	New location
Motivation	(Browning, et al., 2009)	Support / motivation
Support	(M. Booth, et al., 2000; Browning, et al., 2009)	Support / motivation
Social / family support	(Allender, et al., 2006; Australian Bureau of Statistics, 2007b)	Support / motivation
Enjoyment	(Allender, et al., 2006; Australian Bureau of Statistics, 2007b; Browning, et al., 2009)	Perceptions of the environment
Activities to do	(Browning, et al., 2009)	Perceptions of the environment
Desire to achieve good health	(Browning, et al., 2009)	Perceived importance of physical activity to health
Health and fitness	(Allender, et al., 2006; Australian Bureau of Statistics, 2007b)	Perceived importance
Wellbeing	(Australian Bureau of Statistics, 2007b)	Perceived importance
Safe footpaths for walking	(M. Booth, et al., 2000)	Perceptions of the environment
Access to facilities	(M. Booth, et al., 2000)	Perceptions of the environment
Exercise self-efficacy	(M. Booth, et al., 1997; Brassington, et al., 2002; Y. Lee & Laffrey, 2006; Umstattd & Hallam, 2007; Wesch, et al., 2006)	Perceived competence for physical activity

Table 9: Redistribution of barriers to physical activity

Factor	Example source	Location
Health status	(Australian Bureau of Statistics, 2007a; M. Booth, et al., 1997; M. Booth, et al., 2000; Browning, et al., 2009; Davis-Berman, 1990; Lim & Taylor, 2004)	Perceived health status and Actual health status
Too old	(Australian Bureau of Statistics, 2007b; M. Booth, et al., 2000)	Sociodemographic factors
Not enough time	(M. Booth, et al., 1997; Lim & Taylor, 2004)	Perceived importance
Not interested	(Australian Bureau of Statistics, 2007b)	Perceived importance

Social engagement interacts with all of the perceived factors within the revised model as depicted by the grey shaded boxes in Figure 5. This interaction has repeatedly been described by the participants in the study for the present thesis, and is supported in the extant literature as described in the previous sections of this chapter. Social engagement enhances participants' competence for physical activity by modelling behaviours and providing a safe environment within which to explore new activities. It also has the potential to influence participants' perceptions of the importance of physical activity to health. Social engagement also affects perceptions of the environment because it has the potential to create an inclusive community atmosphere within which activities can take place and without which activities may flounder. Modelling of physical activity behaviours by others and vicarious experience of others overcoming perceived health problems are also ways in which social engagement positively influences physical activity behaviour. In the following section the concept of fun is defined and ways to promote older people's participation in physical activities by maximising fun and engagement are explored.

Promoting Engagement

For older people the ability to engage in physical, or any, activities may be moderated by the extent to which they perceive the activity to be enjoyable or 'fun'. Fun and engagement were discussed earlier in this thesis as motivations for getting involved in activities and as a way to overcome health fears and feelings of incompetence. Fun may be derived from the activity itself or from the social interactions that accompany participation in the activity. To have fun, one is required to move into a frame of mind that allows for adult play (Kerr & Apter, 1991) and to suspend feelings of self-consciousness and experience a state of flow (Csikszentmihalyi, 1990).

Fun

Fun can be defined as that which provides amusement or enjoyment ("fun," 2009). According to Read, MacFarlane and Casey (2002) fun has three dimensions; endurability, expectation and engagement. Read and colleagues derived the first of these three dimensions, endurability, from the principle of positivity response bias, termed the 'Pollyanna principle' by Matlin and Stang (1978). The Pollyanna principle postulates that people are more likely to recall pleasant experiences than unpleasant experiences because of a stronger affective bias toward the pleasant experience. However other researchers have argued that this is more a reflection of the fact that the majority of people maintain a mildly positive perception of the world (Taylor & Brown, 1988). Martin Seligman, the founder of the Positive Psychology movement, would argue further that people have the ability to change the way they view the world to a more positive perspective through focusing on their strengths and developing a more optimistic mindset (Seligman, 2002, 2006). Endurability, then, may be amenable to improvement through cognitive interventions and enhancing the enduring memory of an enjoyable experience would likely prompt a desire to repeat that experience.

The second dimension of fun is expectation, which is based on the tenets of expectancy theory. According to expectancy theory (Bandura, 1986) people's anticipated outcomes depend on their judgement of how well they will be able to perform in a given situation. Participants who judge that their skills were not equal to the challenge presented by an activity might be expected to anticipate an unpleasant experience. When the goal is participation rather than performance expected outcomes could be social interaction, feelings of well-being or enjoyment of the experience for its own sake.

The third dimension of fun, according to Read, MacFarlane and Casey (2002) is engagement. Being engaged can be defined as being "involved in activity" or "greatly interested" ("engaged," 2009). Three theories of engagement provide a structural basis for understanding this concept of fun and may help us to understand what prompts older people to engage with activities and what might be done to enhance participation through effective engagement. These theories are adult play, reversal theory and flow (Apter, 1990; Csikszentmihalyi, 1990; Kerr & Apter, 1991). These theories provide conceptualisations of task engagement that may offer a better insight into how to engage older people in physical activity. The theory of adult play and reversal theory have the potential to explain why some individuals engage more easily in physical activities than others. Theories of flow and engagement have been investigated in the fields of art, physical activity and in the classroom (Csikszentmihalyi, 1990; Decloe, Kaczynski, & Havitz, 2009; Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003).

Adult Play

Adult play is, for healthy people, a normal and frequently occurring way of being. Play is an activity that is engaged in for its own ends; it has no set outcome. Thus play can be said to be an autotelic experience (Kerr & Apter, 1991). Autotelic, from the Greek *auto* for self and *telic* meaning goal or end, is defined as having a purpose in and not apart from itself ("autotelic," 2009). For example social dancing is an autotelic activity; the aim is not to reach

the other side of the dance floor it is simply to enjoy the act of dancing. Hyers (1991) says that the irony of all play is that it can become work and conversely a task that represents work to one person may be play to another. The role of 'exercise play' and its contribution to strength and endurance in children has been investigated (Pellegrini & Smith, 1998) but this play aspect of physical activity involvement may be just as important for older people.

There are a variety of stratagems that people use to engage in and enhance play (Apter & Kerr, 1991). The five stratagems listed in Table 10 are of particular relevance to the present thesis as they may provide insight into the way in which older people enhance engagement in adult play. The stratagems may be employed by community and activity leaders to promote engagement.

Table 10: Stratagems for enhancing play (Apter & Kerr, 1991).

Stratagem	Explanation
Exposure to arousing stimulation	Music, bright lights, enthusiastic instructors
Challenge	Any challenge, if accepted, can be arousing
Exploration	Moving off the beaten track, exploring new ideas
Negativism	The deliberate and provocative breaking of rules
Facing danger	Experienced within a protective framework this is a potent way of creating enormous excitement

Reversal Theory

The second theory that contributes to an understanding of engagement is reversal theory (Apter, 1990; Kerr, 1997). Reversal theory holds that an individual's motivational processes are influenced by the interplay of four pairs of metamotivational states (Table 11). Reversals

between states occur continuously in response to environmental (extrinsic) and individual (intrinsic) stimuli. In a therapeutic setting, psychological disturbances can be said to come about through inappropriate reversals or the inability to move between states when appropriate (Apter, 1990). For example, remaining in the telic mode during a dance class would result in performance anxiety instead of producing a feeling of enjoyment.

Table 11: Characteristics of the four pairs of metamotivational states (Apter, 1990)

Telic mode	Paratelic mode
The person is serious, preferring to plan ahead to important future goals, and seeking where possible to avoid arousal (which is experienced as anxiety).	The person is playful and “here-and-now” oriented, preferring to be spontaneous and where possible seeking high arousal (which is experienced as excitement).
Conformist mode	Negativistic mode
The person feels a desire to conform to rules and act in accordance with others’ expectations.	The person feels a desire to break rules and act provocatively or defiantly.
Mastery mode	Sympathy mode
The person experiences the world in terms of control and domination, transactions with others being about “taking” or “yielding up”.	The person experiences the world in terms of care and nurturance, transactions with others being about “giving” or “being given”.
Autocentric mode	Allocentric mode
The person acts on his or her own behalf, so that situations are experienced in terms of how they affect him or her personally (or this other).	The person identifies with (another or) others, and acts on their behalf, experiencing situations vicariously in terms of how they affect these others

Of these metamotivational states, it is the telic – paratelic pair that most likely contributes to an older person's enjoyment of and engagement in physical activity. The ability to move to the paratelic state is central to experiencing arousal as excitement rather than anxiety, thereby making the activity pleasurable. In paratelic mode people have the ability to explore and develop new ways of interacting with the environment; they have the freedom to play with new skills. These new skills may later be used for telic mode problem solving. Apter (1990) states that frequent reversals between telic and paratelic mode are a normal and healthy part of adult life. Assisting and encouraging older people to shift to paratelic mode during physical activities would allow them to engage more fully with the activity and to derive much more enjoyment from that activity.

Flow

When we play or enter the paratelic mode we could be said to enter a flow state (Csikszentmihalyi, 1990). According to Csikszentmihalyi flow has nine dimensions and these are outlined in Table 12. Understanding these dimensions of flow may be important in the development of real world stratagems to assist older people to enter paratelic mode to enable them to engage in physical activities that are perceived as play rather than work. In support of this a disposition toward being able to experience flow has been shown to influence motivation for physical activity in adolescents (Cervello, Moreno, Villodre, & Iglesias, 2006) and this may also be important for older people.

Table 12: The nine dimensions of flow (Csikszentmihalyi, 1990)

Flow Dimension	Explanation
Challenge-skill balance	If skills are too low then the task is seen as insurmountable and anxiety develops, if skills are too high then boredom results.
Action-awareness merging	The participant becomes absorbed by the task and 'feels' the movement / activity rather than thinking about it.
Clear goals	The goal of the activity is clearly understood.
Unambiguous feedback	Feedback about the activity is clear and direct.
Concentration on task	Attention is fully focused on the activity.
Sense of control	The participant has a sense of mastery over the task at hand.
Loss of self-consciousness	Being absorbed in the activity the participant loses awareness of their surroundings.
Time transformation	A sense of time is lost with immersion in the activity.
Autotelic experience	The activity is undertaken for its own sake rather than an external goal or aim.

In the later section on leadership it is highlighted that a good leader, be they a community member or paid professional, is able to achieve this challenge-skill balance, articulates clear goals to followers, gives positive feedback and expresses a belief in their followers' abilities to have control over the task at hand. These elements of leadership could assist participants in activities to experience flow and enhance their motivation to continue participation.

Enhancing Motivation and Overcoming Barriers

As outlined in the previous paragraphs effective approaches to increasing older people's physical activity levels need to take into account elements such as enjoyment, engagement and challenge. Exercise professionals and activity leaders can contribute to success in engaging older people in activities. Training, both professional and for community members interested in leading activities, would likely benefit from the inclusion of effective strategies for engaging people in physical activity and particularly in resolving the ambivalence of believing in the importance of physical activity to health and yet not choosing to participate on a regular basis.

Motivational interviewing (MI) is one technique that is currently being employed to help people to facilitate change in their physical activity levels; MI has traditionally been employed by health professionals to assist with smoking cessation and alcohol addiction but is gaining in popularity as an approach to improving other health behaviours (Rollnick, et al., 2008).

Acceptance and Commitment Theory (ACT) is currently being used in counselling for anxiety and other stress disorders but has potential as a complementary therapy to MI for overcoming barriers and enhancing motivation to be physically active. These two approaches challenge societal perceptions that extrinsic motivation (heart attack, diabetes, family coercion) should be enough to induce behaviour change in an individual. In reality lasting change comes from within and occurs when people are embracing the things in life that they value. In both of these approaches, detailed below, research has shown that the quality of the therapeutic relationship is central to successful outcomes (Miller, 2000;

Rollnick, et al., 2008). Incorporating elements of these approaches into a charismatic style of leadership has the potential to engage and support older people to take up and maintain participation in regular physical activity.

Motivational Interviewing

MI is a client-centred, directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence (Rollnick, et al., 2008). MI was originally developed as a new treatment modality for alcoholics (Miller, 2000). William Miller formulated the methods and spirit of MI by listening to alcoholics as they described the ambivalence they felt about their drinking; they knew it was a harmful and destructive force in their lives but they also felt they needed and enjoyed drinking. Assisting the client to resolve this ambivalence about an issue is central to the tenets of MI. At the time (the mid 1980s) MI was a vastly different treatment modality to the traditional and confrontational methods of 'breaking down alcoholic denial'. This traditional approach implies that extrinsic motivation will be sufficient to achieve behaviour change whereas MI works at enhancing intrinsic motivation.

"At the heart of MI is a quiet curiosity about the motivations of the client, and an ability to use listening to invite reflection and consider the personal value of behaviour change" [pp.30]

(Rollnick, 2009). The four guiding principles of MI form the acronym **RULE**:

- Resist the righting reflex

It is a natural human tendency to resist persuasion. The more a client argues against change the more entrenched they become in not changing. The health professional should roll with any resistance and refrain from arguing with the client because arguing only increases the client's ambivalence.

- Understand the patient's motivations

The patient should be voicing the argument for change not the health professional.

- Listen to the patient

Answers and the means of implementing change lie with the patient and good reflective listening by the health professional is required to tease these out.

- Empower the patient

Help patients to explore how they can make positive changes to improve their health.

Although originally developed to assist alcoholics, MI has been effectively adapted to assist with a wide range of health issues including diet and physical activity (Dunn, Deroo, & Rivara, 2001; Harland, et al., 1999; Rubak, Sandboek, Lauritzen, & Christensen, 2005).

Norcross, Krebs, and Prochaska (2011) support the use of MI for people in the precontemplation stage of behaviour change. As outlined in the literature section precontemplators are often not aware of the need for change, over estimate the barriers to change and underestimate the benefits. By using MI techniques and resisting the urge to impose judgement or action on the client, health professionals increase their chances of maintaining client contact and working collaboratively toward behaviour change (Miller & Rollnick, 2002; Norcross, et al., 2011; Rollnick, et al., 2008).

Although MI is gaining in popularity as an approach to changing health behaviours the data is mixed as to how effective MI is at supporting long term change in domains other than substance abuse. Dunn, Deroo and Rivara (2001) reviewed 29 randomised trials of MI (4 of these were for diet / exercise) and concluded that the data for domains other than substance abuse was inadequate to judge MI's effectiveness. Conversely, Rubak et al. (2005) reported that 8 out of 10 of the diet / physical activity interventions using MI showed an effect. Harland et al. (1999) supported this finding of MI's effectiveness in changing physical activity levels in the short term but they also reported that these short term gains were not sustained through to a one year follow up. With these mixed reported results for the effectiveness of MI it is possible that other therapy modalities may be more effective at promoting long term change

in physical activity behaviours. Another approach that is gaining popularity in psychological practice is acceptance and commitment therapy (ACT).

Acceptance and Commitment Therapy

ACT is a mindfulness-based cognitive-behavioural therapy. ACT has been used by psychologists and counsellors working with people with addictions, anxiety disorders and in anger management. More recently ACT has been investigated in the health sphere as a means of helping patients manage type 2 diabetes and has been posited as an approach to improve athletic performance (Gardner & Moore, 2004; Gregg, Callaghan, Hayes, & Glenn-Lawson, 2007). Harris (2009) [pp.2] describes ACT in the following way:

ACT gets its name from one of its core messages: accept what is out of your personal control, and commit to taking action that enriches your life. The aim of ACT is to help us create a rich, full, and meaningful life, while accepting the pain that life inevitably brings. ACT does this by:

- teaching us psychological skills to handle painful thoughts and feelings effectively, in such a way that they have much less impact and influence—these are known as mindfulness skills; and
- helping us to clarify what's truly important and meaningful to us—that is, clarify our values—and use that knowledge to guide, inspire, and motivate us to set goals and take action that enriches our life.

An adaptation of Harris' description for application to changes in physical activity behaviour might read; to use mindfulness training to accept any limitations out of the participant's control and to overcome barriers by making a commitment to an activity that had value and meaning to the participant. In the health care domain Gregg et al. (2007) reported that type 2 diabetes patients who received ACT training in addition to regular diabetes education reported better levels of self-care and had HbA1c values within target range at 3 months

post intervention compared to education alone. While ACT does not appear to have been researched to date with regard to improving physical activity participation it has been successfully employed to improve the health of obese persons (Lillis, Hayes, Bunting, & Masuda, 2009) and will form the basis of an intervention aimed at enhancing positive lifestyle behaviours, including physical activity behaviours, of colorectal cancer survivors (Hawkes, et al., 2009). MI and ACT both appear to warrant further investigation as potential therapies for promoting physical activity behaviour change.

Leadership

Leadership is a vital element in creating an engaging and inviting atmosphere within which the possibilities for physical activity can be explored (Jancey, et al., 2007). As Ben (AA, 71 years) said, “Crook leader, won’t work! [...] you won’t find a successful business without a successful leader, it is impossible.”

It has been reported that charismatic leaders demonstrate specific traits that help to motivate and engage their followers (Shamir, House, & Arthur, 1993). These traits are:

- a) They are able to instil in followers the feeling that being involved in the effort is to stand up and be counted; that the effort itself reflects important intrinsic values
- b) They express confidence in their followers’ abilities to meet high expectations
- c) “Articulation of a vision and a mission by charismatic leaders presents goals in terms of the values they represent” [pp.583]. Leaders who do this are able to instil meaning into any actions that followers take toward articulated goals
- d) They instil faith in a better future. Charismatic leaders tend to articulate vague and distal goals and often employ symbolism and mysticism to motivate followers knowing that a faith in a better future is a satisfying condition in itself

- e) They create a sense of personal commitment in followers. “This is a motivational disposition to continue a relationship, a role or a course of action and to invest efforts regardless of the balance of external costs and benefits and their immediate gratifying properties” [pp.583]

Successful activity leaders employ stratagems that allow followers to engage in adult play; to experience arousal as excitement rather than anxiety (Apter, 1990; Kerr, 1997). They use stratagems such as providing arousing stimulation, presenting challenges (and expressing confidence in the followers ability to rise to these challenges), they motivate people to explore new ideas and provide a protective frame work within which challenging situations can be explored (Apter & Kerr, 1991). Successful activity leaders also allow participants to explore opportunities for self-managed change by allowing them to resolve ambiguities in their thoughts about physical activity. The findings reported in the present thesis provide support for the role of good leadership in creating an attractive and engaging environment for older people, as important for participation and participant satisfaction and as a motivating force.

Chapter 6 Summary

The work in the present thesis has sought to answer questions about the physical activity behaviours and perceptions of older Tasmanians using a mixed methods approach. This approach has enabled an exploration of those factors that might be amenable to change through promotion, counselling and leadership to maximise the engagement of older people in regular physical activity such that they might receive the inherent health and wellness benefits.

An interesting finding from the survey for this thesis was that a greater percentage of respondents were adequately physically active than reported in the extant literature. Reasons for this discrepancy are suggested as the discounting of some walking and activities of daily living from national physical activity surveys, a mode of delivery employed by those surveys that did not aid recall amongst an older population and the inappropriateness of descriptions of moderate intensity activities in previous surveys of this population.

Participants in the survey conducted for the present thesis widely reported physical activity as being important, interesting and useful, with positive correlations between these measures and levels of activity. Interestingly, inadequately active participants also reported that physical activity was important and interesting to them and this provides evidence for the existence of ambivalence toward being active. Additionally, inadequately active participants perceived that it took a significantly greater effort to be active and that being active was significantly less useful to them. These findings provide support for the argument that people in the early stages of behaviour change, those not thinking about being more active or thinking about it but not acting, over estimate the obstacles to change and under estimate the benefits. Counselling techniques that explore and attempt to resolve ambivalence about being physically active (such as motivational interviewing and acceptance and commitment therapy) have the potential to prompt the uptake of, and sustain long term participation in,

physical activity. Health professionals and activity leaders versed in these methods and who display charismatic leadership traits have the potential to maximise participation rates amongst older people.

The main barriers to physical activity were reported to be health concerns, incompetence and a lack of time and while some participants were able to overcome these barriers and lead an active life others were not. The application of theories of engagement, such as adult play, reversal theory and flow may provide the environment within which people can explore new activities in a supported and engaging environment and could assist in maintaining regular participation. The proposed application of these theories is supported by the findings in this thesis that the main motivations for being active were the support of enthusiastic others, having fun and being engaged with activities.

Based on survey and interview findings a revised health action model has been developed which more comprehensively represents the ways in which a number of factors influence older people's physical activity behaviours. Overarching this model is the effect of social engagement which from the interview data reported herein appears to positively impact on older people's perceptions of physical activity by supporting them in their efforts to become more physically active and provides an important opportunity for health promotion to this population. Social engagement coupled with the theories of engagement and counselling techniques presented herein may also help inadequately active older people to overcome ambivalence, health fears and feelings of incompetence.

Scope and Limitations

Participants in this study were a convenience sample drawn from a rural Tasmanian population to represent a variety of independent living conditions. While their survey data and interviews enable assessment of the physical activity levels and perceptions of older people living independently in this locale caution is urged in generalising these findings to a wider Australian population.

A potential source of bias has been identified according to the criteria listed by Sackett (1979), this is non respondent bias. Sackett recommends that to control for non respondent bias a return rate above 80 percent should be achieved and this was not the case in the surveys administered for this thesis. Again the reader is cautioned in interpreting the results of the survey data in that it may be subject to non respondent bias in that physical activity profiles of those who did not complete the survey at each location may have been significantly different from those who did complete the survey.

Additionally, the surveys for this thesis were administered under two different conditions; respondents at two locations completed the survey individually and returned it by post and at four locations the survey was completed at a group meeting with support from the researcher. While caution may be urged in comparing the results from the two methods employed it must be pointed out that participants received the same set of instructions at each site and completed identical survey items.

The survey sample size was small and so the power of the quantitative findings presented is relatively low. However, these findings do pose important questions about the assessment tools used to collect older people's physical activity data at a national level. Additionally, the way in which surveys are administered to this population may have a significant impact on results obtained.

There was an apparent conflict between the survey data that indicated no correlation between the number of active friends and physical activity level and the interview findings where active friends were described as an important motivator for physical activity. A possible explanation is that survey participants may not have been able to adequately recall, or may have discounted the importance of, the support of others when completing the survey while the longer, narrative nature of the interview experience meant they were more fully engaged with recalling experiences and the importance of the support of others. Alternately,

the proportion of active friends may have been small and reported accurately in the survey but the influence of this small group was important in encouraging participation.

Recommendations for Practice

To engage older people in regular physical activity allied health professionals and activity leaders need to be skilled in leadership and understand those factors that promote engagement. Support and motivation from significant others can influence a participant's perceptions of the importance of physical activity and enhance their perceived confidence to engage in regular activities. Activity leaders are also central to creating an environment within which physical activities are perceived as fun and achievable. Modelling of exercise behaviours by others is also an important element as this demonstrates that perceived health barriers can be overcome. Starting a dialogue with participants, and potential participants, that begins to explore their ambivalence toward physical activity offers opportunities for self-change to be explored and the perceptions around physical activity competence to be challenged. Training for allied health staff and exercise professionals who work with older people needs to specifically address these areas of knowledge and practice.

Recommendations for Future Research

Findings reported in the present thesis raise questions about the accuracy of the oft quoted statistic that 50 percent of older people are inadequately physically active. The tools and method of survey data collection used for the current thesis need to be replicated in a much larger national sample to obtain a clearer picture of older people's activity patterns. The contribution of activities of daily living and all walking to overall activity levels also needs to be acknowledged. Assessing participants' functional capacity in future investigations would most certainly add to the study by providing a point of correlation with reported physical activity level, affective variables and as an adjustment factor.

Support from allied health professionals emerged from the interview findings as a significant source of encouragement and motivation for participants. Future research could incorporate questions about support from this sector as well as support from friends and family. The role of contemporary counselling therapies, such as Motivational Interviewing and Acceptance and Commitment Therapy, in promoting engagement in regular physical activity also needs to be explored further and empirically tested in an older population.

The revised health action model presented in the present thesis also needs further research. The redistribution of the barriers and motivators into specific model factors and the separation of perceived and actual health and functional status are important first steps toward a more comprehensive understanding of older people's physical activity behaviour. The next steps would be to test the strength and validity of associations between the factors in the model through cohort surveys and to design intervention studies that assess the effectiveness of enhancing elements within the model. The factors within the revised model are likely to show strong interactional effects which would require the use of sophisticated research modelling.

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Appendices

Appendix A: Copy of ethics approval letters

<p>MEMORANDUM</p>	<p>Private Bag 01 Hobart Tasmania 7001 Australia Telephone (03) 6226 2764 Facsimile (03) 6226 7148 Marilyn.Knott@utas.edu.au http://www.research.utas.edu.au/index.htm</p>	
<p>HUMAN RESEARCH ETHICS COMMITTEE (TASMANIA) NETWORK</p>		

FULL COMMITTEE ETHICS APPLICATION APPROVAL

8 September 2008

Dr Peter Orpin
Rural Health
Private Bag 103
Hobart

Ethics reference: H10153

Physical activity and healthy ageing: The effects of enhanced social support.

PhD candidate: Sharon Heatherington

Dear Dr Orpin

The Tasmania Social Sciences HREC Ethics Committee approved the above project on 25 August 2008.

All committees operating under the Human Research Ethics Committee (Tasmania) Network are registered and required to comply with the *National Statement on the Ethical Conduct in Research Involving Humans 1999* (NHMRC guidelines).

Therefore, the Chief Investigator's responsibility is to ensure that:

- 1) All researchers listed on the application comply with HREC approved application.
- 2) Modifications to the application do not proceed until approval is obtained in writing from the HREC.
- 3) The confidentiality and anonymity of all research subjects is maintained at all times, except as required by law.
- 4) Clause 2.37 of the National Statement states:
An HREC shall, as a condition of approval of each protocol, require that researchers immediately report anything which might warrant review of ethical approval of the protocol, including:
 - a) *Serious or unexpected adverse effects on participants;*
 - b) *Proposed changes in the application; and*
 - c) *Unforeseen events that might affect continued ethical acceptability of the project.*

The report must be lodged within 24 hours of the event to the Ethics Executive Officer who will report to the Chairs.

- 5) All participants must be provided with the current Information Sheet and Consent form as approved by the Ethics Committee.
- 6) The Committee is notified if any investigators are added to, or cease involvement with, the project.
- 7) This study has approval for four years contingent upon annual review. An *Annual Report* is to be provided on the anniversary date of your approval. Your first report is due [12 months from 'Ethics Committee Approval' date]. You will be sent a courtesy reminder by email closer to this due date.
Clause 2.35 of the National Statement states:
As a minimum an HREC must require at regular periods, at least annually, reports from principal researchers on matters including:
 - a) *Progress to date or outcome in case of completed research;*
 - b) *Maintenance and security of records;*
 - c) *Compliance with the approved protocol, and*
 - d) *Compliance with any conditions of approval.*
- 8) A *Final Report* and a copy of the published material, either in full or abstract, must be provided at the end of project.

Yours sincerely

A. Knott

for Ethics Executive Officer

Private Bag 01 Hobart
Tasmania 7001 Australia
Telephone (03) 6226 2764
Facsimile (03) 6226 7148
Marilyn.Knott@utas.edu.au



MEMORANDUM

<http://www.research.utas.edu.au/index.htm>

HUMAN RESEARCH ETHICS COMMITTEE (TASMANIA) NETWORK

AMENDMENT TO EXISTING APPLICATION APPROVAL

27 March 2009

Dr Peter Orpin
Rural Health
Private Bag 23
Hobart

Ethics reference: H10153

'Physical activity and healthy ageing: The effects of enhanced social support'.

PhD candidate: Sharon Heatherington

Dear Dr Orpin

The Chair of the Tasmania Social Sciences Human Research Ethics Committee approved the Amendment to the above project on 21 March 2009.

Amendment description:

Proposal requested that a whole population physical activity survey be conducted at two suburban residential retirement villages to provide comparative data for the larger study.
Full details as per formal amendment presented for ethics approval.

Yours sincerely

A handwritten signature in cursive script, appearing to read 'M. Knott', is written below the 'Yours sincerely' line.

for Ethics Executive Officer

A PARTNERSHIP PROGRAM IN CONJUNCTION WITH THE DEPARTMENT OF HEALTH AND HUMAN SERVICES

Appendix B: Survey information sheet**SURVEY PARTICIPANT INFORMATION SHEET****Physical Activity and Healthy Ageing: The Effects of Enhanced Social Support**

We would like to invite you to participate in a research study into how social support influences older people's physical activity levels. The study is being conducted by Dr Peter Orpin and Ms Sharon Hetherington (PhD candidate) from the University Department of Rural Health in Tasmania. This study is being conducted in partial fulfilment of the PhD requirements for Ms Sharon Hetherington.

1. 'What is the purpose of this study?'

We want to find out how active older, rural Tasmanians are, and how the amount of support and encouragement they receive from friends and relatives might help them to stay active. This is an important area of study because staying physically active in later life has proven health benefits, such as lower risk of heart disease, prevention and management of type 2 diabetes and lower rates of depression. Being active also helps build muscle and bone strength which means being able to participate more easily in everyday activities and to live independently for longer. We are therefore seeking input from older people in both a rural Tasmanian community and a retirement village.

2. 'Why have I been invited to participate in this study?'

We are inviting you to be part of this study because you are over 65 and living in one of our nominated study locations.

4. 'What does this study involve?'

If you decide to help us in this study we will be asking you to fill in two reasonably short questionnaires which will ask you about your physical activities over the past seven days, what value you place on being physically active and about the level of social support for physical activity you receive from friends and family. You will fill in one survey today and a second survey will be posted to you in twelve months time along with a reply paid envelope. We estimate that it will take no more than 20 minutes to complete each survey.

We would also like to talk face to face with a few community members to get a better understanding of their views of physical activity. If you would be happy for investigators to contact you about being interviewed please tick yes to item 10 on the consent form and ensure that you have included your telephone number. If we do contact you, you will receive a separate information sheet and consent form covering that part of the study at that time.

It is important that you understand that your involvement in this study would be entirely voluntary. While we would be pleased to have you participate, we respect your right to decline and there will be no consequences to you if you decide not to participate. If you decide to discontinue participation at any time, you may do so without providing an explanation. All information will be treated in a confidential manner, and your name will not be used in any publication arising out of the research. All of the research information will be kept in a locked cabinet in the office of Ms Sharon Hetherington at the University Department of Rural Health and not accessible to anyone outside of the research team.

5. Are there any possible benefits from participation in this study?

Your participation in this study will help to improve our understanding of older people's exercise patterns and may provide valuable information to those designing programs and delivering services in your area.

6. Are there any possible risks from participation in this study?

There are no specific risks anticipated with participation in this study.

7. What if I have questions about this research?

If you would like to discuss any aspect of this study please feel free to contact the Chief Investigator, Dr Peter Orpin on ph 6226 7344 or researcher Ms Sharon Hetherington on 63244067. We would be happy to discuss any aspect of the research with you. We will be holding meetings in your community to give you feedback on the survey results. You are welcome to contact me at that time to discuss any issue relating to the research study.

This study has been approved by the Tasmanian Social Science Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study you should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote H10153.

Thank you for taking the time to consider this study.

If you wish to take part in it, please sign the attached consent form.

This information sheet is for you to keep.

Appendix C: Consent form**Physical Activity and Healthy Ageing: The Effects of Enhanced Social Support**

1. I have read and understood the 'Information Sheet' for this project.
 2. The nature and possible effects of the study have been explained to me.
 3. I understand that the study involves filling in and returning two (2) surveys, one today and one which will be mailed to me in twelve months time.
 4. I understand that participation involves minimal risk.
 5. I understand that all research data will be securely stored on the University of Tasmania premises for five years, and will then be destroyed.
 6. Any questions that I have asked have been answered to my satisfaction.
 7. I agree that research data gathered from me for the study may be published provided that I will not be identified as a participant.
 8. I understand that the researchers will maintain my identity confidential and that any information I supply to the researchers will be used only for the purposes of the research.
 9. I agree to participate in this investigation and understand that I may withdraw at any time without any effect, and if I so wish may request that any data I have supplied to date be withdrawn from the research.
 10. I would be happy for the researchers to contact me about participating further by being interviewed and / or helping other people 65+ to be more physically active.
- Please tick one. ☐ YES -my phone number is _____ ☐
 NO

Name of Participant: _____

Signature: _____

Date: _____

Statement by Investigator

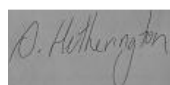
☐ I have explained the project & the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation

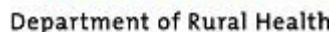
If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☒ The participant has received the Information Sheet where my details have been provided so participants have the opportunity to contact me prior to consenting to participate in this project.

Name of Investigator Sharon Hetherington

Signature of Investigator





Locked Bag 1372 Launceston
Tasmania 7250 Australia
Telephone (03) 6324 4067
Facsimile (03) 6324 4040

Year of Birth:

Completed surveys can be **mailed back** using the prepaid envelope or **dropped off** at.

7 Day Recall Physical Activity Survey

Think about the past **7 days**. Write down, **to the nearest half hour**, how long you spent on each of the past 7 days in the following activities.

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Sleeping (approximately how long were you in bed on each of these nights?)							
Moderate activities (for example: walking, Tai Chi, light gardening or activities of a similar intensity)							
Hard activities (for example: dancing, floor cleaning, heavy gardening, or activities of similar intensity)							
Very hard activities (for example: running, swimming, chopping wood, or activities of similar intensity)							

VALUE OF PHYSICAL ACTIVITY

Please read the following statements about physical activity and complete the sentences using the scale below each sentence. Pay attention to the wording of the sentences. Circle the point on the line that is closest to your answer. If you need to change your answer, please put an "X" over the circle and circle another point on the line.

A01. *In general how do you find participating in physical activity?*

Very boring |-----|-----|-----|-----| Very interesting

A02. *How much do you like participating in physical activity?*

Not at all |-----|-----|-----|-----| Very much

A03. *How important is being able to participate in physical activity to you?*

Not at all important |-----|-----|-----|-----| Very important

A04. *In general, how useful is physical activity to you?*

Not at all useful |-----|-----|-----|-----| Very useful

A05. *How valuable is participating in physical activity to you?*

Not at all valuable |-----|-----|-----|-----| Very valuable

A06. *Participating in regular physical activity takes up how much of your time?*

No time |-----|-----|-----|-----| A great deal of time

A07. *How much does participating in regular physical activity cost you?*

Nothing |-----|-----|-----|-----| A lot of money

A08. How much effort does it take for you to participate in regular physical activity?

Not effort at all A great deal of effort
 |-----|-----|-----|-----|

A09. How difficult is it for you to participate in regular physical activity?

Not at all difficult Very difficult
 |-----|-----|-----|-----|

A10. How many of your friends participate in regular physical activity?

None of my friends All of my friends
 |-----|-----|-----|-----|

A11. How many of your family members participate in regular physical activity?

None of my family members All of my family members
 |-----|-----|-----|-----|

SIGNIFICANT OTHERS' PHYSICAL ACTIVITY BEHAVIOUR

The following questions ask you to think about the physical activity behaviours of your friends, close family and partner. Circle the point on the line that is closest to your answer. If you need to change your answer, please put an "X" over the circle and circle another point on the line.

FRIENDS

*B01. How often do your **friends encourage you** to participate in physical activity?*

Never All the time
 |-----|-----|-----|-----|

*B02. How **important is it to your friends** that you participate in regular physical activity?*

Not at all important Very important
 |-----|-----|-----|-----|

*B03. How often do your **friends support you** in participating in regular physical activity?*

Never All of the time
 |-----|-----|-----|-----|

*B04. How often do your **friends participate** in regular physical activity?*

Never All of the time
 |-----|-----|-----|-----|

*B05. How upset do you think **your friends would be** if you did not participate in regular physical activity?*

Not at all upset Very upset
 |-----|-----|-----|-----|

*B06. In your opinion, how **important to your friends** is participating in regular physical activity?*

Not at all important Very important
 |-----|-----|-----|-----|

*B07. How **useful to your friends** is participating in regular physical activity?*

Not at all useful Very useful
 |-----|-----|-----|-----|

*B08. How much do you think **your friends like** participating in physical activity?*

Not at all Very much
 |-----|-----|-----|-----|

CLOSE FAMILY

C01. How often does your **close family encourage you** to participate in physical activity?

Never All the time
 |-----|-----|-----|-----|

C02. How **important is it to your close family** that you participate in regular physical activity?

Not at all important Very important
 |-----|-----|-----|-----|

C03. How often does your **close family support you** in participating in regular physical activity?

Never All of the time
 |-----|-----|-----|-----|

C04. How often does your **close family participate** in regular physical activity?

Never All of the time
 |-----|-----|-----|-----|

C05. How upset do you think **your close family would be** if you did not participate in regular physical activity?

Not at all upset Very upset
 |-----|-----|-----|-----|

C06. In your opinion, how **important to your close family** is participating in regular physical activity?

Not at all important Very important
 |-----|-----|-----|-----|

C07. In your opinion, how **useful to your close family** is participating in regular physical activity?

Not at all useful Very useful
 |-----|-----|-----|-----|

C08. In your opinion, how much **do you think your close family like** participating in physical activity?

Not at all Very much
 |-----|-----|-----|-----|

PARTNER (If you do not have a partner please leave this section blank)

D01. How often does your **partner encourage you** to participate in physical activity?

Never All the time
 |-----|-----|-----|-----|

D02. How **important is it to your partner** that you participate in regular physical activity?

Not at all important Very important
 |-----|-----|-----|-----|

D03. How often does your **partner support you** in participating in regular physical activity?

Never All of the time
 |-----|-----|-----|-----|

D04. How often does your **partner participate** in regular physical activity?

Never All of the time
 |-----|-----|-----|-----|

D05. How **upset do you think your partner would be** if you did not participate in regular physical activity?

Not at all upset Very upset
 |-----|-----|-----|-----|

D06. In your opinion, how **important to your partner** is participating in regular physical activity?

Not at all important Very important
 |-----|-----|-----|-----|

D07. In your opinion, how **useful to your partner** is participating in regular physical activity?

Not at all useful Very useful
 |-----|-----|-----|-----|

D08. In your opinion, how much **do you think your partner likes** participating in physical activity?

Not at all Very much
 |-----|-----|-----|-----|

Do you have any **comments** about physical activity? (You can continue over the page if you wish)

Appendix E: Interview participant information sheet**INTERVIEW / INTERVENTION PARTICIPANT INFORMATION SHEET****Physical Activity and Healthy Ageing: The Effects of Enhanced Social Support**

We would like to invite you to participate in a research study into how social support influences older people's physical activity levels. The study is being conducted by Dr Peter Orpin and Ms Sharon Hetherington (PhD candidate) from the University Department of Rural Health in Tasmania. This study is being conducted in partial fulfilment of the PhD requirements for Ms Sharon Hetherington.

1. 'What is the purpose of this study?'

We want to find out how active older, rural Tasmanians are, and how the amount of support and encouragement they receive from friends and relatives might help them to stay active. This is an important area of study because staying physically active in later life has proven health benefits, such as lower risk of heart disease, prevention and management of type 2 diabetes and lower rates of depression. Being active also helps build muscle and bone strength which means being able to participate more easily in everyday activities and to live independently for longer. We are therefore seeking to talk to older people in both a rural Tasmanian community and a retirement village.

2. 'Why have I been invited to participate in this study?'

We are inviting you to be part of this study because you are over 65 and living in one of our nominated study locations.

3. 'What does this study involve?'

Should decide that you would like to be part of our research we would be asking you to participate in one or both of the following activities.

1. Two (2) face to face interviews, one now and one in 12 months time. The interviews will last for a maximum of one hour and will ask about your perceptions of physical activity, what value you place on being active and what kind of support you receive, or would like to receive, from family and friends to help you be physically active.
2. A peer support for exercise program that will be run in your residential location. If you decide to take part in this program you will be assisting other older people in your community to become more physically active. You may decide to start a walking group in your neighbourhood or encourage friends to attend fitness classes with you. It is your choice. You will receive assistance in this role from the investigators in the form of education, information and resources.

It is important that you understand that your involvement in this study would be entirely voluntary. While we would be pleased to have you participate, we respect your right to decline and there will be no consequences to you if you should do so. If you decide to discontinue participation at any time, you may do so without providing an explanation. All information will be treated in a confidential manner, and your name will not be used in any publication arising out of the research. All of the research information will be kept in a locked cabinet in the office of Ms Sharon Hetherington at the University Department of Rural Health and not accessible to anyone outside of the research team.

4. Are there any possible benefits from participation in this study?

Being physically active in later life delivers a raft of benefits including, lower risks of heart disease, prevention and treatment of type 2 diabetes, improved ability to carry out daily tasks and being able to live independently for longer. Being part of this project, will enable you to help others within your community to realise these benefits quite apart from any benefits you may receive from increasing our own activity levels. You will also have the satisfaction of helping to build a community wide initiative that encourages and supports activity.

5. Are there any possible risks from participation in this study?

While there are no specific risks anticipated with participation in this study, any physical activity brings with it an inherent risk of injury. However, the activities envisioned for this project, such as walking groups, aqua aerobics, Tai Chi and fit ball classes are all of low to moderate intensity and as such carry a low risk of injury. Also, medical advice will be available to ensure that all participants exercise within their abilities.

6. What if I have questions about this research?

If you would like to discuss any aspect of this study please feel free to contact the Chief Investigator, Dr Peter Orpin on ph 6226 7344 or researcher Ms Sharon Hetherington on 63244067 we would be happy to discuss any aspect of the research with you. We will be holding regular meetings in your community to give you feedback on how the project is proceeding and to share preliminary results with you. You are welcome to contact me at that time to discuss any issue relating to the research study.

This study has been approved by the Tasmanian Social Science Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote H10153.

Thank you for taking the time to consider this study. If you wish to take part in it, please sign the attached consent form. This information sheet is for you to keep.

Appendix F: Interview consent form



University Department of Rural Health
 Locked Bag 1372 Launceston
 Tasmania 7250 Australia
 Telephone (03) 6324 4067
 Facsimile (03) 6324 4040

CONSENT FORM

Title: Physical Activity and Healthy Ageing: The Effects of Enhanced Social Support

-
1. I have read and understood the 'Information Sheet' for this project.
 2. The nature and possible effects of the study have been explained to me.
 3. I understand that the study involves participating in either
 1. two (2) audio recorded face to face interviews, one today and one in twelve months time, each lasting a maximum of one hour, where I will be asked about my perceptions of physical activity.
 2. and / or be involved in a peer support for exercise program where I will be helping and encouraging other older people to become physically active with the support of the investigators and other exercise professionals.
 4. I understand that participation in physical activity carries an inherent risk of injury but that activities in this project will be of low to moderate intensity to minimise this risk.
 5. I understand that all research data will be securely stored on the University of Tasmania premises for five years, and will then be destroyed.
 6. Any questions that I have asked have been answered to my satisfaction.
 7. I agree that research data gathered from me for the study may be published provided that I will not be identified as a participant.
 8. I understand that the researchers will maintain my identity confidential and that any information I supply to the researchers will be used only for the purposes of the research.
 9. I agree to participate in this investigation and understand that I may withdraw at any time without any effect, and if I so wish, may request that any data I have supplied to date be withdrawn from the research.

Name of Participant:

Signature:

Date:

Statement by Investigator

☐ I have explained the project & the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐ The participant has received the Information Sheet where my details have been provided so participants have the opportunity to contact me prior to consenting to participate in this project.

Name of Investigator

Signature of
Investigator

Appendix G: Semi-structured interview guide

Interview questions will investigate the participant's physical activity levels and the support they receive or would like to receive to be physically active. The following outlines the flow of questioning.

What does the term physical activity mean to you?

Does the participant describe themselves as active or inactive?

What do they mean by this description?

In what ways are they active?

What motivates you to be active?

What physical activities do they enjoy?

What is the best thing about those activities?

What other activities might they be interested in?

What type of support does the participant receive from family and friends?

What type of support would they like to receive?

How might they help a friend to be more active?

What barriers do they perceive to being active?

Appendix H: Secondary site survey information sheet**SURVEY PARTICIPANT INFORMATION SHEET****Physical Activity and Healthy Ageing: The Effects of Enhanced Social Support**

We would like to invite you to participate in a research study into how social support influences older people's physical activity levels. The study is being conducted by Dr Peter Orpin and Ms Sharon Hetherington (PhD candidate) from the University Department of Rural Health in Tasmania. This study is being conducted in partial fulfilment of the PhD requirements for Ms Sharon Hetherington.

1. 'What is the purpose of this study?'

We want to find out how active older, rural Tasmanians are, and how the amount of support and encouragement they receive from friends and relatives might help them to stay active. This is an important area of study because staying physically active in later life has proven health benefits, such as lower risk of heart disease, prevention and management of type 2 diabetes and lower rates of depression. Being active also helps build muscle and bone strength which means being able to participate more easily in everyday activities and to live independently for longer. We are therefore seeking input from older people in both a rural Tasmanian community and a retirement village.

2. 'Why have I been invited to participate in this study?'

We are inviting you to be part of this study because you are over 65 and living in one of our nominated study locations.

3. 'What does this study involve?'

If you decide to help us in this study we will be asking you to fill in a very short questionnaire which will ask you about your physical activities over the past seven days and what value you place on being physically active. We estimate that it will take no more than 10 minutes to complete the survey.

Your involvement in this study would be entirely voluntary. While we would be pleased to have you participate, we respect your right to decline and there will be no consequences to you if you decide not to participate. If you decide to discontinue participation at any time, you may do so without providing an explanation. All information will be treated in a confidential manner, and your name will not be used in any publication arising out of the research. All of the research information will be kept in a locked cabinet in the office of Ms Sharon Hetherington at the University Department of Rural Health and not accessible to anyone outside of the research team.

4. Are there any possible benefits from participation in this study?

Your participation in this study will help to improve our understanding of older people's exercise patterns and may provide valuable information to those designing programs and delivering services in your area.

5. Are there any possible risks from participation in this study?

There are no specific risks anticipated with participation in this study.

6. What if I have questions about this research?

If you would like to discuss any aspect of this study please feel free to contact the Chief Investigator, Dr Peter Orpin on ph 6226 7344 or researcher Ms Sharon Hetherington on

63244067. We would be happy to discuss any aspect of the research with you. We will be holding meetings in your community to give you feedback on the survey results. You are welcome to contact me at that time to discuss any issue relating to the research study.

This study has been approved by the Tasmanian Social Science Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study you should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. You will need to quote H10153.

Thank you for taking the time to consider this study.

If you wish to take part in it, please sign the attached consent form.

This information sheet is for you to keep.

Appendix I: Secondary site survey



University Department of Rural Health

Locked Bag 1372 Launceston

Tasmania 7250 Australia

Telephone (03) 6324 4067

Facsimile (03) 6324 4040

CONSENT FORM

ID: 6000

Title: Physical Activity and Healthy Ageing: The Effects of Enhanced Social Support

1. I have read and understood the 'Information Sheet' for this project.
2. The nature and possible effects of the study have been explained to me.
3. I understand that the study involves filling in a survey.
4. I understand that participation involves minimal risk.
5. I understand that all research data will be securely stored on the University of Tasmania premises for five years, and will then be destroyed.
6. Any questions that I have asked have been answered to my satisfaction.
7. I agree that research data gathered from me for the study may be published provided that I will not be identified as a participant.
8. I understand that the researchers will maintain my identity confidential and that any information I supply to the researchers will be used only for the purposes of the research.
9. I agree to participate in this investigation and understand that I may withdraw at any time without any effect, and if I so wish may request that any data I have supplied to date be withdrawn from the research.

Name of Participant: _____

Signature: _____

Date: _____

Statement by Investigator

☐ I have explained the project & the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☒ The participant has received the Information Sheet where my details have been provided so participants have the opportunity to contact me prior to consenting to participate in this project.

Name of Investigator

Sharon Hetherington

Signature of Investigator



University Department of Rural Health

Locked Bag 1372 Launceston
Tasmania 7250 Australia
Telephone (03) 6324 4067
Facsimile (03) 6324 4040

Name: _____ ID code: 6000

Mailing Address:

Contact Phone: _____

Gender: Male Female
(please circle)

Year of Birth:

Accommodation:

House	Unit	Shared	Other please specify _____
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Please make sure you have **signed the consent form** on the front page before you start the survey.

7 Day Recall Physical Activity Survey

Think about the past **7 days**. Write down, **to the nearest half hour**, how long you spent on each of the past 7 days in the following activities.

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Sleeping (approximately how long were you in bed on each of these nights?)							
Moderate activities (for example: walking, Tai Chi, light gardening or activities of a similar intensity)							
Hard activities (for example: dancing, floor cleaning, heavy gardening, or activities of similar intensity)							
Very hard activities (for example: running, swimming, chopping wood, or activities of similar intensity)							

VALUE OF PHYSICAL ACTIVITY

Please read the following statements about physical activity and complete the sentences using the scale below each sentence. Pay attention to the wording of the sentences.

Circle the point on the line that is closest to your answer. If you need to change your answer, please put an "X" over the circle and circle another point on the line.

A01. In general how do you find participating in physical activity?

Very boring Very interesting
 |-----|-----|-----|-----|

A02. How much do you like participating in physical activity?

Not at all Very much
 |-----|-----|-----|-----|

A03. How important is being able to participate in physical activity to you?

Not at all important Very important
 |-----|-----|-----|-----|

A04. In general, how useful is physical activity to you?

Not at all useful Very useful
 |-----|-----|-----|-----|

A05. How valuable is participating in physical activity to you?

Not at all valuable Very valuable
 |-----|-----|-----|-----|

A06. Participating in regular physical activity takes up how much of your time?

No time A great deal of time
 |-----|-----|-----|-----|

A07. How much does participating in regular physical activity cost you?

Nothing |-----|-----|-----|-----| A lot of money

A08. How much effort does it take for you to participate in regular physical activity?

Not effort at all |-----|-----|-----|-----| A great deal of effort

A09. How difficult is it for you to participate in regular physical activity?

Not at all difficult |-----|-----|-----|-----| Very difficult

A10. How many of your friends participate in regular physical activity?

None of my friends |-----|-----|-----|-----| All of my friends

A11. How many of your family members participate in regular physical activity?

None of my family members |-----|-----|-----|-----| All of my family members

Appendix J: Thematic analysis node structure

- Available Activities
 - Township
 - Village
- Location specific comments
- Physical activity
 - Barriers
 - Motivators
 - Perceptions
 - Prompting events
 - Self description
- Resources
 - Facilities
 - Transport
- Social support
 - Family
 - Friends
 - Others