Active Ageing in The Community.

Exploring the Role of Community Activity Groups for Older Adults for Physical Activity, Health and Wellbeing.

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Abstract

The proportion of older adults (60+ years) globally, is predicted to more than double between 2017 and 2050. Ageing is often associated with declining health and physical capacity, but has the potential to be a positive experience, often termed Active Ageing or successful ageing. The promotion of Active Ageing within the community, is important, to ensure positive experiences of older adults, and to lessen the burden that older adults have on health and social services. Physical activity (PA) and social support are key determinants of Active Ageing, however, PA declines with age.

The aim of this PhD was to investigate Active Ageing in the community, through participation in volunteer-run community activity PA and social programs. This research adopted a case-study approach, specifically the community organisation and associated activities, was Life Activities Clubs Victoria (LACVI). This research included two systematic reviews (study 1), a longitudinal self-report quantitative survey study (n=35, mean age=67) administered in three waves (baseline, six and twelve months) analysed using linear mixed models, and four focus groups (n=24) which were analysed using thematic analysis. A mixed-methods study synthesising results from the survey study and two focus groups (n=11) explored the impact of participation in social and PA programs on social wellbeing, PA and health (study 2a and b). The final qualitative study, analysed the four focus groups, including participants from LACVI and other community activity programs (e.g. Men's Shed). This study explored how and why participation in PA and social programs impact wellbeing.

Study 1. The systematic reviews investigated the association between social support or social integration and PA. In summary, social support for PA and social integration factors, having large friendship networks, and connecting widely and regularly with people, were positively associated with PA levels.

Study 2 a and b. Synthesis of the findings of the mixed methods study suggested that program participation significantly reduced loneliness. In addition, participants felt they gained social connectedness through program participation and this was especially important at times of significant life events. The studies suggested that socially oriented PA programs increased motivation to adhere to PA programs long term. This was supported by maintenance of PA levels over one year in the PA groups compared to reduction over one year in social group participants.

Study 3. The final qualitative study utilised a leisure-based model of wellbeing to explore the aspects of program participation that older adults felt were important for their wellbeing. in summary, older adults appreciated groups that they could identify with, in order to develop new social contacts, with activities that gave them control, enjoyment, meaning and challenge in their lives. The analysis suggested that both social and PA programs could provide these.

Overall, this program of research suggests that community activity programs for older adults offer a variety of benefits for older adults and thereby promote Active Ageing, especially when a variety of types of activity are offered in one setting, with a social focus and in a way that older adults feel they can relate to.

Student Declaration

Doctor of Philosophy by Publication Declaration

"I, Gabrielle Lindsay Smith, declare that the PhD thesis by Publication entitled *"Active Ageing in the Community. Exploring the Role of Community Activity Groups for Older Adults for Physical Activity, Health and Wellbeing"* is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work".

Signature  Date 5 March, 2019

Details of Included Papers: Thesis by Publication

VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

DETAILS OF INCLUDED PAPERS: THESIS BY PUBLICATION

Chapter No.	Paper Title	Publication Status (e.g. published, accepted for publication, to be revised and resubmitted, currently under review, unsubmitted but proposed to be submitted)	Publication Title and Details (e.g. date published, impact factor etc.)
3	The association between social support and PA in older adults: A systematic review	Published	Journal of Behavioural Nutrition and Physical Activity. Q1 Journal, Impact Factor (2018) 5.548. 25 citations in Crossref at 22 Feb, 2019
5	A mixed methods case study exploring the impact of membership of a multi-activity, multicentre community group on social wellbeing of older adults	Published	BMC Geriatrics. Q1 Journal. Scimago H Index = 51. Impact factor (2017) 2.866.
6	A mixed-methods case study exploring the impact of participation in community activity groups for older adults on physical activity, health and wellbeing	Currently under 2nd journal review after author revisions with positive feedback	BMC Geriatrics. Q1 Journal. Scimago H Index = 51. Impact factor (2017) 2.866.
7	Important psychosocial factors for subjective wellbeing in older adults engaged in community groups. A qualitative comparison of social and physical activity programs	Currently under review	Journal of Aging and Physical Activity Q1 Journal, Scimago H index =49 Impact factor (2017) 2.038

Declaration by [candidate name]: **Signature:** **Date:**

Gabrielle Lindsay Smith G Lsmith 5 March 2019

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Contents

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List of Abbreviations

ANOVA	Analysis Of Variance
AR1	Fist Order Autoregressive Correlation Structure
ASGC-RA	Australian Standard Geographical Classification – Remoteness Area
COTA	Council of The Aged
DRAMMA	Detachment, Recovery, Autonomy, Mastery, Meaning and Affiliation
EPRA	Early Planning for Retirement Association
FG	Focus Group
HR QOL	Health Related Quality Of Life
LAC	Life Activities Club
LACVI	Life Activities Club Victoria
LMM	Linear Mixed Models
LPFA	Life Planning Foundation Of Australia
LTPA	Leisure Time Physical Activity
MCS	Mental Health Component Score For The Sf-12 Quality Of Life Scale
MET	Metabolic Equivalent of Task
MVPA	Moderate to Vigorous Physical Activity
n	Number of Participants
PA	Physical Activity
PCS	Physical Health Component Score for the Sf-12 Quality Of Life Scale
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
QOL	Quality of Life
RCT	Randomised Controlled Trial

SDT	Self-Determination Theory
SF-12	Short-Form Version. Twelve Question Quality of Life Scale.
SR	Systematic Review
SS	Social Support
SSPA	Social Support for Physical Activity
SST	Socioemotional Selectivity Theory
SWB	Subjective Wellbeing
U3A	University of The Third Age
UK	United Kingdom
UN	United Nations
USA	United States of America
WHO	World Health Organisation

Chapter 1 Introduction

An ageing population

The promotion of active and healthy ageing is becoming more important as the population ages. A reduction of fertility rates and improved health care has meant that the proportion of the population who are considered to be 'older'; defined as those who are over the age of 60 (United Nations, 2013); is growing more rapidly than any other age-group world-wide. In 2017, the number of older adults globally was 962 million and is projected to more than double to 2.1 billion by 2050. The same trend is being seen in Australia with 22-25% of Australians predicted to be aged over 65 years in 2056, compared with only 14% in 2012 (Australian Bureau of Statistics, 2013c). For the purpose of this research, health was defined as health-related quality of life (HR QoL) (Ware, 1996) and the subjective health reported by focus group participants. Wellbeing was defined as mental wellbeing in this study, which is a common utilisation of the term (Steptoe, Deaton & Stone, 2015)

Impact of ageing on health and wellbeing and health care systems

Ageing is typically associated with a decline in health and function, and an increased risk of developing non-communicable diseases. After 60 years of age, the major causes of morbidity and mortality are age related vision, hearing and mobility losses as well as non-communicable diseases such as heart disease, stroke, respiratory disorders, cancer and dementia (World Health Organisation, 2015b). In 2012, 87% of older Australians reported having a long-term health condition, compared with 31% of people under 65 years (Australian Bureau of Statistics, 2013b). Therefore, the predominance of these conditions will rise with an ageing population (World Health Organization, 2011).

It is clear that an ageing population will lead to a greater incidence of chronic illness globally, and this will place a growing burden on health care systems worldwide (World Health Organisation, 2015b). However, considering a purely medical perspective on what constitutes healthy ageing fails to capture the full story. When studying 'ageing' it is vital to not only look at health in terms of the absence of disease, but also to also consider other human rights factors of older people including *"independence, participation, dignity, care and self-fulfilment"* (World Health Organization, 2002, p12). Healthy ageing is more than just adding years to life, but also about adding quality to longer lives (World Health Organisation, 2015b). Therefore, theories that include psychosocial elements of ageing well, are more

reflective of the lived experience and needs of older adults, than purely biomedical models of healthy ageing.

Benefits of an ageing society

Research has demonstrated that quality of life (QoL) is an important consideration for population indicators of economic wellbeing and social progress, and that measures of QOL and wellbeing should be included in addition to traditional economic statistics such as Gross Domestic Product (Stiglitz, Sen, & Fitoussi, 2010). Older adults should not be viewed as purely an economic burden to society, because an appropriately supported ageing population add significant social and economic benefits to society. It has been demonstrated recently that when policies are in place allowing older people to contribute in areas where they possess skills, an increase in life expectancy of a country increases "output per hour worked, per worker and per capita" (Franklin, 2018, p4). For example, older adults can contribute their skills by training younger co-workers (Franklin, 2018). There have been a number of gerontological wellbeing theories developed to explain the mechanisms enabling positive wellbeing in older age and these are outlined below.

Theories relating to health and wellbeing in older age

Activity Theory of ageing

This theory was developed by Robert Havighurst in 1961 (Havighurst, 1961), as a response to the negative social theory of ageing, the Disengagement Theory published soon before it (Cumming & Henry, 1961). The Disengagement Theory suggested that there is a withdrawal from mainstream social roles such as work and relationships and a mutual withdrawal away from older adults by society in preparation for death (Cumming & Henry, 1961). In contrast, the Activity Theory states that people are more likely to experience positive wellbeing in their later lives when they are able to continue to take part in activities that are similar to what they participated in during their middle years. Often this requires taking up a modified version of an activity or gaining new social relationships that meet the individual's needs. For example, substitutions for work, or starting new but similar clubs or social activities. The activity theory has stronger support than the Disengagement Theory but there are some situations where the Activity Theory is not supported. For example, it fails to recognise the individual differences in preference for maintaining activity; some older adults prefer not to

maintain activity engagement as they age (Bruggencate, Luijkx, & Sturm, 2017). Additionally, chronic illness may preclude them from maintaining engagement but does not always lower life satisfaction or emotional wellbeing (Young, Frick, & Phelan, 2009).

Continuity Theory

The Continuity Theory was first proposed by George L Maddox in 1968 (Maddox, 1968) and then Robert Atchley in 1971 (Atchley, 1971) as a progression of the theories above. It suggests that as people age, they tend to retain the same lifestyles, habits and personalities that they developed during their earlier lives. This theory proposed that as people age, if they are required to give up activities or relationships for some reason they will make substitutions that are as similar as possible to maintain continuity in their lives (Maddox, 1968; Atchley, 1971).

Contemporary ageing theories

The early social gerontology theories relating to wellbeing in older adults described above (Activity Theory, Disengagement Theory and Continuity Theory) have recently been critiqued for being too narrow as they failed to recognise the vast variety of experiences that individuals have of ageing, resulting from different political and social structures, environments and individual developmental dynamics (Bowling, 2008). More contemporary ageing theories take some or all of these factors into account.

Socioemotional selectivity theory

The Socioemotional Selectivity Theory (SST) (Carstensen, 1991) is a life-span motivational theory. It proposes that the needs for emotional and social contact change at different ages. Older adults tend to adapt their social networks and activities to *"maximise social and emotional gains and minimize social and emotional risks"* (Carstensen, 1992, p 331). In the earlier years of life, people tend to have a preference for a large number of novel relationships because this type of interaction tends to offer many learning opportunities. Novel relationships also require significant energy expenditure and carry negative emotional risks. The SST proposes that with increasing age there is a preference for emotionally rewarding relationships and less need for learning gained through novel relationships. Therefore, the general reduction in size of one's social network that occurs with increasing age is a reflection of the gradual change over the life-course rather than a sudden occurrence. The later developments of this theory also propose that it is time left in life, rather than

chronological age, that is important. That is, as the end of life approaches, learning is perceived to be a less important goal than emotional gratification. It is this change in relationship goals that makes older adults focus on emotionally meaningful relationships, rather than novel interactions. It has been observed that the perspective of time left in life can be changed by events such as relocation or socio-political changes. These may lead to a reduced time perspective (e.g. diagnosis of terminal illness) or expansion of time perspective (e.g. relocating) and a preference for close or novel social relationships respectively (Fung, Lai, & Ng, 2001; Löckenhoff & Carstensen, 2004).

Successful Ageing

The most recent gerontological wellbeing theories have taken a broader perspective than those above. They typically include both social and biomedical perspectives of health; with a life-course focus. These "Successful Ageing" theories (Rowe & Kahn, 1997) propose that ageing is not just a definite period of decline of health and wellbeing but that individual behaviours can modify the course of the ageing process. The seminal work of Rowe and Kahn defined successful ageing as a *"low probability of disease and disease-related disability, high cognitive and physical functional capacity, and active engagement with life" (Rowe & Kahn, 1997, p 433).* Since then there have been developments in the literature, but typically studies have a utilised a wide range of definitions. These additional studies have added to the area but also complicated the field and made consensus of successful ageing definitions more challenging. A review of 28 quantitative studies found that successful ageing was defined differently in each of the included studies, with the majority only considering measures of disability or physical functioning. Social and wellbeing factors were included in only a few of the studies (Depp & Jeste, 2006). In contrast, qualitative studies of older adults' opinions on successful ageing have found that while good physical and mental health and maintaining physical activity levels are agreed to assist successful ageing, being independent or doing something of value, acceptance of ageing, life satisfaction, social connectedness or keeping socially active were of greater importance (Song & Kong, 2015; Tate, Lah, & Cuddy, 2003). Also, happiness (positive affect) has been shown to be protective of future mortality in a large longitudinal study of health in the UK. Respondents with the highest tertile of reported positive affect were 34% less likely to die over the period studied than those in the lowest tertile group after controlling for demographic and health factors (Steptoe & Wardle, 2011).

Active Ageing

Recognising the limitation of utilising only a social or biological perspective of healthy ageing, the World Health Organisation (WHO) considered the early social gerontology theories in addition to biological perspectives and added these to the life course perspective, which also considers the varying influences on health and wellbeing at different life stages and in different contexts. "Active Ageing" is the term that describes "*the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age"* (World Health Organization, 2002, p12). 'Active' does not simply imply the ability to do physical activity but active participation in *"social, economic, cultural, spiritual and civic affairs"* (World Health Organization, 2002, p12). It was proposed that if older adults were enabled to age actively, they would experience a good QoL with increasing age (Bowling, 2008). In other words, "adding life to years" (Ku, Fox, & Chen, 2016, p1350). The Active Ageing framework, published in year 2002 identified six determinants of Active Ageing: economic, behavioural, personal, social, health and social services, and the physical environment (Figure 1-1)

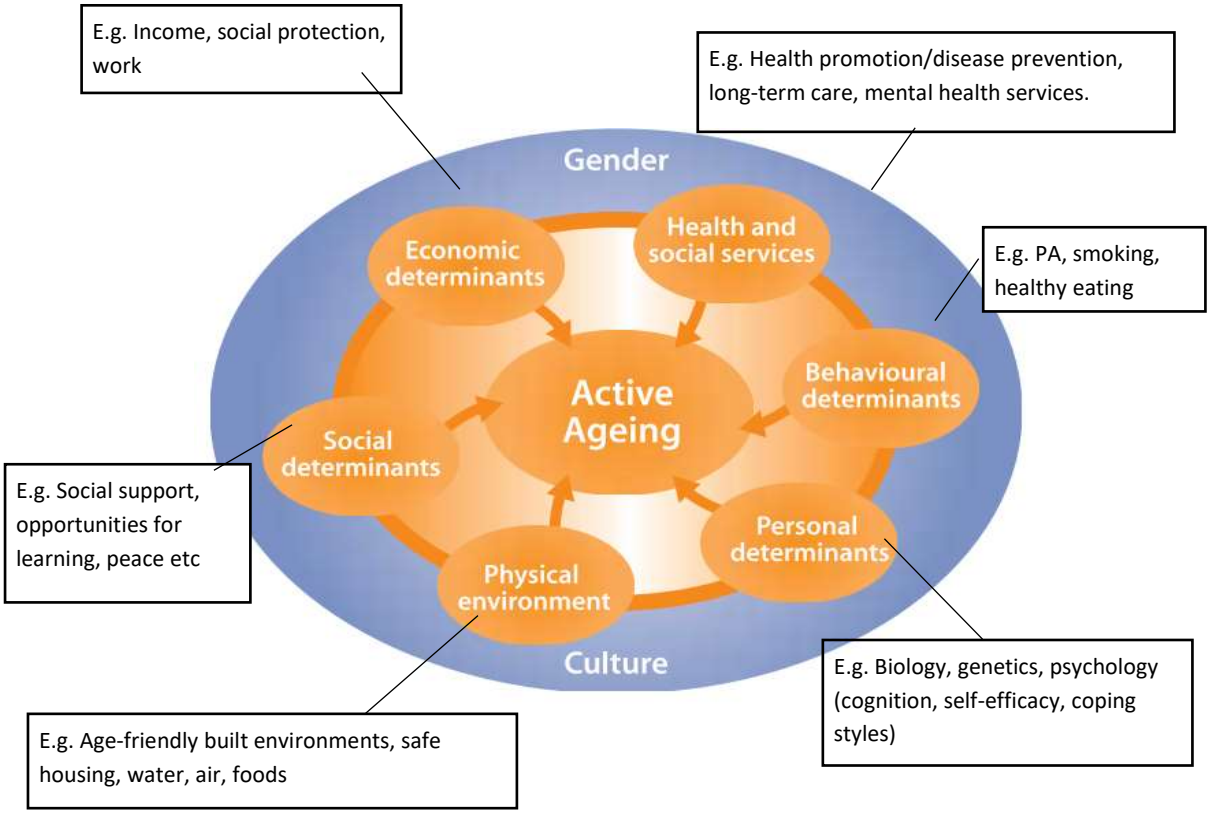

Figure 1-1:Determinants of Active Ageing (from WHO, 2002 p 19)

The World Report on Ageing and Health published in 2015 examined the results so far relation to Active Ageing on a global scale. The recommendations for future success incorporated the previous recommendations, in addition to the guidance made in the Political Declaration and Madrid international plan of action on ageing, and international human rights norms and standards recommendations. It utilises the term "Healthy Ageing"; defined as *"the process of developing and maintaining the functional ability that enables well-being in older age".* Functional ability is the ability to achieve the things that people have reason to value, such as *"a role or identity, relationships, possibility of enjoyment, autonomy, security, potential for personal growth"* (World Health Organisation, 2015b, p28).

To simplify the language in this thesis we will utilise the phrase 'Active Ageing' to refer to the above Healthy Ageing or Active Ageing concepts.

Active Ageing in the context of this PhD research.

When considering programs and policies for Active Ageing, the WHO utilises a life-course perspective, which recognises that there are many entry points for action across the ageing cycle but that all should have one goal to "foster functional ability" (see Figure 1-2). Most of the Active Ageing theories and frameworks recognise that both social relationships and physical activity are key determinants of this process. The focus of this program of research are programs that particularly target people with high and stable capacity (see Figure 1-2) to allow them to maintain their functional capacity or improve it. Two aspects of life that are identified as being relevant for functional capacity of older adults are maintaining social relationships and undertaking regular physical activity (World Health Organisation, 2015a; World Health Organization, 2002). Therefore, health promotion programs encouraging positive social relationships and PA will be the focus of the PhD program of research. Socially-oriented activity programs can take the form of either social-only programs (e.g. board games, dine-outs, movie groups, book groups, craft groups) or physical activity programs (e.g. walking, table tennis, dancing). Given the multi-facetted nature of Active Ageing, the program of research will explore a variety of interconnected concepts. The primary idea is that socially-focused programs may improve social relationships for older adults and then this may have trickle down effects on health, wellbeing and PA. After exploration of the impact of participation in social or PA programs on social wellbeing, the impact on PA, health and wellbeing will be further explored.

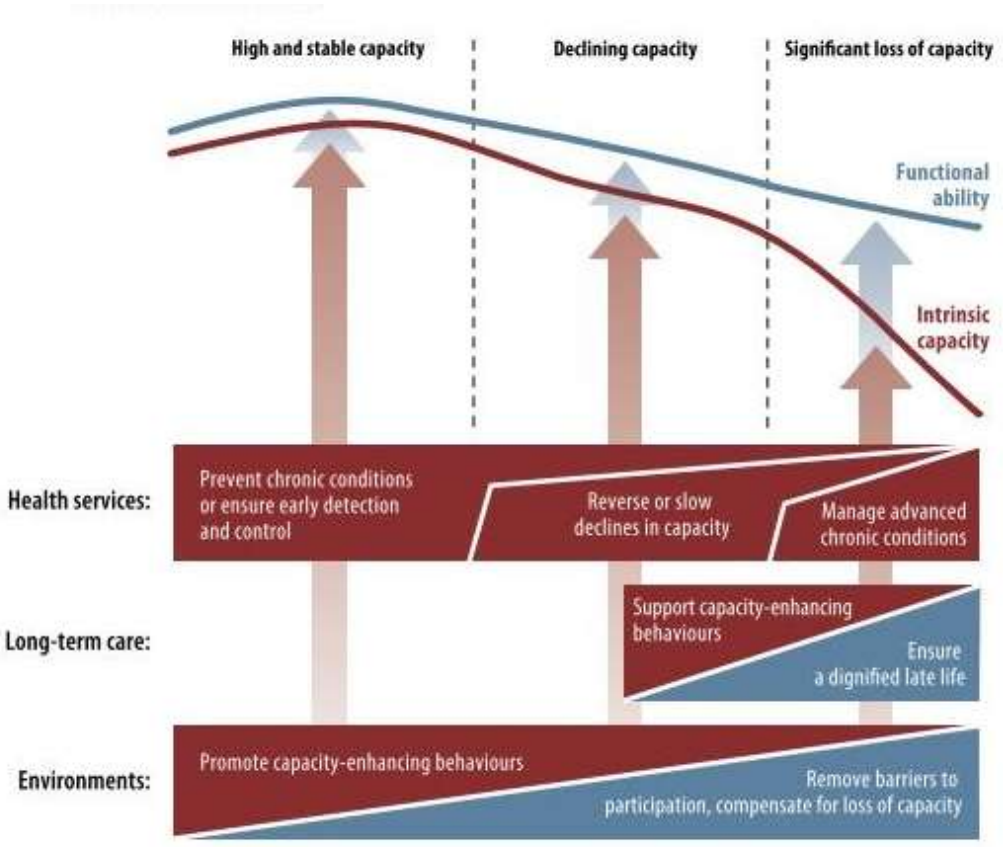

Figure 1-2. Opportunities for action relating to Healthy Ageing across the life course (World Health Organisation, 2015b, p32)

Social factors for Active Ageing

Social relationships and Active Ageing

Personal relationships are a key factor contributing to Active Ageing, because they are highly valued (World Health Organisation, 2015b) and can impact health, wellbeing and longevity (Umberson & Karas Montez, 2010). Social relationships have long been known to be influential to health, beginning with the work of Emile Durkheim, published in 1951, showing that erosion of societal connectivity at times of political unrest is associated with increased mortality rates through suicide, cardiovascular disease and homicide (Berkman, Glass, Brissette, & Seeman, 2000; Durkheim, 1951). Following on from this work, Cassel (1976) and Cobb (1976) reviewed a large body of human and animal evidence and concluded that social relationships were beneficial for health. They demonstrated that having people in one's life whom make a person feel loved and cared for enables a greater capacity to cope with stressful life events. Around the same time as this clinical work was taking place, large

epidemiological studies showed that the size and inclusion of different types of relationships in one's social network reduced mortality risk (Berkman & Syme, 1979).

There are two major constructs of social relationships that relate to health, social support and social integration. Both have the ability to prevent the negative effects of stress (stress-buffering hypothesis) (Cobb, 1976; Cohen & Wills, 1985; Thoits, 1982). Additionally, simply being in social relationships may directly influence health (main effects hypothesis) (Berkman & Syme, 1979; Cohen, 2004; House, Landis, & Umberson, 1988). These two constructs are defined below in addition to proposed mechanisms for how they impact health.

Definitions and theory of social relationships relating to this PhD research

Social support

There are many definitions of social support in the literature. A critical appraisal of the literature by Williams, Barclay and Schmied (2004) found 25 variations. The key themes from this study have been summarised into a concise definition for this PhD research*:* social relationships that are reciprocal, accessible and reliable and provide any or a combination of supportive resources (e.g. emotional) and distraction from stressors or information (Williams et al., 2004). Three types of social support are described. These are *instrumental support*- provision of material aid**,** *informational support*- provision of advice, and *emotional support*- expression of empathy and caring and opportunity for emotional expression (Cohen, 2004). Social support can come from a variety of different sources. For example, spouses, relatives, friends, neighbours, co-workers, or superiors.

Social integration

Social network typically refers to social network size, whereas social integration is a more complex construct incorporating both social network and regular participation in a variety of types of social relationships (Berkman & Syme, 1979; House et al., 1988). Some definitions of social integration also include an identification with one's social role (Cohen, 2004). In the literature, there is also classification of social integration measures of social relationships as being *structural social support* (presence of relationships) whereas the quality of social relationships (social support), is sometimes referred to as *functional social support***.** There is a distinction between existence of social relationships and the functions provided by these. So, the structure would be the number of friends, colleagues, family relationships a person has. The functional aspect would refer to what these relationships do. In essence, having many

relationships does not immediately imply that they are high quality. For example, a study examining the association between different network variables and perceived social support found that only the variables of amount of contact with people in network (e.g. friends and family) were related to support, not size of network or physical distance from other network members (Stephens, Noone, & Alpass, 2014). Loneliness, defined as a perception of an inadequacy in the quality or quantity of one's social relationships (de Jong Gierveld, Van Tilburg, & Dykstra, 2006), is likely to exist when people are unsatisfied with their social relationships.

The relationships between social support, health and wellbeing

There is some supporting evidence that social support received from friends and family can have positive health and wellbeing benefits for older adults. A positive association has been found between receiving social support from friends and family and physical and mental HR QoL in older adults in both cross sectional (Lee, Arozullah, Cho, Crittenden, & Vicencio, 2009) and longitudinal studies (Chang, Wray, & Lin, 2014). Additionally, emotional support seems to be the most important of the three support types for physical and mental HR QoL (Wong et. al, 2014). Giving social support also appears to be important for QoL in older adults because it allows them to 'feel useful' (Gruenewald, Karlamangla, Greendale, Singer, & Seeman, 2007). Social support appears to be particularly important for mental HR QoL in older adults, with a greater number of studies finding an association with mental HR QoL or life satisfaction than physical HR QoL (Chen & Feeley, 2014; Guindon & Cappeliez, 2010). Some comparative studies found a positive association between social support and mental HR QoL and social support but not physical HR QoL (Walen & Lachman, 2000). Some studies have also found that social support typically leads to greater mental HR QoL and then this mediates physical HR QoL (Portero & Oliva, 2007). Whilst there is fairly strong evidence that social support has a positive association with HR QOL and especially Mental HR QoL, the presence of studies finding social support to be negatively associated with HR QoL should not be ignored (Bozo & Guarnaccia, 2009; Croezen et al., 2012) and it is likely that the importance of social support for health varies between individuals (Snowden et al., 2015). This implies that no blanket statements regarding the benefits of social support for older adults can be made and that it is likely to be beneficial for the health of older adults, but may in some contexts or for some individuals have a negative impact.

The relationships between social integration, health and wellbeing

The evidence relating to social integration appears to particularly centre on physical health benefits relating to social integration. Social isolation is particularly detrimental to health and a number of large epidemiological and prospective longitudinal studies have shown that people with a degree of social integration are significantly less likely to die or suffer from non-communicable diseases such as dementia, diabetes and cardiovascular disease than those who are socially isolated (Berkman & Syme, 1979; Crooks, Lubben, Petitti, Little, & Chiu, 2008; Giles, Glonek, Luszcz, & Andrews, 2005; Holt-Lunstad, Smith, & Layton, 2010; Reifman, 1995; Rizzuto, Orsini, Qiu, Wang, & Fratiglioni, 2012). The benefits of social integration are not necessarily linear however, with moderately sized social networks appearing to offer similar health benefits to larger ones (Han, Tavares, Evans, Saczynski, & Burr, 2017; Holt-Lunstad et al., 2010; Ishikawa et al., 2016; Pynnonen, Tormakangas, Heikkinen, Rantanen, & Lyyra, 2012). Having larger networks of close friends with regular social contact in later life appears to reduce mortality risk ten years later by up to 32% compared to people in the lowest tertile of friendship network size (Giles et al., 2005). It is likely that both good quality and adequate quantity of social relationships are both necessary for good health and some types of relationships may be particularly beneficial for older adults.

There are a number of aspects of social integration that have been found to be beneficial for mental health in older adults. For example, in a longitudinal study, regular social participation and being more socially integrated such as a larger network, were both predictive of good mental health two years later (Santini et al., 2017). A related study found that people with a smaller confidante network, that is, fewer people to talk to about feelings, were more likely to suffer from symptoms of anxiety (Fung & Lam, 2017). Additionally, loneliness has a negative association with health and mortality in older adults (Luo, Hawkley, Waite, & Cacioppo, 2012). This suggests that possibly one factor linking more social integration to mental health is more opportunities to develop confidantes, with whom people can share their problems. Other studies have reported that having a diverse social network (a variety of types of relationships) also appears to be beneficial for mental health, especially when compared to having more restricted networks (Fiori, Antonucci, & Cortina, 2006; Windsor, Rioseco, Fiori, Curtis, & Booth, 2016). This may relate to having more enjoyment or diversity in life - stimulating wellbeing. Alternatively, a recent study has reported that people with restricted social networks had lower physical activity levels and this was predictive of greater

depression three years later. However, social isolation itself did not predict depression (Herbolsheimer, Ungar, & Peter, 2018).

Thus, the size, quality and variety of one's social connections all appear to be important for mental and physical HR QoL and may act via different mechanisms. Some potential mechanisms are explored below.

Mechanisms linking social relationships with health

Social support

The primary hypothesis explaining the association between social support and health is through a stress-buffering mechanism (Cobb, 1976; S. Cohen & Wills, 1985; Thoits, 1982). Stress has the potential to be deleterious on the body through one of two mechanisms. The first is by encouraging maladaptive behaviours such as smoking, overeating, sedentary behaviour or alcohol consumption. The second is a physiological response whereby social support may dampen the hypothalamic-pituitary-adrenal cortical axis response to stress (Hostinar, Sullivan, & Gunnar, 2014). It has been hypothesised that social support can buffer against stress at the behavioural and physiological levels. i.e. i) The presence of supportive relationships may help people cope with their stress and not adapt negative behaviours. ii) The presence of supportive relationships may increase one's capacity to deal with the stressful situation, thus reducing the physiological stress response to the situation (Cohen, 1985; Cobb, 1976; Thoits, 1982).

Social integration

Social integration is hypothesised to influence health irrespective of the presence of a stressful situation. Access to multiple relationships provides stable roles and potential for enjoyment and wellbeing. In addition, access to more relationships is likely to be a source of motivation and social pressure for self-care (Cohen, 2004; Berkman & Syme, 1979; House, Landis & Umberson, 1988). It is likely that having access to multiple relationships then impacts health through either improved neuroendocrine functioning or by the group providing positive normative health behaviours which the individual would be more likely to follow. The effect of social integration on health is sometimes also referred to as the 'main effects hypothesis' because the effect is not reliant on the presence of a stressful situation (Loucks, Berkman, Gruenewald & Seeman, 2006).

It is clear that neither social support or social integration are associated with health and wellbeing independently. It is also not possible to have social support without a social network and connecting socially with others. However, it is not as simple as assuming that people with larger networks have more support and better health and wellbeing as mentioned above. The convoy model of social relations developed by Kahn and Antonucci (1980) demonstrates the protective function of social relationships across the lifespan, especially those that are emotionally close. This theory emphasises that relationships vary in their quality, structure and function and the way that these three interact is what impacts health and wellbeing. They also stated that these factors are all influenced by personal and environmental characteristics that individuals experience at any one time in their lives. This helps to explain the inability to simply predict the effect of social relationships on health. It now recognised that in most situations the quality of relationships is more predictive of physical and mental health than size of network alone (Fiori, Smith, & Antonucci, 2007) but that it is likely that having more social contact in one's life (more diverse contact ideally) may increase the likelihood of having greater social support and thus better health and wellbeing (Gilmour, 2012; Stephens et al., 2014). Additionally, the social convoy model emphasises that support from different sources (e.g. friends or family or neighbours) may have different effects on health and wellbeing (Antonucci, Ajrouch, & Birditt, 2014). This indicates that, for older adults, the amount of contact time spent with friends and family is likely to increase social support. Therefore, interventions that increase social contact and encourage meaningful social engagement are likely to be valuable for the mental and physical health of older adults.

Participating in groups for health

There are many ways that people can interact socially with people around them and many ways that social networks can differ. As described above, the size and amount of social integration appears to be important for health and wellbeing, as does the quality of the interactions, which can lead to social support. Social participation describes the interactions themselves and is defined as "*the conduct of actions in which individuals share (a part of) their resources with others"* (Bukov, Maas, & Lampert, 2002, p510). Social integration is therefore, an aggregate of the amount of all the social participation occurring in a person's

life and social support describes the quality of social participation and social integration may increase social support (Gilmour, 2012; Stephens et al., 2014).

It has been previously hypothesised that different types of social participation can be defined based on the type of resources shared and that each type is likely to have different effects on health (Bukov et al., 2002). The researchers describe three types of social participation – collective social participation, productive participation and political participation. In collective social participation (or group membership), members are primarily aiming to spend time together or socialise, as in leisure groups (Bukov et al., 2002). In some cases, they may also work toward collective productive goals, but this is not a requirement to be classed as social participation. The main function of this type of group would therefore relate primarily to being a source of emotional support (Mannell, 2007). Productive social participation is the second type and has the goal of "rendering goods, services and benefits for others" (Bukov et al., 2002; p511). In this type of participation, other resources such as special skills are shared (e.g. voluntary work, caregiving). Political participation is the final type and is concerned with decision-making and allocation of resources. This type of participation requires the input of the other two types of resources plus special social knowledge or skills.

Collective social participation appears to be particularly important for health and wellbeing of older adults. For example, collective rather than productive social participation was protective of mortality and also physical and mental health 17 years later (Pynnonen et al., 2012) and frequent participants of social activities were 57% more likely than those who did no activities to display a greater number of positive wellbeing outcomes (Vozikaki, Linardakis, Micheli, & Philalithis, 2017). Collective social participation also appears to be particularly important for maintaining cognitive ability in older adults, even more so than socialising individually (Glei et al., 2005; C. Haslam, Cruwys, Milne, Kan, & Haslam, 2016 ; Lee & Kim, 2016; C. Haslam, Cruwys, & Haslam, 2014). The importance of collective social participation or socialising in groups appears to increase with age (C. Haslam, Cruwys, & Haslam, 2014). The above evidence supports the importance of collective social participation for the health and wellbeing in older adults and supports the utilisation of group social participation as an intervention for maintenance of Active Ageing in older adults. The mechanism that has been proposed to link social participation with better health has been suggested to be related participating in groups that people identify with, which then can lead to increased social support and better wellbeing or health (C. Haslam, Cruwys, Haslam, Dingle, & Chang, 2016; C. Haslam et al., 2017). This theory was derived from original

theories of Social Identity (Tajfel, 1974) and Self-Categorization (Turner et al., 1994) and psychological researchers have recently expanded the evidence and theory-base into the Social Identity Approach to Health (C. Haslam, Cruwys, Haslam, Dingle, & Chang, 2016; C. Haslam et al., 2017; C. Haslam, Cruwys, Milne, et al., 2016; Haslam, Jetten, Postmes, & Haslam, 2008). Key aspects of the Social Identity Approach to Health for improving health and wellbeing appear to be that when people identify strongly with groups that they participate in they are more likely to have access to social resources such as social support, social connectedness, and feel that their life has meaning and that they have a sense of self-control. These social resources that they develop can then enhance their wellbeing and health (C. Haslam et al., 2018). Similar to Social Integration Approach to Health, another model has been developed to specifically explain how factors that relate to involvement in Leisure Activities (which can be social or independent) may contribute to wellbeing. This model is called the Detachment/Recovery, Autonomy, Mastery, Meaning and Affiliation Model of Subjective Wellbeing (DRAMMA- Newman et.al., 2014). Similar to the Social Integration Approach to Health it recognises that the ability to achieve social support, social connectedness (affiliation); meaning (same for the DRAMMA model) and sense of control (Autonomy) are important for wellbeing. It does not specify that these resources need to be derived socially because sometimes leisure can be undertaken individually. In addition to resources that are similar between the two theories, the DRAMMA model also recognises that detachment and mastery or challenge are important for wellbeing. These two additional resources could potentially be derived socially or individually through leisure. Because the DRAMMA model was derived specifically for Leisure Activity it was used for analysis in Chapter 7 in this thesis relating to community activity participation and wellbeing. Further explanation of the detail relating to the DRAMMA Model, and the Social Identity Approach to Health can be found in the Methods Section below.

Physical activity for Active Ageing.

Definitions and theory

PA is defined as "*any bodily movement produced by skeletal muscles that requires energy expenditure"* (Caspersen, Powell, & Christenson, 1985). The widely considered domains of PA are occupational, domestic (home duties), transport and leisure time physical activity (Bauman, Phongsavan, Schoeppe, & Owen, 2006). PA is distinct from exercise because it

includes all types of movements whereas exercise is a planned, structured PA that has an objective of improving or maintaining physical fitness (Caspersen et al., 1985).

Physical activity, health and wellbeing

Regular PA has well established health benefits for both physical and psychological health. Regular PA reduces all-cause mortality by approximately 30% (Services., 2008) and contributes to the prevention of chronic illnesses such as type two diabetes (Berlin & Colditz, 1990), cardiovascular disease, stroke (Lee et al., 2011) and various cancers (U.S. Department of Health and Human Services, 2008). In older people especially, physical activity has been shown to reduce falls risk (Campbell & Robertson, 2007) and has a beneficial effect on global functional measures including physical disability and participation in activities of daily living (de Souto Barreto, 2009; Hodge, English, Giles, & Flicker, 2013; Paterson & Warburton, 2010).

There are also clear benefits of PA for mental health across all ages with evidence that physical activity can reduce the risk and severity of depression and anxiety (Pasco et al., 2011; Pfaff et al., 2014; Stubbs et al., 2018; Underwood et al., 2013). In older people especially, physical activity has been shown to be positively associated with better QoL (de Souto Barreto, 2009; Paterson & Warburton, 2010) and reduced risk of Alzheimer's disease and dementia (Nunan, Mahtani, Roberts, & Heneghan, 2013; Reiner, Niermann, Jekauc, & Woll, 2013). It also appears physical leisure activities are particularly beneficial for wellbeing in older adults (Alidoust, Bosman, & Holden, 2019; Zhang, Feng, Lacanienta, & Zhen, 2017) and especially when run in a group situation (Windle, Hughes, Linck, Russell, & Woods, 2010).

Lack of physical activity in older adults

There are several guidelines indicating recommended PA levels for health benefits (Australian Government, 2014a; Pate et al., 1995; World Health Organization, 2010), which all recommend a minimum level of 150 minutes of at least moderate intensity PA per week to achieve 'adequate' levels of physical activity for health benefits. The Australian Government recommends that older adults undertake at least 30 minutes of moderate intensity physical activity on most (days of the week and try to maintain a variety of activities. In addition, it is recommended that older adults try to engage in some vigorous physical activity if possible (Australian Government, 2014a).

The proportion of adults meeting these guidelines decreases with age and is lowest in the oldest age groups. Approximately 60-70% of older adults in developed countries such as Canada, the United States of America (USA) and Australia are not sufficiently active to achieve health benefits (Australian Bureau of Statistics, 2014a; Gomes et al., 2017; Schoenborn, Adams, & Peregoy, 2013; World Health Organisation, 2015a).

Strategies for increasing PA in older adults

It is clearly important to consider the factors that may encourage greater participation in PA by older adults and develop strategies that have the potential to be sustainable in the long term. There are many individual factors such as poor education, low income, increasing age, poor health, fear of falling and cost that are associated with lower levels of PA in older adults (Koeneman, Verheijden, Chinapaw, & Hopman-Rock, 2011). However, individual strategies for PA promotion in older adults such as action planning or providing information about benefits of doing PA, goal setting or barrier management typically have small effect sizes in controlled trials (French, Olander, Chisholm, & Mc Sharry, 2014) and do not have successful long-term outcomes in relation to adherence to PA (Chase, 2015; O'Brien et al., 2015). Interpersonal strategies utilising social support or social engagement and promotion of existing PA programs in the community have had promising results in large randomised controlled studies, with the treatment groups having higher levels of PA during the study (Hughes, Seymour, Campbell, Whitelaw, & Bazzarre, 2009; Wilcox et al., 2009; Wilcox et al., 2006) and promising effects on PA maintenance post-study (McMahon et al., 2017). In addition, a review of interventions for increasing physical activities in community dwelling older adults found that system-oriented PA intervention strategies relating to social factors and environmental support for PA and enjoyment were more effective than purely individual cognitive strategies (Zubala et al., 2017). In addition to having potential to increase PA adherence in older adults, PA programs that foster supportive relationships development may also have social and wellbeing benefits for older adults (Fox, Stathi, McKenna, & Davis, 2007; Losito, Murphy, & Thomas, 2006).

Mechanisms linking social relationships with PA in older adults

There are many potential mechanisms whereby social support and social integration may influence physical activity. As mentioned previously, social relationships influence the adoption of good health behaviours, provide access to resources and enhance individual coping mechanisms (Newsom, Shaw, August, & Strath, 2018). Social cohesion within groups

may also encourage changes in physical activity levels through encouraging a social or group norm towards positive health behaviours (McNeill, Kreuter, & Subramanian, 2006). The Social Identity Approach to Health also suggests that adoption of positive behaviours such as PA are more likely if people are members of social groups with strong positive values and they identify with them. This group participation may lead to social support to undertake the positive health behaviours (C. Haslam, Cruwys, Haslam, Dingle, & Chang, 2016; C. Haslam et al., 2017; C. Haslam, Cruwys, Milne, et al., 2016; S.Haslam, Jetten, Postmes, & Haslam, 2009). Chapter three and four are reviews of the research evidence relating to the association between social support or social integration and PA in older adults.

Community groups

Defining community groups

The evidence presented to this point emphasises the importance of collective social participation (group activity) for development of social support and promotion of Active Ageing. Interpersonal strategies for promotion of physical activity are also clearly more important for older adults than intrapersonal strategies. Therefore, community groups are an appropriate setting for the exploration of a potential strategy for promotion of Active Ageing, which includes physical activity for health and wellbeing. The definition of what is meant by a community group or organisation in an Australian context will now be provided, along with some preliminary evidence of the effectiveness of such groups for Active Ageing.

The Australian Government defines a community organisation as *"any organisation engaged in charitable or other community-based activity operating under Australian law and not established for the purpose of making a profit"(Australian Government, 2014b, p1).* There are a variety of types of community organisations that exist in Australia. These include not-for-profit corporations, non-government organisations, private voluntary organisations, community- based and those managed by volunteers. A community organisation can incorporate more than one of these qualities, such as being non-profit, community-based and run by volunteers. Approximately 90% of community organisations in Australia are small organisations run voluntarily, relying on contributions of members, and funding from other sources, such as government or donations (Australian Government, 2014b, p985). These groups are sustainable, often run by volunteers and developed by people from within a community of interest (Bopp & Fallon, 2008).

The types of community groups that are a focus of this PhD program of research, are voluntary, community-run organisations offering social, hobby and physical activities programs in a social setting, primarily for older adults. They would fall into the category of collective social participation as defined earlier (Bukov et al., 2002). There are a variety of these types of community group available in Australia including Seniors Citizen Centres, University of the Third Age (U3A), Probus and Life Activities Clubs (LACs). Rather than being isolated programs of short-term duration, these groups offer activities year-round, usually with a small break over holiday periods (Life Activities Clubs, 2014). Participation in social, hobby or sports clubs appears to increase in middle aged and older adults compared to younger adults (Cherry, Brown, Kim & Jazwinski, 2016). For the purposes of this thesis, these community groups will hereafter be referred to as *community activity groups for older adults.*

Community activity groups and Active Ageing

Community group programs and the social lives of older adults

Older adults have perceived that community activity groups and 'clubs' are important to their lives because the activities offer a means of interacting with new people and developing relationships with other people (Alidoust et al., 2019; Broughton, Payne, & Liechty, 2017). These groups and centres provide places where older adults can access emotional support from other people in the group or service (Colistra, Schmalz, & Glover, 2017). A qualitative study found that this appeared to be especially important for older single adults (Alidoust et al., 2019).

Participation in community groups and health and wellbeing in older adults

Community groups offer programs focusing on collective social participation opportunities. In addition to the general research mentioned earlier, there have been some small longitudinal (Hikichi et al., 2015; Portero & Oliva, 2007), cross sectional (Millard, 2017) and qualitative studies (Broughton et al., 2017), that have found associations between participation in these types of programs and health and wellbeing for people with long-term conditions as well as healthy older adults.

Community groups and physical activity

There is some direct evidence that participation in community groups is positively associated with PA levels in older adults but the evidence in this area is sparse, primarily utilising cross-sectional designs (Mazo, Benedetti, & Sacomori, 2011), highly specific exercise programs (Brassington, Atienza, Perczek, DiLorenzo, & King, 2002; Christensen, Schmidt, Budtz-Jorgensen, & Avlund, 2006; Hughes et al., 2009) or specialist participant groups such as cancer survivors (Barber, 2013). A systematic review of adherence to community-based PA programs for older adults found that adherence rates to physical activity programs run in the community are approximately 70%; which is very high; adherence rates to common general exercise programs are typically only 50% (Farrance, Tsofliou, & Clark, 2016). The review suggested that one of the key reasons why older people adhere to these kinds of programs is social connectedness (Farrance et al., 2016). Older adults who attend community-based PA interventions have been found to have an average of 6% lower health care costs over a three-year period compared to people who do not take part and with attendance of at least once per week the average reduction in health care costs was 21% (Roux et al., 2008).

Justification for this PhD program of research

Despite the demonstrated importance of collective social participation and PA for successful ageing and the risk for reduced social engagement as people age, few in-depth studies have longitudinally investigated the impact of participation in community groups on social wellbeing and physical activity levels in the same study. For example, a non-significant increase in social support and reduction in depression was found in a year-long Randomised Controlled Trial conducted in senior centres in Norway with lonely older adults with poor physical and mental health (Bøen, Dalgard, Johansen, & Nord, 2012). Some qualitative studies have reported that community groups for older adults can contribute to fun and socialisation for older adults, however social wellbeing was not the primary focus of the studies (Golding, 2011; Hutchinson & Gallant, 2016). A review of the PA interventions that have been conducted with an aim to reduce loneliness or increase low perceived social support found no support for PA interventions for these social wellbeing variables, with wide variability in results. The majority of the studies were 12 weeks in length and the authors proposed that the brevity of studies may have reduced the likelihood of seeing intervention effects (Shvedko, Whittaker, Thompson, & Greig, 2018). Given that social wellbeing is a

broad and important area for the health and QoL in older adults, an in-depth study lasting longer than 12 weeks is warranted to understand how it can be maximised in older adults.

Aims and research questions

To further the current evidence, this PhD program of research investigates the role of **community activity groups for older adults** in the Active Ageing process. Specifically, it investigates the impact of participation in social or physical activity programs for increasing physical activity and health and wellbeing in older people, and whether this is related to social factors such as social support. Because the majority of the evidence on the field is from interventions of short duration or cross-sectional studies, a longitudinal case-study approach using an existing community organisation has been chosen as an appropriate method for investigating the research questions.

The overarching research question for this PhD program of research is: *What is the the role of community activity groups for older adults for Active Ageing, with a specific focus on PA, health and wellbeing.*

To explore this, the question was segmented into two major sub-questions; each with specific objectives that contributed to answering those questions investigated through the separate studies (See Table 1.1 for details of the individual research questions relating to each separate study).

Research sub-question 1. What is the relationship between social support and physical activity in older people?

Research sub-question 2. What is the potential role of community groups for older adults offering a socially supportive environment in improving physical activity, health and wellbeing?

Structure of thesis

This thesis contains eight chapters, as detailed in Table 1.1. Two reviews helped answer research sub-question one and the mixed method and qualitative studies were utilised to answer research sub-question two. Each study has its own specific research objectives, detailed in Table 1.1.

The references in three of the chapters in this thesis (Chapters 3, 5 and 6) are formatted using Vancouver formatting style. This is because the journals to which they are published required formatting in that particular style. The rest of the document is formatted in the style of the American Psychological Association (APA)

Table 1.1 :Chapter structure of thesis

Chapter Number	Chapter	Thesis Sub Question	Research objectives of chapter	Publications
1	Introduction			
2	Methodology			
3	Literature review A	1	1) Systematically review and summarise the studies examining the association between social support, including loneliness and PA in older adults 2) Clarify if any potential associations differ between types (e.g. task specific support, general support) or sources of support (e.g., support from family, friends or exercise group); 3) Investigate whether the association between Social support and PA in older adults differs between specific PA domains (leisure-time PA, transport, household, occupational).	The Association Between Social Support and Physical Activity in Older Adults: A Systematic Review Published: International Journal of Behavioral Nutrition and Physical Activity, (2017) 14(1), 56. doi:10.1186/s12966-017-0509-8
4	Literature review B	1	Update the findings of the systematic review for research published between August 2014 and November 2018	
5	Results	2	1) Examine whether loneliness and social support of new members of Life Activities Clubs change in the year after joining 2) Explore how social wellbeing changes in new and longer-term members of Life Activities Clubs.	A Mixed Methods Case Study Exploring the Impact Of Membership of a Multi-Activity, Multicentre Community Group on Social Wellbeing of Older Adults Published in BMC Geriatrics (2018), 18(1), 226. doi:10.1186/s12877-018-0913-1

Chapter Number	Chapter	Thesis Sub Question	Research objectives of chapter	Publications
6	Results	2	1) Examine whether PA levels, health and wellbeing of new members of LACs change in the year after joining 2) Compare the effects of participating in PA or social activity programs on the above outcomes 3) Explore the above in depth with both new and longer-term members of LACs	A Mixed-Methods Case Study Exploring the Impact of Participation in Community Activity Groups for Older Adults on Physical Activity, Health and Wellbeing. Under review in BMC Geriatrics
7	Results	2	1) Explore mechanisms for the association between participation in social and PA programs at community activity groups and SWB by older adults, using the DRAMMA model as framework 2) Explore how social and physical based activity programs for older adults differ in the types of DRAMMA mechanisms identified by participants	Important Psychosocial Factors for Subjective Wellbeing in Older Adults Engaged in Community Groups: A Qualitative Comparison of Social and Physical Activity Programs. Under Review in Journal of Aging and Physical Activity
8	Discussion and Conclusions			

Chapter 2 Methodology

The aim of this program of research was to explore the role of community activity groups for older adults for Active Ageing, with a specific focus on PA, health and wellbeing. Specifically, the overall research question was split into two sub-questions: *1) What is the relationship between social support and physical activity in older people* and *2) What is the potential role of community groups for older adults offering a socially supportive environment in improving physical activity, health and wellbeing?* This chapter provides an overview of the methodology and research design utilised to address these research questions. Further methodological information relating to the individual studies can also be found within the chapters of this thesis.

This program of research was undertaken in four parts (see Table 2.1):

1. a systematic review
2. a rapid narrative review
3. a concurrent mixed-methods case study of Life Activities Clubs (LACs) combining a one-year quantitative longitudinal survey study with three waves (baseline, six and twelve months) and a qualitative focus-group interview study
4. a qualitative focus group study of members of a variety of community activity groups.

The systematic and narrative reviews assisted in answering the first specific PhD research question. The mixed methods cased study and the additional qualitative focus groups with members of a variety of community activity groups aimed to contribute knowledge to the second research question.

Table 2.1. Flow chart of thesis studies and PhD aims.

Thesis title	Active Ageing in the Community. Exploring the Role of Community Activity Groups for Older Adults for Physical Activity, Health and Wellbeing				
Thesis question	What is the role of community activity groups for older adults for Active Ageing, with a specific focus on PA, health and wellbeing?				
	Sub- Question 1		**Sub-Question 2**		
Thesis Sub-questions	What is the relationship between social support and PA in older people?		What is the potential role of community groups for older adults offering a socially supportive environment in improving physical activity, health and wellbeing?		
Thesis chapter	**Chapter 2**	**Chapter 3**	**Chapter 4**	**Chapter 5**	**Chapter 6**
Study type	Study 1: Systematic review	Study 2: Rapid review	Study 3A Concurrent mixed methods case study – social wellbeing	Study 3B: Concurrent mixed methods case study – PA, health and wellbeing	Study 4: Qualitative FGs - multiple Community organisations
Research objectives for study	1) Systematically review and summarise the studies examining the association between social support, including loneliness and PA in older adults. 2) Clarify if any potential associations differ between types (e.g. task specific support, general support) or sources of support (e.g., support from family, friends or exercise group). 3) Investigate whether the association between social support and PA in older adults differs between specific PA domains	Update findings of systematic review for studies published between 2014 and 2018	1) Examine whether loneliness and social support of new members of LACs change in the year after joining 2) Explore how social wellbeing changes in new and longer-term members of LACs.	1) Examine whether PA levels, health and wellbeing of new members of LACs change in the year after joining 2) Compare the effects of participating in PA or social activity programs on the above outcomes 3) Explore the above in depth with both new	1) Explore mechanisms for the association between participation in social and PA programs at community activity groups and SWB by older adults, using the DRAMMA model as framework 2) Explore how social and physical based activity programs for older adults differ in the types of DRAMMA

	(LTPA, transport, household, occupational).			and longer-term members of LACs	mechanisms identified by participants
Incorporated Theories	Active Ageing (World Health Organization, 2002)		• Social Identity Theory (Tajfel, 1974) • Self-Categorization Theory (Turner, Oakes, Haslam, & McGarty, 1994): • Social Identity Theory and Health (C. Haslam, Jetten, Cruwys, Dingle, & Haslam, 2018)	Self-Determination Theory (Deci & Ryan, 1985)	DRAMMA Model (Newman, Tay, & Diener, 2014)

Table 2.2. Metrics for published papers

Thesis Chapter	Publication title	Publication status	Citations	Nature and extent of candidate's contribution
3	The Association Between Social Support and Physical Activity in Older Adults: A Systematic Review	Published: International Journal of Behavioral Nutrition and Physical Activity, (2017) 14(1), 56. doi:10.1186/s12966-017-0509-8	• Google citations: 53 • Crossref citations: 26 • Article accesses: 6571 • Altmetric Attention Score: 42	Review conceptualisation, data collection, review of literature (including synthesis and rating of quality of studies), manuscript preparation first author of paper
5	A Mixed Methods Case Study Exploring the Impact of Membership of a Multi-Activity, Multicentre Community Group on Social Wellbeing of Older Adults	Published in BMC Geriatrics (2018), 18(1), 226. doi:10.1186/s12877-018-0913-1	• Citations: 0 • Article accesses: 727 • Altmetric Attention Score: 10	Research design, data collection and analysis, writing of majority of manuscript. First author of paper
6	A Mixed-Methods Case Study Exploring the Impact of Participation in Community Activity Groups for Older Adults on Physical Activity, Health and Wellbeing.	Currently under second review with BMC Geriatrics after initial positive feedback and author amendments based on reviewer suggestions (as at Feb 26, 2019)	NA	Research design, data collection and analysis, writing of majority of manuscript. First author of paper
7	Important Psychosocial Factors for Subjective Wellbeing in Older Adults Engaged in Community Groups: A Qualitative Comparison of Social and Physical Activity Programs.	Currently under review with the Journal of Aging and Physical Activity (As at Feb 20, 2019)	NA	Research design, data collection and analysis, writing of majority of manuscript. First author of paper

Defining research

In order to undertake any research, it is important to first consider how it is defined. In this thesis, the following definition was used:

"Research, regardless of the form of inquiry used, is a focused, systematic endeavour that addresses a social problem or issue, theoretically derived prediction, practice question, or personal concern." (DePoy & Gitlin, 2016,p17).

The research problem

In deciding on a topic for this program of research two factors were taken into consideration; 1) a perceived personal, theoretical, political, professional or societal issue and 2) an area of concern that was of personal interest to me, the researcher, to ensure I could maintain a strong commitment to the process of undertaking the research (DePoy & Gitlin, 2016).

As mentioned in the introduction section of this thesis, the global population is ageing, which makes investigation of strategies to enhance Active Ageing an individual and public health priority.

My interest in pursuing a topic related to PA, social support and older adults came about through my experience working with older adults for four years in a large community health facility in London in the United Kingdom. My role was varied, but a regular part of my week was conducting group-based exercise for older adults with a number of musculoskeletal issues, including osteoarthritis. The main observations that I made during the time I spent with these groups were that:

1. participants benefited deeply from undertaking regular PA – both physically and emotionally
2. many older adults had never exercised before
3. participants perceived that gained benefit from being surrounded by others with similar issues to themselves
4. many identified that they would love to be able to be involved in similar community activities after they left the service.

In addition to this professional experience, both my parents had recently retired with extremely different early retirement experiences. As an outsider, I observed how this

was partially related to the way they had been able to adapt their social circumstances to suit the new phase of their lives.

It was these two factors that influenced me to undertake research that may contribute to the body of knowledge surrounding the potential physical activity, health and wellbeing benefits of participation in community activity groups for older adults. Evidence suggested that social support, loneliness, PA, health and wellbeing are factors that were particularly relevant to explore in older adults and potentially associated with community activity group participation (Alidoust et al., 2019; Broughton et al., 2017). Table 2.1 provides an overview of the studies that were conducted as part of this program of research and how they contributed to the overall research question. Table 2:2 shows the current metrics for the sections of the thesis that have been submitted to relevant journals. At the time of submission, two had been published and two were under review.

In addition to the general literature review presented in the introduction of this thesis (Chapter 1), a detailed systematic review and rapid review update were conducted to specifically investigate the association between social support and PA in older adults. There are two types of systematic review, a meta-analysis and narrative review. The aims of the reviews were to summarise and describe patterns in the studies and there was a large breadth of studies identified as meeting the inclusion criteria for review. Therefore, a narrative review was most appropriate (Torgerson, 2003).

When designing, undertaking and reporting the systematic review, the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement was utilised to ensure that the review was undertaken with adequate quality (Liberati et al., 2009). The PRISMA statement was developed in 2005 through consensus between authors, medical editors, clinicians, methodologists and consumers to improve the quality of reporting of systematic reviews and meta-analyses of health care interventions, which had previously been poor (Liberati et al., 2009).

Quality appraisal: Each study that met the inclusion criteria was assessed for quality; which was determined based on internal validity in this case because it is reflective of risk of bias of a study (Gyorkos et al., 1993). This systematic review included a variety of quantitative study designs, therefore standard quality assessments used for assessing quality and risk of bias in randomised controlled trials only were not appropriate.

Although there is no agreed quality assessment scale for systematic reviews incorporating a variety of observational and experimental designs, it is agreed that the most important indicator of quality is risk of bias (Sanderson, Tatt, & Higgins, 2007; Voss & Rehfuess, 2013). To ensure that the potential risk of bias is not overlooked, simple checklists rather than scales with a numerical score may be more appropriate for systematic reviews including a variety of designs, because scales may weight all sources of bias equally even though there may be some that are more important than others (Sanderson, Tatt, & Higgins, 2007; Voss & Rehfuess, 2013). As such, the Gyorkos risk of bias assessment tool was selected (Gyorkos et al., 1993). The authors of this scale recommend that reviewers come to a consensus about the definition of major and minor flaws for each of the four areas of potential bias for each type of study. This process was undertaken by four of the authors of the manuscript, who specified that the variables of interest for quality assessment would be PA, social support and/or loneliness, as well as the overall design of the experiment (see Table 1 in Chapter 3 for details). Each paper was subsequently reviewed by two authors independently and given a rating of strong, moderate or weak, based on definitions by Gyorkos (1993) (see Chapter 3 for details).

In summary, the research conducted in this thesis sought to explore whether involvement in socially-focused community activity programs has any impact on aspects of Active Ageing, using measures of physical activity, health and wellbeing in older adults. A systematic review was used to explore concepts around physical activity and social support or social integration. The next section will outline the philosophical foundations for the research including the epistemological stance underpinning this program of research, followed by the explanation of theory and description of the methodology.

Philosophical foundations for research

There are many ways to view the nature of reality (ontology) as well as the nature of knowledge (epistemology) and it is common that the epistemological standpoints utilised in qualitative and quantitative research differ, as does the epistemology common to mixed methodology of research (Merriam & Merriam, 2009). It is beyond the scope of this thesis to discuss each in detail but outlined below are some epistemologies that are common to quantitative and qualitative research before describing the epistemology chosen for this program of research.

Epistemologies common to quantitative research

Logical positivism (Comte,1798-1857 in Patton, 2015, p 105) was derived from a belief that individual thoughts and what is 'real' outside ourselves are completely separate (*monism*). It states that real scientific knowledge about an area of interest can only be gained from observations that are conducted without any individual perspective or subjectivity influencing the results. Logical positivism assumes that there is only one reality, which can be understood through systematic collection and analysis of objective data and that use of such methods of data collection and analysis ensures that research can be replicated and generalised over time and space (DePoy & Gitlin, 2016, ch4; Patton, 2015, p 105). The approach to conducting research in this way is taken in a systematic and logical order to minimise possibility of the results containing bias (DePoy & Gitlin, 2016 – ch2). This epistemology is traditionally taken by pure experimental (quantitative) researchers, though has been criticised by social scientists as being too narrow (Patton, 2015, p 106). A number of related epistemologies, that recognise a range of misgivings in pure logical positivism, have since been developed. Post-positivism asserts that some judgement is required in science (Patton, 2015). Knowledge is influenced by our own histories and is therefore relative and that all methods of research are imperfect. With this thinking, mixing qualitative and quantitative research methods is appropriate where real-life transferability of research to human life is concerned (Patton, 2015).

Epistemologies common to qualitative research

There are other epistemologies that are more closely related to qualitative research where, rather than assuming there is only one truth or one realty, there are many

(*pluralistic philosophies).* Pluralistic philosophers believe these multiples realities exist dependent on the lenses or biases through which life events are viewed (DePoy & Gitlin, 2016). There are a number of factors that impact the way individuals interpret their situations, including their social, economic, political, cultural, linguistic, physical and emotional contexts. What is 'real' in any one situation is dependent upon these influencing factors, but also the theory or lens that an individual chooses to view that particular situation through. As stated by DePoy and Gitlin (2016, p46):

"*Individuals create their own subjective realities and thus the knower and the knowledge are interrelated and interdependent"*.

Some examples of pluralistic philosophies are social constructionism, constructivism and postmodernism. Constructionists view of the multiple realities in life means that, in interpreting research, they look for patterns in the way different people view their world. There is no one truth or right or wrong, but there are many individual and group views that are valid, therefore collecting and understanding these is valuable. Context is key in constructionist epistemology as it affects findings, and findings cannot be generalised from one context to another (Patton, 2015).

Epistemology specific to mixed methods research and chosen for this program of research

Pragmatism is a different epistemology altogether and it moves away from trying to determine what is true or false or generating theory. It strives to understand human experience and find practical solutions to real-world problems in a realistic way that take into account time and resource constraints (Teddlie & Tashakkori, 2009). Pragmatism suggests that rather than there being only one correct way to view knowledge or understand the world, exploring the world using multiple points of view can give a more complete understanding. In other words, viewing a question from multiple angles can give a more complete answer (Tashakkori & Teddlie, 2003). Pragmatism recognises that the different strengths and weaknesses of different research approaches can be complimentary to solve the research problem (Creswell & Plano-Clark, 2011).

Pragmatism was chosen as the appropriate epistemological standpoint for this program of research because it is appropriate for real-world research projects, as described

above. It was also appropriate to my background and personal preferences as a researcher. I arrived at this research from an educational background of sports science followed by research experience in basic musculoskeletal physiology then clinical work as an Exercise Physiologist. This pathway developed an appreciation for importance of rigour in research, as well as the necessity for undertaking real-life research in a flexible way. In the case of this research study, I felt pragmatic epistemology was appropriate because the multiple methods and viewpoints could assist in answering the public health problem of enabling best health and wellbeing in an ageing population.

Background and theory base for this PhD program of research

Background - Health and Public Health

The World Health Organisation (WHO) defines health as *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*" (World Health Organisation, 1948, p1). The determinants of health are therefore derived from a wide variety of sources: *"a complex mix of social economic, political and environmental factors all of which reflect complex issues of power, status and resource distribution"* (Baum, 1995, p459).

This program of research is positioned within the field of Public Health. Public health is defined as *"the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society" (Acheson, 1988, p1).*

Public health incorporates activities that maintain or improve health and wellbeing, and not just prevent disease. Some of the essential public health services defined by the WHO and how they interact can be seen in *Figure* 2-1 below.

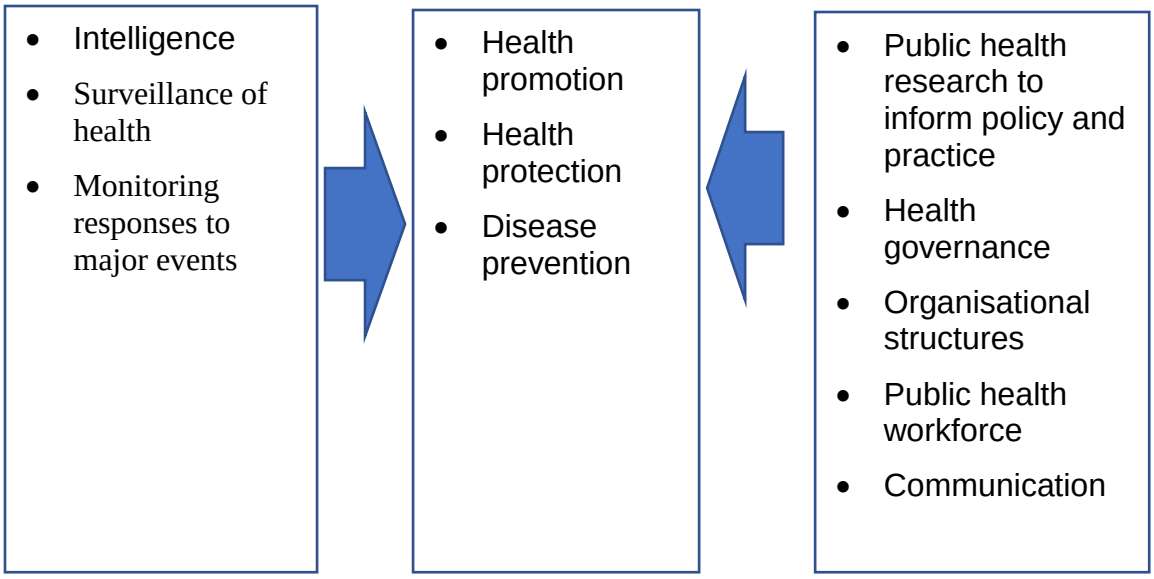

Figure 2-1. Clustering of essential public health operations to deliver public health services (World Health Organisation., 2018)

As shown in *Figure* 2-1, research acts as an important feeder of information into the delivery of health promotion and health protection services and it is therefore vital that the information we as researchers provide is relevant to practitioners in the real world (World Health Organisation., 2018*)*. There are a vast range of factors at play behind public

health problems that arise from social, individual, political, economic and environmental causes. In the real world, where service delivery takes place, the environment is difficult to standardise and systematise in the way that many researchers would like to do in research. As such, it is important to conduct research utilising all methods available and in a flexible manner, to enable a broader understanding of how to improve and maintain health in the real world (Baum, 1995; Glass & McAtee, 2006; Milat et. al., 2011).

Theory base for this program of research

This program of research primarily utilised the Active Ageing framework as the underpinning foundation (World Health Organization, 2002). Because the focus of the program of research was social relationships, PA and wellbeing, the aspects of the Active Ageing framework that were most appropriate to consider were those that related to social gerontology, social theory and behaviour theory. Social gerontology theories such as Activity Theory, Continuity Theory and Socioecological Selectivity Theories have been described in detail in the introduction to of this thesis. A brief description of the Active Ageing framework and how it relates to this thesis will be given below. In addition, theories that were utilised for explaining specific results observed in the separate studies of this program of research will also be described below. These are the Social Identity Theory (Tajfel, 1974), Self-Categorization Theory (Turner et al., 1994): Self-Determination Theory (SDT) (Deci & Ryan, 1985) and the DRAMMA (Detachment, Recovery, Autonomy, Mastery, Meaning and Affiliation) model of subjective wellbeing from leisure (Newman et al., 2014).

Active Ageing

Given the global ageing population, the WHO has described 'Active Ageing' (which is also sometimes referred to as 'Healthy Ageing') as a key priority for health promotion worldwide. What constitutes active Ageing was discussed in detail in the Introduction of this thesis (Chapter 1). Active Ageing is "*the process of developing and maintaining the functional ability that enables well-being in old age"(World Health Organisation, 2002, p12).* The WHO defines functional ability as the combination of individual resources (e.g., physical and emotional resources), their environments and the interaction between the two (World Health Organisation, 2015b, p28). Functional ability allows older adults to do things that they value such as *"a role or identity,*

relationships, possibility of enjoyment, autonomy, security, potential for personal growth" (World Health Organisation, 2015b, p28).

This framework was the sounding board for the overarching research question for this thesis to investigate how participating in community activity groups for older adults may contribute to Active Ageing. This framework is extremely wide-reaching because it aims to improve the lives of older adults in all ways possible. The aspects of the WHO Active Ageing framework that were chosen as markers for Active Ageing were PA and mental and physical health related QoL (HRQoL in particular, how the social aspect of these groups potentially relate to these constructs (Chapters 5-7). These factors were selected because they relate to the aspects of life that older people have reason to value. Theories relating specifically to the role of groups for health and wellbeing

To understand the mechanisms relating to *why* community activity groups for older adults may impact health and wellbeing, it was deemed important to consider theories that explain the relationship between groups of people in society, health and wellbeing and health behaviours. Two appropriate theories that have been utilised to successfully explain the relationship between group participation and health are the Social Identity Theory (Tajfel, 1974) and Self-Categorization Theory (Turner et al., 1994). Social Identity Theory proposes that, in addition to acting as individuals, humans identify as members of social groups. Groups may change in different contexts or different times of life and they can contribute negatively or positively to one's self-image (S.Haslam, Jetten, Postmes, & Haslam, 2009; Tajfel, 1974). This was termed *social identity* and is defined as the knowledge that a person belongs to social group/s that have some significance or value to them (Tajfel, 1974). It was theorised that positive social identity is associated with greater life satisfaction and less psychological distress (Tajfel, 1974). In a development of Social-Identity Theory, *Self-Categorization Theory* attempted to explain psychological factors that enabled group behaviour (Turner et al., 1994). This theory states that when a person identifies strongly with a social identity/group they will behave in ways that align with the norms and values of that group/identity in preference to their own individual traits. People are more likely to identify with a certain group if they perceive that key values or shared social identity that are relevant to them in that situation are present in the others of the group.

There is a body of evidence specifically relating Social Identity Theory and Self Categorization Theory to health and wellbeing, which has been referred to as the Social Identity Approach to Health (C. Haslam, Cruwys, Haslam, Dingle, & Chang, 2016; C. Haslam et al., 2017; C. Haslam, Cruwys, Milne, et al., 2016; S.Haslam, Jetten, Postmes, & Haslam, 2008. The Social Identity Approach to Health proposes that involvement in social groups that are congruent to one's social identity are pertinent for both recovery and resilience in times of stress (C. Haslam, Cruwys, Haslam, Dingle, & Chang, 2016; C. Haslam et al., 2017; C. Haslam, Cruwys, Milne, et al., 2016; S.Haslam, Jetten, Postmes, & Haslam, 2008; Ishikawa et al., 2016). It is postulated that groups linked with individual's social identities act as psychological resources (Haslam, Cruwys, Haslam, et al., 2016) and (C. Haslam et al., 2018). There are four mechanisms postulated to link group identification to health (see also Figure 2:2).

1) **Social connection**: *"a sense that one is psychologically close to and yoked (connected) with, other people"* (C. Haslam et al., 2018, p27). As social identification increases amongst members of a group then mutual trust and connection between them also increases.
2) **Meaning, purpose and worth:** people who identify strongly with the groups they are associated with are more likely to partake in the collective activities willingly and with passion, especially if the group is working towards a collective goal. This collective work will also contribute to one's sense of value or self-worth (C. Haslam et al., 2018).
3) **Social support:** people who identify strongly with a group will want to give support to others in the group. Additionally, if they receive support from others in the group they are likely to perceive this as being helpful to them rather than controlling (C. Haslam et al., 2018).
4) **Control, efficacy and power:** people who identify strongly with a group will encourage other group members to want to contribute to a collective goal. Furthermore, when people have a strong sense of social identity it can lead to a strengthened sense of personal control over their lives. This last point is key to this program of research, which focuses on health and wellbeing in older adults. It suggests that being part of groups that one identifies strongly with can increase self-efficacy to maintain positive health behaviours (C. Haslam et al., 2018).

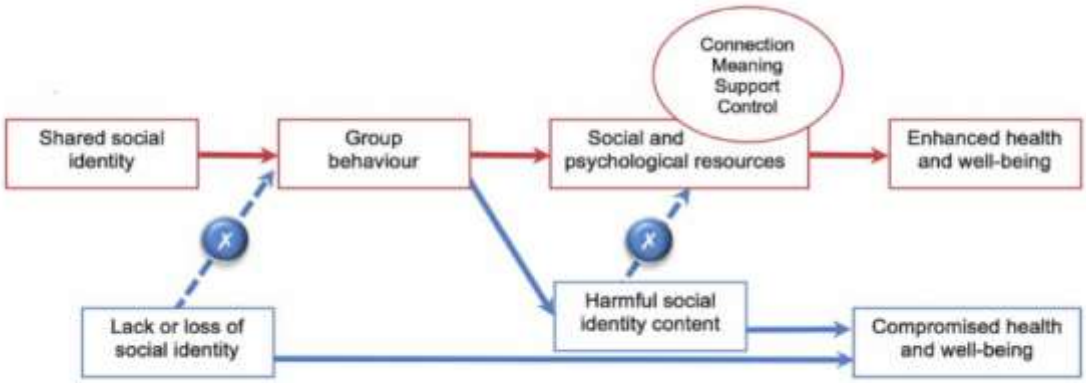

Figure 2-2.The social identity approach to health from p32 (C. Haslam et al., 2018) Red indicates a positive pathway and blue indicates a negative pathway. Written permission received from author to include figure on 20/2/19

"Groups make us human, and without them our humanity – and all that goes with it – is diminished. In the most basic sense, groups make life worth living, and they are what we live for. It therefore follows that because social identity is what makes group behaviour and group life possible, then it, too, must be essential for us to thrive. But by the same token if groups exert a negative influence on our lives (as they sometimes do) or if we lack or lose valuable group memberships, then we can see that social identity processes will tend to be implicated in poor health outcomes"(C. Haslam et al., 2018, p17)

The above quote demonstrates that harmful social identification or lack or loss of social identities can compromise health and wellbeing.

In summary, the social identity approach to health suggests that interventions aiming to foster a sense of social identity or that can replace lost identities can have tangible health benefits. Social Identity Theory and Self-Categorization Theory described above and the four aspects linking social identity and health above were considered in Chapter 5 as potential pathways between group participation and social wellbeing. These theories were used in Chapter 6 as potential factors explaining maintenance of PA in social group PA programs, because social identification with a group may lead to increased social support and positive health behaviours if the others in the group are also taking part in them.

Detachment/Recovery, Autonomy, Mastery, Meaning and Affiliation Model

The types of programs that are offered in community activity groups for older adults are a form of leisure activity. The two primary types of leisure considered in this program of research were **a) social activities** and **b) socially focused physical activities**. There are many mechanisms that have been suggested to explain the positive association that is consistently described between taking part in leisure activities and subjective wellbeing. The Detachment/Recovery, Autonomy, Mastery, Meaning and Affiliation (DRAMMA) model is the culmination of these mechanisms (Newman et al., 2014). The model was derived by Newman and colleagues in 2014 utilising a systematic approach to summarise psychological mechanisms associating leisure and subjective wellbeing from previous literature (Newman et al., 2014). Some of these theories are gerontological theories of wellbeing specific to older adults and some are relevant to the general population (see Newman et al., 2014 and Appendix 1 in Chapter 7 for details). The final DRAMMA model contains five overarching mechanisms linking leisure to subjective wellbeing. These are Detachment/Recovery, Autonomy, Mastery, Meaning and Affiliation. This model was utilised as a framework for coding in Chapter 7 to evaluate the reasons described by PA and social program participants for why membership of community activity groups for older adults positively impacted their wellbeing and QoL. Subthemes within each of the DRAMMA mechanisms were then identified, which demonstrated how the mechanisms were relevant to older adults in the context of community activity groups for older adults.

Design strategy - Mixed Methods

The research questions for this program of research and the pragmatic epistemological approach chosen by the researcher meant that it was appropriate to use a combination of methodologies to achieve the aims of the research. Mixed methods research combines two methodologies in order to answer a specific question that cannot be answered by one methodology alone. Combining two methodologies provides strengths that can outweigh the weaknesses of quantitative and qualitative research methods alone (Creswell & Plano-Clark, 2011). Ideally the methods chosen will have non-overlapping weaknesses and complementary strengths so that *"their convergent findings can be accepted with far greater confidence than any single method's findings would warrant."* (Brewer & Hunter, 2006, p4). It is sometimes stated that the use of mixed

methodologies can cause paradigm conflicts because quantitative and qualitative methods were traditionally drawn from different epistemological standpoints. The overwhelming consensus of research conducted using both methodologies is that they are actually complementary, and that utilising quantitative and qualitative approaches can assist with developing, testing and supporting the conclusions of a study (Maxwell, 2016). Additionally, qualitative research methods can add depth and richness to research when used alone or in conjunction with quantitative research (Patton, 2015).

The strengths and weakness of each type of research methodology are outlined in Table 2.3.

Table 2.3. Strengths and weakness of quantitative, qualitative and mixed methods research methodologies

Method	Weakness (from Creswell, 2011)	Strengths
Quantitative	• Lack of context • Voices of participants not heard • Researchers have own innate biases and interpretations but these are rarely mentioned in Quantitative research	• Findings produced by quantitative research aim to be objective (minimal bias), reliable, valid and reproducible (Curtis & Drennan, 2013) • Findings can be generalised to other similar populations
Qualitative	• Inherently 'biased' due to personal interpretation of data • Small sample sizes mean difficult to generalize to large group	• Illuminate meaning • Study how things work (e.g., program evaluations) • Better understand people's perspectives and experiences • Explore system functioning and impact on human lives • Context • Find unexpected consequences • Compare cases and discover themes or patterns across them to deepen understand of a phenomenon (Patton, 2015, p13)
Mixed methods	• Potential for weaknesses from each method to be brought to the research if not considered	• Provides more evidence than one methodology alone • Research can use all tools to answer research question and is not limited by one method

	(Onwuegbuzie & Johnson, 2006)	• Encourages the use of multiple worldviews/ paradigms • Practical approach to solving a research problem (Creswell & Plano-Clark, 2011) • More holistic than one method alone

Table includes strengths and weaknesses taken from (Creswell & Plano-Clark, 2011; Curtis & Drennan, 2013; Patton, 2015)

Utility of mixed methods study designs in public health research

A comparative analysis of qualitative and quantitative research in the field of public health has demonstrated that randomised quantitative interventions may not be practical or the most appropriate method to utilise in the study of many public health issues (Baum, 1995). This is because they are limited in their ability to study experience and difficult to achieve in a community setting. Mixing approaches can deal with the complexities of public health problems and are therefore useful to help solve real-world problems in real-world settings. Using qualitative research in public health can examine and explain the economic, political social and cultural factors influencing health, explore how individuals and communities make sense of factors that relate to their health, and to study interactions between relevant factors influencing health (Baum, 1995).

In a more recent analysis of research providing greatest health and policy impact, Wolfenden and colleagues found that in the past, public health research has been predominantly descriptive or epidemiological (Wolfenden et al., 2016). Within the descriptive studies, the majority of the published works have been cross-sectional (57%), followed by cohort studies (16%) (Wolfenden et al., 2016). However, when considering academic impact of research through citation, the most impactful research methods were generally randomised controlled trials and research conducted in real-world contexts, for example *"studies that examine how changing health practice leads to changes in populations (e.g., public health outcomes research, policy and impact research"* (Wolfenden et al., 2016, p 524). These types of research are generally in the minority of studies published in the public health field, probably because they are far more time and resource intensive and complex in nature than descriptive studies (Wolfenden et al., 2016).

Given the complexity of the aim of research in this PhD and being placed in the field of public health, a mixed methodological approach in a real-world community setting was the most appropriate approach for this program of research. To best answer the research question, it was decided to observe the impact of an existing organisation in a real life setting over an extended period because there is little longitudinal research in existing community organisations in older adults. The mixed methods included in this program of research included a survey, as well as some thematic and content analysis of interviews and focus groups. A convergent parallel design was used (see figure 2.3); the surveys and focus groups were conducted concurrently, analysed separately and the results were mixed at the point of interpretation and discussion (Creswell & Plano-Clark, 2011). In a convergent parallel design, the qualitative study giving depth and context to the results from the quantitative study rather than one methodology informing the other (Creswell & Plano-Clark, 2011).

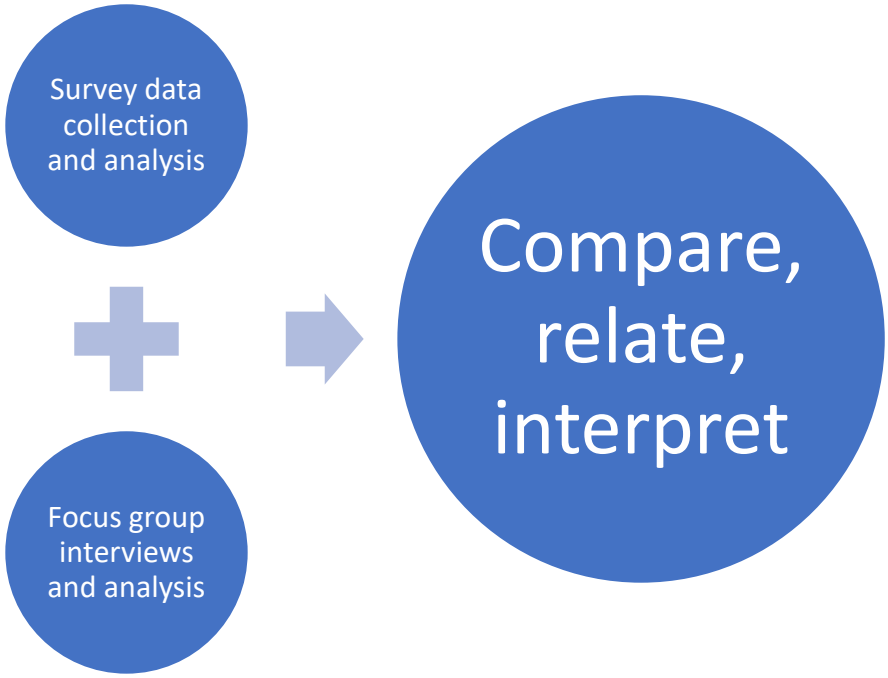

Figure 2-3. Convergent parallel design for this thesis, adapted from (Creswell & Plano-Clark, 2011) p 69

Context of the research - A case study

A case study is an observational research method that "allows investigators to focus on a 'case' and retain a holistic and real-world perspective – such as in studying individual life cycles, small group behaviour organizational and managerial processes" etc (Yin, 1994, p 4). The key to case study research is that it is an in-depth analysis of a *bounded*

system (e.g., a single person, organisation, group or policy). (Merriam & Merriam, 2009).

A case study aims to answer 'how or why questions' that the researcher has little control over, in a contemporary situation. There are some special features of case study research that make it different to other types of research. For example, it is:

i) *particularistic:* it focuses on one particular group, person or phenomenon,

ii) d*escriptive*: a case study aims to provide an end product which is a rich or complete description of the phenomenon being studied,

iii) h*euristic*: meaning it has an aim of increasing understanding about a topic in question by giving it new meaning or confirming what is already known (Merriam & Merriam, 2009). A case study can utilise either quantitative or qualitative data (or both) to give breadth to the knowledge surrounding the case. There are a number of different types of case studies including instrumental, historical and intrinsic case studies (where the case itself is of interest to the researcher, as opposed to a particular phenomenon). Given that I was most interested in understanding the phenomenon of how participation in community activity groups may impact the health and wellbeing of older adults, this case study is an instrumental one. This means that the case is being utilised to develop our understanding of this type of group in the lives of older adults generally.

I was interested in understanding how and why community groups for older adults that offer socially-oriented activities may impact on the health and wellbeing of their participants. There are a number of community groups in Australia that offer such activities, such as University of the Third Age, Probus, Men's Shed, Live Longer-Live Stronger. In order for the scope of my project to be achievable, it was decided that I would investigate this in one community group and if there was time, spread the exploration to other community groups to see if benefits were similar amongst other types of groups. For this reason, it was appropriate to use a case study as the starting point for my research.

The case for this research Life Activities clubs Victoria.

Life Activities Clubs Victoria (LACVI) was selected as a case study for the survey because there was a relationship formed between the researchers and the organisation. Furthermore, the topic of this program of research and the aims of LACVI as an organisation aligned. As a result, the organisation was interested and willing to be the

case for this particular study. LACVI is a not-for-profit non-discriminatory community organisation with 23 independently run branches in rural and metropolitan Victoria, Australia. The slogan of LACVI is '*Life is better together'*. The overall aim of LACVI is:

> *"to improve the wellbeing of Victorians in or approaching retirement by providing a range of opportunities to enjoy healthy and satisfying social and recreational activities in the company of good friends. We want to 'keep people young': avoiding social isolation, enjoying an active lifestyle and having fun." (Life Activities Clubs., 2016b, p1)*

More details about LACVI will follow a brief history of the organisation.

History of LACVI

The predecessor non-profit organisation to LACVI, the Early Planning for Retirement Association (EPRA), was formed in 1972 to provide physical, social and recreational activities, as well as education and motivational support to older people managing significant change in their lives (especially retirement). The trigger for the establishment of this non-profit organisation was that the Council of the Aged (COTA) and a number of large employers recognised that payouts from post-war superannuation funds were on the increase but people retiring did not know how best to manage their finances in retirement. Additionally, long term conditions, especially cardiovascular disease began to peak at this time and a focus turned to improving health in older age. In the early years, EPRA consisted of both community groups as well as company retirement courses. Some of the early activities of the EPRA community groups included monthly meetings with different topics including investment and finance, health and wellbeing, gardening, cooking, hobbies nights as well as regular weekly activity groups such as walking and music appreciation. Over the years, the number of activities offered regularly increased and the monthly talks became less focused on finance. For example, a variety of general interest topics were delivered, such as travel destinations and talks from other organisations of interest in the local area (e.g. Men's Shed) (Legg, 2016). EPRA became known as the Life Planning Foundation of Australia in 1995 and the individual community groups within the LPFA became known as Life Activities Clubs (LACs). The LPFA became known as Life Activities Clubs Victoria (LACVI) in 2009.

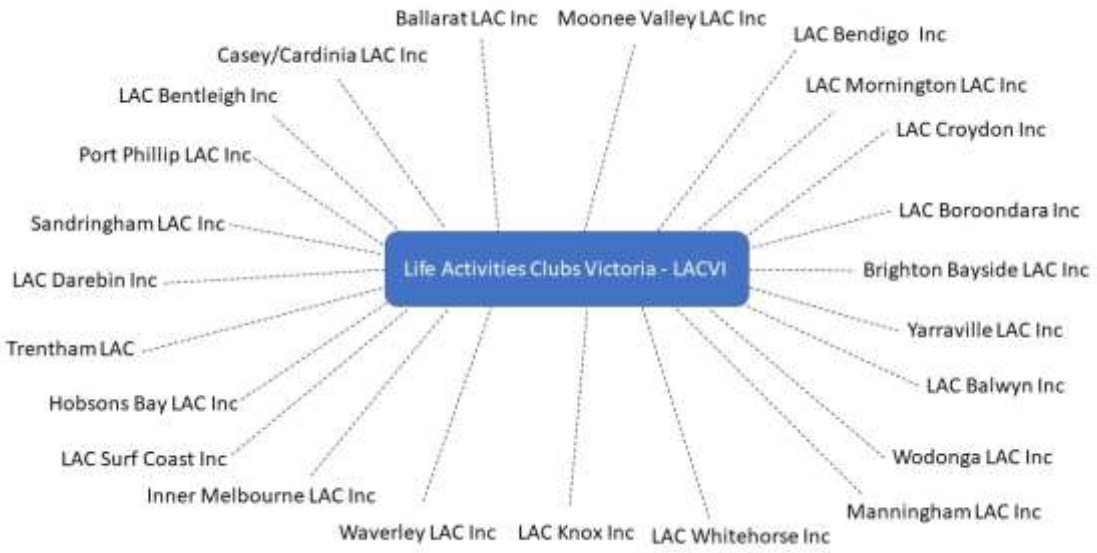

Figure 2-4.Structure of Life Activities Clubs Victoria. Dotted lines represent the guidance and assistance given to the clubs. LAC clubs are independent incorporated clubs in their own right.

What is Life Activities Clubs Victoria now?

LACVI as a governing organisation has a number of functions with the ultimate goal of aiding older adults to develop and maintain active, engaged and enjoyable lifestyles as they are approaching and in retirement (Life Activities Clubs., 2016a). The functions of LACVI are to provide a point of contact for the public and all individual LACs, and maintain contact with other relevant organisations and the Victorian Government. It also maintains an advocacy role through contribution to various debates around issues relating to seniors in the community. The organisation is primarily funded by the Victorian Government, Department of Health and the Office of Senior Victorians. If LACVI recognises the need for an additional LAC in the Victorian community, they will find an appropriate area and establish a new club. LACVI and all the LACs are run voluntarily by members for members, except for one part-time paid office assistant. Each LAC elects a member to be a representative on the LACVI council, who sit alongside the LACVI board members. The council assists in making decisions on behalf of the organisation about policy and the running of the organisation (Life Activities Clubs., 2016b).

What are Life Activities Clubs?

The Life Activities Clubs (LACs) are the independent incorporated associations providing a variety of activities to their members. LACs form the 'branches' of the tree, with LACVI at its' centre providing organisational guidance and assistance to the LACs (see Figure 2-4). There are 23 LACs, with approximately 4,000 members, based in both rural and metropolitan Victoria. Each LAC has a member-elected committee formed of members. Committee members work in a voluntary capacity to manage the affairs of their club and decide which activities will be run. Every club offers a variety of different activities, which are determined by the interests of their membership base. Each activity has a convenor, who is a point of contact for the specific activity. The structure of some activities is quite fluid, whereas others are more structured (e.g. dancing classes). Every club has a small membership fee of approximately $30 per year. This fee is used to cover costs of the club and a portion is returned to the LACVI to assist in covering organisational costs. This fee allows all members to attend any activity they choose for little or no cost. Some of the LACs have a regular meeting to discuss club related information. It is not compulsory to attend these meetings and many members join a LAC to attend one particular program or activity. Some of the activities that are typically offered at clubs include walking, exercise, photography, table tennis, golf, bird watching, eating out, dancing, day trips, sports, arts and crafts, cycling, cinema, live theatre, book clubs, writing groups, travel including caravan/camping trips cards and board games (Life Activities Clubs., 2016b).

Some of the aims of the LACs are to:

- Offer a range of social, recreational and physical activities
- Support the development of new friendships
- Keep members physically and mentally alert
- Let members determine their own commitment without pressure
- Provide an environment to stimulate learning new skills and sharing experiences
- Reduce loneliness and isolation
- Offer a welcoming and friendly environment

Data collection and analysis for this program of research

The data collection and analysis undertaken for this program of research, described in detail below, involved qualitative and quantitative methodologies (mixed methods) as mentioned earlier. All procedures undertaken in the collection and analysis of the data were conducted in compliance with the National Statement on Ethical Human Research and the Australian Code for the Responsible Conduct of Research. Ethics approval to conduct this program of research was obtained from the Victoria University Human Research Ethics Committee (HRE14-071 and HRE15-291). All participants provided informed consent to partake in the study. Further details of specifics regarding ethical procedures for each of the studies can be found in Chapters 5-7.

Quantitative data collection and analysis methodologies used in this program of research

Quantitative methods utilised for this research

Study design- longitudinal observational study using self-report surveys

As a real-world setting was selected for this program of research, manipulation of the environment as in experimental studies was not possible. An observational study utilising surveys was considered to be the most appropriate way to collect data for the quantitative portion of the study (Gray, 2013). A survey was chosen as the most appropriate form of primary quantitative data collection for this study because surveys can be effective for looking at overviews or evaluations of interventions, especially with large sample sizes. The survey was offered as either paper or online formats depending on the preferences of the participants.

The purpose of a survey is to provide a statistical estimate of the presence or absence of specific characteristics in a target population (Fowler Jr, 2013). Sampling strategies used to collect surveys can be used to gather data from a proportion of the population of interest that is representative of the overall population (Fowler Jr, 2013). One example of these strategies is random sampling from a population of subset of the population of interest. If this kind of strategy is not used, there will be a high risk that the results of the study are not representative of the target population and therefore cannot be generalised to that target group. Previous studies have found that participation in group

activities is beneficial for the health and wellbeing of older adults (Choi, DiNitto, & Marti, 2016; Colistra et al., 2017; Millard, 2017; Wikman et al., 2017) and support that group PA is more appropriate than individual motivational strategies for older adults (Carlson et al., 2012; Kahn et al., 2002; Kouvonen et al., 2012; McMahon et al., 2017; Orsega-Smith, Payne, Mowen, Ching-Hua, & Godbey, 2007). Therefore, the population that was selected to study were members of a community organisations incorporating PA and social activities.

Study sample for the survey

To give an indication whether joining LACVI had any impact on the constructs of interest in the study, it was decided that the population of interest would be new members of LACVI. Their baseline data would be indicative of a level similar to other older adults who may consider joining clubs but have not yet done so, and hence their follow up data would be demonstrative of the impact of LACVI membership overall. Ideally, a control group who did not take part in any community groups would have been used to provide greater statistical validity to the results of the study. However, this was not feasible because approximately 60% of adults of the age of 65 living in Australia participate in some kind of socially focused community organisation (Australian Bureau of Statistics., 2010), and those who are not are typically very difficult to access. Time and budget constraints made this unfeasible.

It was projected that all new LACVI club members during the sampling period would be invited to take part in the study. Prior to study initiation the LACVI board projected this would probably be 500 new members in the course of one year. The actual number of new members was 450. Five clubs decided not to take part in the study (n=60). Therefore, the total pool of new members invited to take part was 390. Based on the response rate of 48% of a similar kind of survey in an Australian community organisation, the predicted number of participants was 250 (Foreman, van Uffelen, & Brown, 2012). Based on the numbers of our study (n=44 responded), the response rate was 11%). It was not possible to determine why new members decided not to take part in the study because they were only invited by a flyer and if they chose not to respond we did not hear from them. There were several reasons that take up for the study was lower than anticipated:

1) Poor take up by clubs in promotion of the study. Each LAC is independent from the LACVI and a number of clubs decided to not assist with the study, while others were enthusiastic about being involved. The reasons for the enthusiasm varied between clubs, but the two main reasons were especially good rapport between them and LACVI and/or a president who was in strong support of the aims of the study. This resulted in three types of support for the study *1) refusal to support or promote, 2) low support for the study:* Most of the LACs were not comfortable doing more than sending out information about the study with new membership information, and this meant that the study information was often overlooked by the participants amongst the rest of the new member information in the pack. *3) High support for the study:* A small number of the clubs had greater support for the study and the president of the club wrote a letter of support to the new members detailing the study. These clubs had the highest response rate.

2) Poor take up by the new members of the club. It was difficult for new members of LACs to be enthusiastic about participating in the study because they had not yet gained any affiliation with their club. Additionally, they did not know if they would be a member over a long period of time.

The period of recruitment was extended to two years and the total number of initial participants in the study was 44: 31 Females and 13 Males (see figure 1, Chapter 6 for a flow chart of participant recruitment in the study). At the 12-month time point, 28 participants remained who had not ceased membership and who had completed the first and last survey and 35 people completed surveys at baseline and six-months (see recruitment flow chart (Figure 1) in Chapter 6).

This meant that the sample for the study was small and not random. Thus, there would be sampling error and possible response biases in our data and results of analysis could only be interpreted with caution (Fowler Jr, 2013). The small sample size also meant that multivariate statistical techniques with several covariates were not possible.

Development of the survey

A survey was developed in conjunction with the Board of LACVI. In order to maintain statistical rigor, the primary variables of interest (social support, loneliness, PA and health related wellbeing) were all assessed using valid and reliable scales that had been

previously used with older adults (see below for details of each individual scale). Additional questions relating to perceived outcomes of participation and reasons for drop-out (if any) were also included. After development of the survey, it was piloted with six members of the organisation representing both lay-members and board members. They assessed the survey for length, readability and acceptability. Suggestions for modifications were made where feasible and acceptable. To maintain validity of the individual scales in the survey, the wording was not altered in pre-published questionnaire items.

Outcome measures included in the survey

The survey collected programme specific and socio-demographic information in addition to a number of standardised measures of lifestyle and wellbeing specific to older adults (see below).

The survey contained the following sections:

1) Program specific questions about reasons for joining etc.
2) Quality of Life (mental and physical health-related quality of life (HR QoL) (Henry & Crawford, 2005; Ware, Kosinski, & Keller, 1996)
3) Social support (Broadhead, Gehlbach, De Gruy, & Kaplan, 1988)
4) Loneliness: (De Jong Gierveld & Van Tilburg, 1999; Hughes, Waite, Hawkley, & Cacioppo, 2004)
5) Health behaviours (PA) (Australian Institute of Health and Welfare, 2003;)

Program-specific questions.

These were developed in conjunction with LACV board members to gather information about reasons for joining, perceived benefits of joining and club. Members were also asked why they dropped out of LACVI if they dropped out. The results from these questions can be found in the report written for LACVI in Appendix 10.

Social support

Functional social support was assessed using the Duke–UNC Functional Social support questionnaire (Broadhead et al., 1988). This scale specifically measures participant perceived functional social support in two areas; i) confidant support (5 questions; e.g.,

chances to talk to others) and ii) affective support (3 questions; e.g., people who care about them). See Chapter 5 for more details.

Loneliness

Loneliness was measured using the de Jong Gierveld and UCLA-3 item loneliness scales developed for use in many populations including older adults (De Jong Gierveld & Van Tilburg, 1999) and shown to be valid and reliable in older adult populations (Hughes et al., 2004; Tilburg & Leeuw, 1991). See Chapter 5 for more details.

Quality of life

The Short Form 12-item Health Survey Questionnaire (SF-12v2 QualityMetric Incorporated, Lincoln, NE, USA) was used to assess QoL. The 12 questions in the scale assess self-reported physical and mental HR QoL. The SF-12 has good internal consistency reliability and test-retest reliability (for both alpha > 0.7) and good construct validity when used with older adults (Resnick & Nahm, 2001). See Chapter 6 for more details.

Health behaviours

Physical activity (PA)

PA was assessed using the validated Active Australia Survey (Armstrong, Bauman, & Davies, 2000). It assesses total minutes in the previous week (in at least 10-minute bouts) in PA. The self-reported version of this survey has acceptable validity and reliability in adults and older adults (Brown, Burton, Marshall, & Miller, 2008; Heesch, Hill, Van Uffelen, & Brown, 2011). See Chapter 5 for more details.

Sociodemographic and health variables

Sociodemographic variables

Where not indicated by a specific reference (e.g. employment, ability to manage on income, marital status), the demographic data were collected using standard questions, as used in other large population based surveys, such as the Australian Longitudinal Study on Women's Health (Women's Health Australia, 2016).

Highest level of education was based on highest level of qualification and full responses were categorised into the following: 'low' (school certificate or less), 'intermediate'

(higher school certificate), ‘technical’ (having a trade certificate or diploma), or ‘university’ (completed a university degree) (van Uffelen et al, 2011; p222).

Main life occupation was categorised as: ‘manager/administrator’; ‘professional' (professional or associate professional); 'clerical' (advanced clerical or service; intermediate clerical, sales or service or elementary clerical, sales or service); 'trade, production or labour' (intermediate production and transport associate professional; trades persons; labourers & related workers) (Australian Bureau of Statistics, 2013a)

Current employment was categorised as ‘full time’, ‘part-time’ (part time or casual), ‘not working’ (retired, unemployed).

Ability to manage on income available was measured with a one-item question with five options. It was categorised as ‘not difficult’ (participant indicated ‘it is not too bad’ or ‘it is easy’), ‘somewhat difficult’ (participant indicated ‘it is difficult some of the time’), ‘very difficult’ (participant indicated ‘it is impossible’ or ‘it is difficult all the time’)

Present Marital status was classified as ‘single’ (never married, separated, divorced, widowed) or ‘partnered’ (married or defacto)**.**

Country of birth was classified as ‘Australia’, ‘other English speaking’, or ‘other non-English speaking’.

Area of residence. Participants provided their postcode in the baseline survey and this was converted into a classification of urban or rural based on the Australian standard geographical classification – remoteness area (ASGC-RA) system (Australian Bureau of Statistics, 2011).

Health variables

Self-rated general health was assessed using the following question from the Short Form 12 Health questionnaire ‘In general, would you say your health is: excellent, very good, good, fair, poor?’ (Ware et al., 1996, p225)

Functional health was assessed using the following statement, which is a question from the SF-36 health questionnaire adapted for use with and Australian audience (Sanson-Fisher & Perkins) ‘During a typical day, does your health now limit you in being able to walk 100m? If so, how much?’ - ‘Yes limited a lot’, ‘yes limited a little’, ‘no not limited at all’.

Quantitative data analysis methods used in this research

Linear Mixed Models

The quantitative data for this study were collected using a longitudinal repeated measures design, with the same cohort used at three time-points and measurements at baseline, six months and 12 months. Repeated measures or within-subjects study designs can be advantageous because each participant contributes multiple scores for the dependent variable (rather than just one). Additionally, the use of the same subjects over time or treatment condition, the variability between subjects is removed from the analysis and extraneous error variance is reduced. As a result, the number of subjects required for an adequately powered study is usually lower than for a between subjects design (Maxwell, Delaney, & Kelley, 2017).

Mixed effects models (or sometimes also called multilevel models, hierarchical linear models or random coefficient models) are an appropriate method for dealing with issues that can often arise in repeated measures longitudinal studies such as problems with loss of data over time, inability to meet assumption of sphericity and compound symmetry and are based on multilevel modelling (or hierarchical linear modelling) (Maxwell et al., 2017). A linear mixed model uses maximum likelihood estimation, which does not assume sphericity (Maxwell et al., 2017). This is a highly complex and rigorous mathematical and statistical methodology, which estimates the most appropriate summary population parameter (mean or median) within the distribution of the scores that have been studied. It takes into account individual differences in the variation that occurs (random effects) from the start of the analysis, which is useful for natural longitudinal studies (Maxwell et al., 2017).

The other benefit of linear mixed models that is appropriate for this study is that if a score is missing from a case, it is not required that the whole case is removed. So, with small data sets this method is preferable (Maxwell et al., 2017). The other benefit of this method is that these kinds of model can include categorical and continuous predictor variables. In this case these refer to covariates which do not change over the study can be included (time-invariant covariate) as well as those which do change (time-varying covariate) (Maxwell et al., 2017).

The effects of becoming a member on quantitative outcome variables (i.e. social support, loneliness; Met.minutes PA, physical and mental HR QoL (from SF-12) were analysed in SPSS for windows (v24) using linear mixed models (LMM). LMM enabled testing for the presence of intra-subject random effects, or equivalently, correlation of subjects' measures over time (baseline, six-months and 12 months). Three correlation structures were examined: independence (no correlation), compound symmetry (constant correlation of each subjects' measures over the three time points) and autoregressive (correlation diminishing with increase in spacing in time). The best fitting correlation structure was compound symmetry for the loneliness and social support variables. For the PA, physical health and mental health variables, an autoregressive correlation structure was the best fitting. The LMM incorporated longitudinal trends over time, with adjustment for age, employment at baseline, and mean weekly LAC attendance as potential confounders.

Qualitative data collection and analysis methods used in this program of research

Qualitative data collection - qualitative inquiry frameworks

Many different qualitative frameworks can be utilised to conduct qualitative research. Each is rooted in a different discipline and seeks to answer a core question. For example; ethnography is grounded in anthropology and seeks to understand how cultural differences explain behaviour. Grounded theory was originally a social sciences methodology and has the goal of developing a theory to explain a specific observation through systematic fieldwork and comparative analysis. Phenomenology is rooted in philosophy and seeks to understand the meaning, structure and lived experience of a person or people experiencing a particular phenomenon (Patton, 2015).

Generic qualitative enquiry

The final qualitative framework to be discussed here, and the methodology chosen for this program of research is 'generic qualitative enquiry'. Emerging from the disciplines of philosophy and program evaluation, this framework is rooted in pragmatic epistemology and seeks to explore practical lessons and wisdom about a real-world issue or problem (Patton, 2015). It is research that seeks insights to inform action. Another important feature of pragmatic generic modes of enquiry is to make pragmatic

decisions incorporating real-world constraints (including time and resource limitations). This allows decisions about methods to be made as a study progresses and unfolds rather than being confined to a fixed design (Patton, 2015). Generic qualitative enquiry is especially useful to explore if programs work in real life and is the primary framework utilised in mixed methods studies. The methods used in generic qualitative enquiry are interview (focus groups or individual interviews), observation and document analysis.

Qualitative data collection - qualitative research methods

Focus groups and interviews

A focus group is a group interview allowing for broader discussion than an individual interview, as participants can add further comments after they hear what others have to say. A focus group also allows researchers to explore whether there is agreement or dissonance around topics of discussion (Patton, 2015).

Use of focus groups has been recommended in combination with quantitative data collection when assessing community health interventions to *"better understand the community's attitudes, values and beliefs about PA…"* (Bopp & Fallon, 2008, p 175). Focus groups aim to gather rich information through diversity to experiences and opinions, rather than consensus as in quantitative research (Morrison-Beedy, Côté-Arsenault, & Feinstein, 2001) They can be used to explore a particular topic and, when used in mixed methods research, can be useful for interpreting the results from another section of the study as was done in this program of research (Johnson & Turner, 2003). This use of qualitative studies to give context to and broaden the applicability of survey results is a valid method (Bryman, 2006). Due to the small sample size for the survey study, the statistical power of the quantitative results remained fairly low, so the qualitative study also enabled us to triangulate the results of the survey study with what was found in the focus groups to strengthen the credibility of the results (Bryman, 2006).

Some further strengths and weakness of focus groups are highlighted below.

Focus groups are usually composed of six to 12 participants of a mostly homogeneous group, and last between one and three hours. It is suggested that between five and ten

research open-ended questions be asked in a focus group (Johnson & Turner, 2003). Focus groups can have many different structures. Some have a purely qualitative focus and aim to explore how the participants interact – these utilising a very flexible format with few questions or just a discussion topic. The other end of the spectrum incorporates a very strict closed ended structure with little or no flexibility around the questions for wider discussion. This study took the form of a mixed focus group type with some structure, but much room for discussion (Johnson & Turner, 2003). This study was undertaken in the form of a generic qualitative study utilising focus groups to collect thoughts and feelings around the health and wellbeing benefits of being involved in a community activity group, as well as factors that were associated with any perceived benefits.

Study sample for the focus groups

The participants were initially selected from a convenience sample (Creswell & Plano-Clark, 2011) of LACVI members who completed the baseline and six-month surveys and had volunteered to take part in the focus groups. Because of low initial numbers from this strategy we also recruited four additional LAC members who had not taken part in the survey. The total number of participants available using these methods was enough for one focus group with people participating in PA programs and with people who participate in social programs. To provide additional breadth to the study, we conducted two additional focus groups. One focus group represented people who are involved in social programs, obtained from a local Men's Shed (Hobsons Bay) to increase the male representation in the qualitative part of the study; the second was a mixed group of people who do PA in other types of community groups (including U3A, social walking groups, live longer live stronger, Keenagers table tennis group). In the case of this study, the type of group was a purposive sampling strategy, although participants who took part in the focus groups were self-selected. It was also a goal of the research study to compare differences between social programs and PA programs and this type of purposive sampling is called stratified sampling (Patton, 2015). Purposive sampling is an appropriate strategy where the goal of the research is to gain an in-depth understanding of a specific case, because it enables the researcher to choose participants who will provide information, as in this study (Patton, 2015). The four focus groups were as follows:

1. LACVI PA group
2. LACVI social group
3. Non-LACVI PA group
4. Non-LACVI social group.

This last group was obtained using a mailing list of people who contact the COTA Victoria with an interest in research. COTA also placed a small publicity piece in their newsletter. Only women expressed interest in participating. Separate FGs were held for members of social and physical activities groups to 1) assist participants in feeling a sense of commonality with other members and improving group dynamic and participation in the discussions (Loeb, Penrod, & Hupcey, 2006); and 2) allow for comparison between themes that arose in the social and PA activity groups.

Demographic information about the members of these groups was collected using a self-reported survey. A summary of the demographic information about the focus group participants can be found in Chapter 7 and the demographic survey can be found in Appendix 6: Focus group demographic information survey form.

Focus group data collection procedure

An interview guide was developed containing topics of interest/broad semi-structured open-ended questions to guide the interviews and ensure that each focus group discussed the same topics, and allowed for each discussion to be expanded dependent of the group dynamic (Patton, 2015). During the process of data collection, the questions asked to participants were changed slightly, based on the previous group responses and in consultation with the other researcher assisting with data collection. This involved refining the number of topics down to focus on the most useful and relevant areas of interest. For example, the first groups were questioned thoroughly on their PA backgrounds, but it was decided during the period of the focus groups that this data would not be utilised in analysis so it became less of a focus in future focus groups (Patton, 2015). An example of the focus group questions can be found in Appendix 7.

The process followed in the interview involved recording the interviews, one person mediating the discussion (Gabrielle Lindsay Smith) and another paper co-author was taking notes (Grant O'Sullivan). Following the focus group interview, the two researchers reflected on the interview and included these reflections in the focus group

notes (Patton, 2015). Audio recordings were transcribed verbatim by a professional transcriptionist and transcripts were checked against the recorded interviews for errors before being uploaded to NVivo. See Chapters 5-7 for further details.

Qualitative analysis methods used in this program of research

The process of qualitative data analysis is an interactive, interconnected, circular process of connecting, describing and classifying qualitative data, as shown in Figure 2-5 below

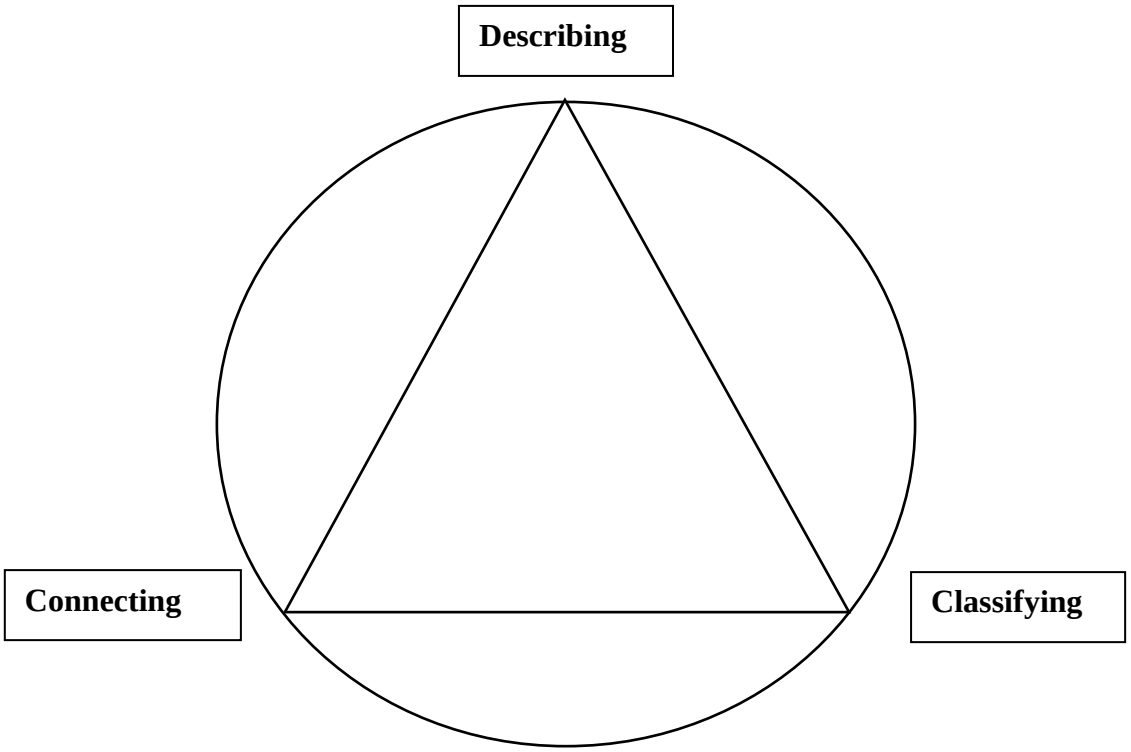

Figure 2-5. Qualitative analysis as a circular process. From p 32 Dey (1993)

The choice of qualitative analysis strategy chosen for any research depends on the research question. It generally takes on an inductive and comparative process, but can take the form of phenomenological study, grounded theory, ethnography, or narrative analysis. Strategies that were relevant for use in this generic qualitative research were content analysis and thematic analysis (Patton, 2015).

The data from the study were analysed by the two researchers following transcription of the audio records. A general inductive approach was adopted for the analysis of the qualitative data collected in the focus groups, because it was appropriate to the generic qualitative methodology that was adopted for this research (Thomas, 2006).

The process for this approach is described by Thomas (2006) as follows:

- Data cleaning – formatting transcripts into common format
- Close reading of text – to familiarise the researcher
- Creation of categories – general categories were derived from the research objectives and specific categories were derived directly from coding of the raw data with multiple readings and gradual refinement from many codes to around 3-8 categories.

As suggested by Patton (Patton, 1999) three methods of triangulation were employed to improve the credibility of the qualitative data analysis in this program of research (Patton, 1999). The first was analysist triangulation, where two researchers were involved in the coding process. The first researcher (GLS) conducted initial coding and the coding tree was checked by a second researcher for consistency of coding. The second method of triangulation was methods triangulation; where the results of the survey study were compared to those of the survey study to check for consistency. The third method of triangulation was theoretical triangulation. This was especially utilised in the qualitative analysis for the study investigating how community groups impact wellbeing in their members (see Chapter 7). See Chapters 5-7 for further details of the qualitative analysis methods utilised for each study.

In summary, a systematic review, a mixed methods study and a qualitative study were conducted throughout this program of research to explore the role of community activity groups for older adults for Active Ageing, with a specific focus on PA, health and wellbeing. A case study approach utilising an existing community organisation based in Victoria (LACVI) was the most appropriate method for addressing the research problem.

Chapter 3 : The Association Between Social Support and Physical Activity in Older Adults: A Systematic Review

This Chapter reviews the quantitative evidence relating to the association between social support or loneliness and physical activity (PA) in older adults. It has been utilised to aid in answering research sub-question one of this program of research, which was: *What is the relationship between social support and PA in older people?*

The following paper: *The association between social support and physical activity in older adults: A systematic review* by Lindsay Smith, Gabrielle, Banting, Lauren, Eime, Rochelle, O'Sullivan, Grant, van Uffelen, Jannique is published in the International Journal of Behavioural Nutrition and Physical Activity (2017) 14(1), 56. doi:10.1186/s12966-017-0509-8

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GRADUATE RESEARCH CENTRE

DECLARATION OF CO-AUTHORSHIP AND CO-CONTRIBUTION: PAPERS INCORPORATED IN THESIS BY PUBLICATION

This declaration is to be completed for each conjointly authored publication and placed at the beginning of the thesis chapter in which the publication appears.

1. PUBLICATION DETAILS (to be completed by the candidate)

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2. CANDIDATE DECLARATION

I declare that the publication above meets the requirements to be included in the thesis as outlined in the HDR Policy and related Procedures – policy.vu.edu.au.

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Signature Date

3. CO-AUTHOR(S) DECLARATION

In the case of the above publication, the following authors contributed to the work as follows:

The undersigned certify that:

1. They meet criteria for authorship in that they have participated in the conception, execution or interpretation of at least that part of the publication in their field of expertise;
2. They take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. There are no other authors of the publication according to these criteria;
4. Potential conflicts of interest have been disclosed to a) granting bodies, b) the editor or publisher of journals or other publications, and c) the head of the responsible academic unit; and

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5. The original data will be held for at least five years from the date indicated below and is stored at the following location(s):

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Jannique van Uffelen	7.5	Study design, Manuscript conceptualisation and manuscript preparation	[redacted]	28/2/19
Rochelle Eime	5	Study design, and manuscript preparation		28/2/19
Grant O'Sullivan	7.5	Review and quality evaluation of literature, and manuscript preparation		28/2/19
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REVIEW Open Access

The association between social support and physical activity in older adults: a systematic review

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Abstract

Background: The promotion of active and healthy ageing is becoming increasingly important as the population ages. Physical activity (PA) significantly reduces all-cause mortality and contributes to the prevention of many chronic illnesses. However, the proportion of people globally who are active enough to gain these health benefits is low and decreases with age. Social support (SS) is a social determinant of health that may improve PA in older adults, but the association has not been systematically reviewed.
This review had three aims: 1) Systematically review and summarise studies examining the association between SS, or loneliness, and PA in older adults; 2) clarify if specific types of SS are positively associated with PA; and 3) investigate whether the association between SS and PA differs between PA domains.

Methods: Quantitative studies examining a relationship between SS, or loneliness, and PA levels in healthy, older adults over 60 were identified using MEDLINE, PSYCInfo, SportDiscus, CINAHL and PubMed, and through reference lists of included studies. Quality of these studies was rated.

Results: This review included 27 papers, of which 22 were cross sectional studies, three were prospective/longitudinal and two were intervention studies. Overall, the study quality was moderate. Four articles examined the relation of PA with general SS, 17 with SS specific to PA (SSPA), and six with loneliness. The results suggest that there is a positive association between SSPA and PA levels in older adults, especially when it comes from family members. No clear associations were identified between general SS, SSPA from friends, or loneliness and PA levels. When measured separately, leisure time PA (LTPA) was associated with SS in a greater percentage of studies than when a number of PA domains were measured together.

Conclusions: The evidence surrounding the relationship between SS, or loneliness, and PA in older adults suggests that people with greater SS for PA are more likely to do LTPA, especially when the SS comes from family members. However, high variability in measurement methods used to assess both SS and PA in included studies made it difficult to compare studies.

Keywords: Physical activity, Social support, Loneliness, Older adults/aging, Systematic review

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Background

The global population is ageing due to an increase in life expectancy and a reduction in fertility rates. In 2010, an estimated 524 million people were aged 65 or older – 8% of the world's population. By 2050 this is expected to nearly triple to 1.5 billion, representing about 16% of the world's population [1]. It is well known that age is an independent risk factor for the development of non-communicable diseases (NCDs) such as cardiovascular disease, cancer, diabetes and dementia [1]. Even without NCDs, function and independence generally decline in older age as a result of reductions in cognitive and physical capacity (e.g. muscle strength, balance, cardiovascular endurance) [2, 3]. Now more than ever it is vital to investigate ways to encourage aging well [4] or 'Active Ageing'. This phrase refers to older adults being enabled to continue participating in "social, economic, cultural, spiritual and civic affairs" and maintain a good quality of life [5]. Promotion of Active Ageing has the potential to slow the otherwise ever-growing burden on national economies and health care systems worldwide and more importantly, to ensure that older adults are able to enjoy their lives to the best of their capacities.

Performing sufficient physical activity (PA) is a primary modifiable determinant of health especially pertinent to Active Ageing because it is known to have vast mental and physical health benefits for people of all ages [6, 7]. In adults, PA reduces the risk of all-cause mortality, prevents various chronic diseases, and in older adults especially, it reduces the risk of falls and helps maintain physical and cognitive function [8–17]. Despite the known benefits of regular PA [18], 23% of adults globally are insufficiently active, with some high income countries having inactivity rates of up to 54% [14]. Inactivity rates increase with age, with around two-thirds of those between 65-74 years and three-quarters of those over 75 years not meeting PA guidelines of at least 150 min/week of moderate intensity activity in either the US [15] or Australia [17].

In order to have a more active and healthy ageing population, it is vital to investigate ways to increase PA levels in older adults. Research addressing the most appropriate intervention methods is still inconclusive. However, many behaviour change theories, including the Social Cognitive Theory [19], Social-Ecological Model [20, 21], Theory of Planned Behaviour [22] and the Health Belief Model [23], highlight the importance of social factors such as social support (SS) and social connectedness in maintaining and/or initiating behaviour change. These theories have also been used in PA behaviour change research with older adults [24–29]. Furthermore, the World Health Organisation (WHO) identifies SS as a key determinant of Active Ageing [5], because of the importance of strong social ties for life satisfaction and subjective wellbeing in older adults. It is vital that social interactions are maintained with increasing age, as good social functioning is associated with improved self-efficacy [30–32], reduced risk of depression [33, 34] and a reduced risk of all-cause mortality [35]. Older adults have the potential to experience greater levels of loneliness and decreased SS as they encounter significant life events such as retirement, loved ones becoming unwell or passing away, or moving into care [36]. Furthermore, experiencing multiple life events at once is associated with a reduction in physical activity levels in this population group [37].

Despite having featured prominently in research for some time, SS is still a contentious and poorly defined concept, but with agreement that it is multifaceted [38–40]. A critical appraisal of the literature by Williams et al. [40] found 25 variations on the definition of SS in use. Key themes identified in the SS definitions were social relationships that are reciprocal, accessible and reliable and provide any or a combination of supportive resources (e.g. emotional) and distraction from stressors or information [40]. Additionally, the WHO defines SS as being both 'emotional and practical support characterising good social relations' and a social determinant of health [41]. In the description of SS by the WHO, there is also referral to an absence of loneliness [5]. Whilst social support and loneliness are not the opposite of one another and one can be lonely without being socially isolated, they have been shown to be directly linked in community-dwelling older adults [34] and thus we have included loneliness in this review.

In the general adult population there has been some suggestion that task-specific SS is more important than general support for maintaining or changing health behaviours [42, 43]. However, for PA behaviour this association does not seem to be as clear-cut, with studies supporting a positive association between PA and both general SS [44–46] and support specific to PA [47–49]. It is possible that similar associations also exist in older adults but these have not been summarised before, therefore this will be addressed in this review. There may also be value in understanding the specific role of different sources of SS (e.g. friends, family or exercise group) and PA levels in older adults. Kouvonen et al. [30] reported that people with high emotional support from their closest significant other, who met PA guidelines, were more likely to still be undertaking adequate PA five years later. Eyler et al. [49] found that high SS from both friends and family was significantly associated with greater PA levels in women. Not only the *type* and *source* of SS may play a role in the association between SS and PA, this association may also differ across the PA *domains* of active transport, active recreation or leisure

time PA, household activities and occupational activities [50]. For example, studies synthesised in a recent systematic review of the association between SS and PA in adolescents consistently found a positive association between support from both parents and friends and leisure time PA, whereas the transport domain of PA was only consistently and positively associated with SS from friends [51].

As demonstrated above, the research surrounding SS and PA in adults is varied and therefore difficult to generalise to older adults with certainty. Also, in older adults the literature has not been reviewed and summarised in the past. Given the considerable societal changes occurring with the ageing population and the importance of PA to the health and quality of life in older adults, a review of the research evidence for this population group is warranted. Therefore this review has three aims: 1) systematically review and summarise the studies examining the association between SS, including loneliness as per the WHO definition, and PA in older adults; 2) clarify if any potential associations differ between *types* (e.g. task specific support, general support) or *sources* of support (e.g., support from family, friends or exercise group); and 3) investigate whether the association between SS and PA in older adults differs between specific *PA domains* (LTPA, transport, household, occupational).

Methods

Protocol

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist has been followed to undertake this systematic review [52].

Study eligibility criteria

Studies examining the association between social support, including loneliness, and physical activity (PA) in older adults and meeting the following criteria were included: 1) Generally healthy, community dwelling older adults with a mean age of at least 60 years, as per the definition of the UN [53] and a minimum age of no less than 50. If the mean age or age range of participants was not clear the paper was excluded; 2) A validated measure of SS with at least two items or a validated measure of loneliness; 3) PA was measured objectively or subjectively using measures with established validity as reported in the individual papers, or with clear face validity [54]. As Terwee et al. [54] state in their review of measurement characteristics of PA questionnaires, face validity is often the most important measurement property of a questionnaire and the relevance of other aspects of validation (e.g. reliability, validity, responsiveness) differs depending on what the scale intends to measure. Therefore, PA questionnaires with clear face validity were included in this review. In addition, PA data needed to be analysed appropriately, i.e. studies that analysed ordinal PA data as a continuous variable were excluded; and 4) Peer reviewed, quantitative studies, regardless of study design, available in English, German, French or Dutch were considered for inclusion.

Information sources and search

Systematic searches of MEDLINE, PSYCInfo, SportDiscus, CINAHL (via EBSCOHost Megafile premier) and PubMed were conducted in August 2014. No limit to dates of coverage was applied to these searches. Free terms as well as appropriate thesaurus terms of each database were combined for the population, SS, including loneliness, and PA. An example full search strategy for PubMed is included in a separate file (see Additional file 1). Full search strategies for EBSCOHost are available from the first author on request.

Study selection

Results of the database searches were imported into Endnote X7 and duplicates were removed. Titles and abstracts were then screened by one reviewer (GLS) to remove papers out of scope. Next, full texts were screened in detail by one reviewer (GLS) to check if the inclusion criteria were met. Two authors then independently reviewed the papers in the final list. Reference lists of included papers were screened to identify additional studies meeting the inclusion criteria. In case of any uncertainty during the review process, an additional reviewer was consulted and a consensus decision was made.

Data extraction

Data were extracted by two reviewers according to the following pre-agreed categories: Country where study was conducted, study design, sample size, participant characteristics (age [mean and range], gender), PA and SS or loneliness measures, results and adjustments in multivariate analyses. See Table 2 and Table 3 for further details. Authors were contacted for more information if there was insufficient detail about validation of the SS/loneliness measure.

Risk of bias and quality assessment

The Gyorkos risk assessment tool was used to rate the quality of included papers, as it includes items to assess the quality of multiple study designs [55, 56]. All reviewers came to a consensus about the definitions of major and minor flaws for the various study designs as recommended in the rating instructions [56]. See Table 1 for details. In addition to overall study design, quality of SS (or loneliness) and PA variables were assessed for each study. For each study, every item was rated independently by 2 reviewers as 'yes,' 'partially met,' 'no,' 'can't

Table 1 Definitions of major and minor flaws for this SR

	Experimental studies (clinical trial or community trial)	Longitudinal Observation (cohort study or observational study)	Cross-sectional
Study population: Major	• No Control • Sample size inadequate for power ($n < 20$ per group) • Non-random allocation or randomisation not described	• Not representative of the population of interest. In relation to age, gender AND • Confounders not accounted for • No description of sample	• Not representative of the population of interest. In relation to age, gender AND • Confounders not accounted for. • No description of sample
Minor	• Confounders not completely accounted for • Omission of detail about confounders.	• Not representative of the population of interest. In relation to age, gender • Omission of detail about confounders • Non-random sampling • Sample size inadequate for power ($n < 10$ per variable) or not described (if study $n < 500$)	• Not representative of the population of interest. In relation to age, gender • Confounders not accounted for • Non-random sampling • Sample size inadequate for power ($n < 10$ per variable) or not described (if study $n < 500$)
Intervention/ exposure: Major	• No description of the PA or SS component of the intervention • No measurement of intervention strength or exposure • Intervention <12 weeks	• No measurement of exposure • Poor or no face validity of measurement of exposure	• No measurement of exposure • Poor or no face validity of measurement of exposure
Minor	• No blinding	• No validity of measurement PA or SS exposure mentioned	• No validity of measurement PA or SS exposure mentioned
Outcome: Major	• Poor face validity of measurement of outcome	• Poor or no face validity of measurement of exposure	• Poor or no face validity of measurement of PA or SS outcome
Minor	• No validity of PA or SS outcome measure mentioned	• No validity of PA or SS outcome measure mentioned	• No validity of PA or SS outcome measure mentioned
Follow-up: Major	• High drop-out (>20%) (from pre to post- test measurement)	• High drop-out (>20%) (from pre to post-test measurement)	• NA
Minor	• High drop out in long term follow up (post intervention) • No long term follow up	• High drop out in long term follow up (post intervention) • No long term follow up	• NA

tell' or 'NA'. Based on these ratings the overall quality was rated by each reviewer as:

> Strong: No major flaws, a few minor flaws - any plausible postulated bias was unlikely to seriously alter the results,
> Moderate: No major flaws, some minor flaws - a plausible bias exists that brought into question the confidence that could be attached to the results,
> Weak: One or more major flaws - a plausible bias existed that seriously weakened confidence in the results.

In case of discrepancies between reviewers in the final quality rating, a third reviewer assessed the study and the three reviewers discussed to resolve the disagreement.

Data synthesis

The studies were categorised as focusing on loneliness, general SS or SS specific to PA. Each paper was rated as + or - if a statistically significant positive or negative association was found; 0 was assigned if no statistically significant association was found (In the remainder of this paper, 'statistically significant' results will be referred to as 'significant'). Studies reporting differences in results for males and females, or in the type, source and/or domain or PA are coded multiple times (See Table 3 for details of quality assessment). To summarize the associations found in the studies, the following overall ratings, as suggested by Sallis et al. [57], were given to each section: "0" (No association; 0%-33% of the findings supported the association), "?" (indeterminate association; 34-59% of the findings supported the positive or negative association), "+" or "- "(positive or negative association; 60%-100% of the findings supported the association) [57] (see Table 4 for overall quality ratings for each category).

Results

Study selection

Of the 4265 papers identified in the search, 3349 remained after removing duplicates. After screening titles and abstracts to remove papers out of scope, the full text of 211 papers was checked. Of these, 24 met the inclusion criteria. Three further relevant studies were identified in backward reference tracking giving a total of 27 papers for the review (See Fig. 1).

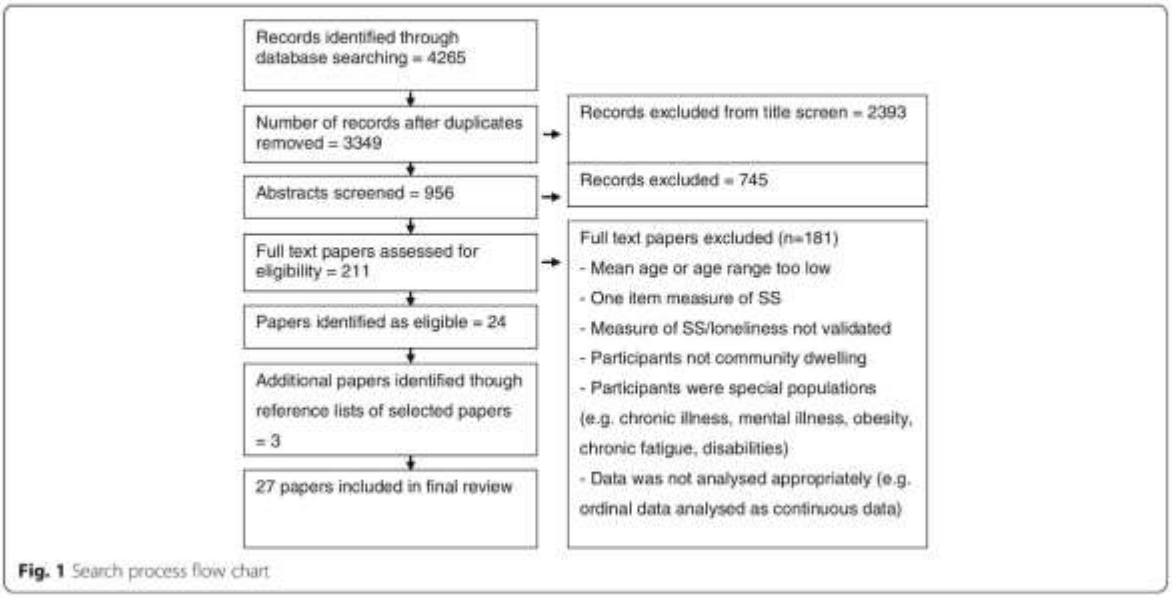

Fig. 1 Search process flow chart

General study characteristics

More than three quarters of the included studies (21 studies) examined the association between SS and PA, and the remaining six studies investigated the relationship between loneliness and PA levels [58–63]. Of the studies examining the association between SS and PA, 17(81%) examined the association between SS specific to PA or exercise [31, 64–79] and the remaining four examined the association between general SS and PA [80–83].

The majority of the studies (67%) were published between 2006 and 2014 with the oldest paper published in 1992 [83]. Seventeen studies were conducted in either the USA or Canada, with six from Asia, two from Europe [61, 66], one from Australia [64] and one from Israel [59]. More than 80% of the identified studies (22 studies) were cross-sectional, three were longitudinal [58, 60, 71] and two were experimental [66, 79] (see Table 2). Sample sizes ranged from 64 [79] to 13,812 [63]. Most studies incorporated both males and females and four included females only [67,72,78,65]. Only four studies assessed sex differences relating to SS and PA levels [59, 70, 73, 80]. See Table 2 for details.

Quality rating

The quality of the four studies examining the association between general SS and PA levels was moderate for three studies [80, 81, 83] and weak for one study [82]. Ten of the 17 papers examining the association between PA specific SS and PA levels were of moderate quality and the other seven were of weak quality.

Of the six studies examining the association between loneliness and PA, all were of moderate quality, except for the longitudinal study by Newall et al. [60], which was of weak quality. For further details see Table 2.

Measurement and analysis of social support and physical activity

The way PA was measured and analysed varied widely between studies. Overall, 23 of the studies used self-report PA measures and four used objective PA measures. The majority (74%) of studies collected continuous PA data and the remaining seven collected categorical (ordinal) data. Seven of the papers transformed the data into categories such as active or inactive based on pre-defined cut-offs for analysis purposes. Further details about collection and analysis of the PA measures in each of the three categories (i.e. general SS, SS for PA, loneliness) is described in Table 2 and Additional file 2. There were also a wide range of social support and loneliness scales used in the studies in this review. The SSPA category of studies had the most consistency of scales, with 14 out of 17 utilising various versions of The Sallis SS for Leisure Scale [42]. See Table 2 for more detail of scales used in the included studies and Additional file 2 for more detail.

Relationship between SS, loneliness and PA

Overall, of the 21 studies examining the association between either general or PA specific SS and PA levels, 13 found a significant positive association and one study found a significant negative association [75]. Four of the six loneliness studies [58, 59, 61, 63] found a significant negative association.

Table 2 Study characteristics: design, study population and measures of SS and PA

First Author (Year) Country	Study design[1] Sample size[1]	Gender Age (Years): (Range) Mean (SD)	PA Measure[2]	Domain of PA[2]	Definition of 'active' [4]	SS Measure[5]	Type of SS	Source of SS
Booth [95] Australia	XS 402	44.8% male [60+ years] NA	SR: LTPA questionnaire [95]	LTPA (walking and MVPA)	>800 kcal /week spent doing PA	Social environment scale (Likert scale, 4 items). Adapted from Sallis' SS for ex. Scale [42].	SSPA	friends and family
Bopp [65] Rural USA	XS 102	All female [50+ years] 70.6 (9.2)	SR: PA Scale for the Elderly (PASE) [96]. Strength training.	Strength training exercise (LTPA)		SS for ex. scale [42] Friends 15 qs, family 5 qs. Conflicts with original version (5 friends, 5 family).	SSPA	friends and family
Carlson [31] USA	XS 687-709 (3 PA variables)	46.9% male [65+ years] 74.4 (6.3)	Objective: Accelerometer (1 week) and subjective SR survey: CHAMPS [97]	Total MVPA, TPA		SS for ex. scale. Adapted from [42] & [31]. 4 items; Internal consistency Cronbach's α = 0.67	SSPA	family and friends (Sum score)
Gellert [66] Germany	Experimental N = 302 *n* = 48 ex. with partner *n* = 84 singles *n* = 170 not ex. with partner	52% male [60-95 years] 66.5 (4.9)	SR PAQ-50 (adapted from [98]. Frequency and duration in last 7 days	HH, LTPA/ sport, TPA		Only 2 items from SS for ex. Scale [42]	SSPA.	friends, partner and family (total)
Hall [67] USA	XS 128	All female [NA] 69.6	Objective: accelerometer analysed as less than 10,000 and more than 10,000 steps per day	All	At least 10 000 steps /day	SS for ex. scale [42] 10 item version, not clear which questions.	SSPA	Friends and family
Kaplan [80] Canada	XS 12611	39% male [65+ years] NA	SR: leisure PA. Monthly moderate-intensity PA lasting more than 15 mins	LTPA	Greater than 15 mins PA at least 12x/m = *frequent*; less than this = *infrequent*	4 questions. Perceived SS [93]. Qs: 1) someone they could confide in, 2) someone they could count on, 3) someone who could give them advice,4) and someone who made them feel loved. Score = sum of all affirmative (yes) responses to the four items. (Internal consistency Cronbach's α = 0.75.)	General perceived SS. (General SS)	
Kim [68] South Korea	XS 290	30% male [65-89 years] 68.6 (4.4)	SR: Leisure time PA scale [99] Habitual weekly PA. Greater than 15 mins. Scored in METs (sum total of all activities)	LTPA		24 item SS for ex. scale [42]. Translated [100]. 12 friend and 12 family questions. Unclear exactly which Qs.	SSPA	family and friends
Kraithawom [69] Thailand	XS 258	26% male [60-88 years] 70.0 (6.4)	Modified version of self-reported PAQ for older Thais [101]. 42 items. Number hours /week for each activity. Last 7 days. Scored in METs	All	30 mins mod. intensity PA, 5 days /week or 20 mins vig. PA 3 days /week.	Scale developed from Social support for ex. scale [42] modified version for this study and Thais. 11	SSPA (emotional support, tangible support, informational support.	family and friends

Table 2 Study characteristics: design, study population and measures of SS and PA *(Continued)*

						items [102]. Unclear which questions used.		
Lian [70] Singapore	XS 2494	42% male [60+ years] NA	SR: Number of times doing moderate or vigorous PA at l east 20 mins in last week (moderate: walking, gardening, tai chi chuan, qigong; Vigorous: jogging, cycling, swimming)	LTPA	mod. or vig. PA at least 20 mins at least 3x /week	SS for ex. Scale Adapted from [103]. 6 questions in original; 3 friends, 3 family.	SSPA	Family and friends
Luo [58] China	Longitudinal. 2002 sample n = 14072 re-interviewed 2005 *n* = 7668 re-interviewed 2008 *n* = 4033	47.1% male [65-105 years] 72(6)	SR: Regular PA yes/no?	LTPA		Loneliness (as an IV for health). Single question about loneliness (how often lonely: never - always). 5 point Likert scale	Loneliness	NA
McAuley [71] USA	Longitudinal 153	28% male [60-75 years] 66	PA during the study: attendance at the classes (SR exercise log after each class). Follow up PA at 6 and 18 months assessed by SR: PASE [104] 10 item scale	LTPA, OPA, HHPA, (summed)		Social Support Provisions Scale [105] (support provided by exercise group). 24 items, 6 headings reflecting the social provisions proposed by [106]: attachment, social integration, reassurance of worth, reliable alliance, opportunity for nurturance, and guidance.	SSPA	Exercise group
Mowen [81] USA	XS 1515	44% male [50-99 years] 67.4(9)	SR: Single ordinal item. Daily PA levels scored 1-3. 1 = sedentary, 2 = moderate activity 3 = vigorous activity (uses examples for each e.g. usually sedentary, usually walking a lot etc.)	LTPA, OPA, TPA (combined)		Social support questionnaire (SSQ) [92]. 6 items. Number of people providing supports and degree of satisfaction with support. 6 Point Likert	General SS, network size, SS satisfaction	Number of people to provide support, satisfaction with. (all people in network)
Netz [59] Israel	XS 1663	48% male [65+ years] 74.8(6.2)	SR: frequency and average time doing certain types of Moderate and vigorous intensity PA each week (e.g. walking etc.).	LTPA	*Sufficiently active*: Mod. PA at least 150 mins /week, or Vig. PA at least 75 mins /week or an equivalent mix of the 2. *Insufficiently active*: Some activity but less than the levels above. *Inactive*: no activity other than light-intensity activity less than 1x /week	1 item from CES-D [107] Lonely/not lonely 4 point Likert scale. A question also about living alone	Loneliness, living alone	NA

Table 2 Study characteristics: design, study population and measures of SS and PA *(Continued)*

Newall [60] USA	Longitudinal 194	37.7% male [77-96 years] 83(4.2)	Objective: Accelerometer. Daily PA	all daily activity		Loneliness measured in 2001 using [108] 11-item loneliness scale.	Loneliness	NA
O'Brien Cousins [72] Canada	XS 327	All female [70-98 years] 76.7 (5.5)	SR: Older adults exercise status inventory (adapted from other scales for this study)	LTPA, OPA, HHPA (summed)		4 Questions (1) previous family sport involvement; (2) current encouragement by at least one person to maintain one's physical abilities; (3) endorsement by the family physician; and 4) peer group interest in physical fitness activity	SSPA	family, friends, doctor (sum score)
Oka [73] Japan	XS 137	47% male [70-89 years] 74.5	Objective: pedometer daily number of steps. Recorded. Over 1 year and data downloaded every month.	All	Men = 6700 steps, women = 5900 steps	Itakura Social support for ex. [109] 5 item scale. Functional, emotional, and informational Social support for exercise i) advice/instruction, ii) understanding/ sympathy, iii) former encouragement/ reinforcement, iv) joint implementation, v) compliment/ appreciation.	SSPA	family and friends (sum score)
Orsega-Smith [33, 74] USA	XS 1900	38.5% male [50+ years] 67.7 (6.9)	SR: survey frequency, intensity, time of 6 different PAs (specified by participants) over the last week. Total METs calculated.	LTPA	A minimum of 3 METs (mod. level of PA), at least 5 days /week (meeting PA guidelines)	Social support for ex. scale [42] 12 items for friends and family (not clear if 12 is total number of questions or 12 for each friends and family)	SSPA	Family and friends (separate)
Park [75] South Korea	XS 187	29.9% male [57-96 years] 71.6 (5.9)	SR: PASE [110]	LTPA, OPA HHPA (summed)	*high-active* = 150mins mod. and/or 75 mins vig. PA /week. *low-active* = Less than above	Social support for ex scale [42] Not clear if full original questionnaire was used. Translated into Korean.	SSPA	Friends and family
Potts [83] USA	XS 936	40.4% male [NA] 72.6 (5.9)	SR telephone interview: Regular exercise in last week yes/no	LTPA		Social network scale [91] , 10 items. Number of friends and family (asked separately) seen regularly, able to talk to about private matters and ask for help.	General Social engagement (General SS)	family and friends
Sasidharan [76] USA	XS 1967	Gender NA [50+ years] NA	SR: 5 items from PASE [110]	LTPA		Social support for ex scale [42] 12 questions for each; friends and family	SSPA	friends or family
Schuster [77] USA	XS 108	31% male [60+ years] NA	SR: Frequency of participation in one or more physical activities in last 6 months for 20-30 min?	LTPA		Social support for ex. scale. 5 items. Adapted from Sallis (1987). Not clear which questions	SSPA	Friends and family (combined).
Shankar [61]	XS	46.1% male		LTPA, OPA				NA

Table 2 Study characteristics: design, study population and measures of SS and PA *(Continued)*

UK	8688	[NA] 66.9 (10.4)	SR: times /week taken part in vigorous, moderate or mild PA		*Inactive* = mod.- vig. PA no more than 1x /week	3 item revised UCLA loneliness scale [111]. And also a measure of social isolation	Loneliness and s ocial isolation	
Shiovitz-Ezra [62] USA	XS 3005	46.6% male [57-85 years] NA	SR interview: frequency participating in PA (examples provided), 5-point Likert scale ranging from more than 3x /week to never.	LTPA		Loneliness question from CES-D	Loneliness	Loneliness
Theeke [63] USA	XS 13812	38.7% male [NA] 67.7 (9.2)	SR: Frequency doing sports/ activities that are moderately energetic: every day, more than 1x/week, 1x/week, 1-3x /m, never.	LTPA		Loneliness question from Center for Epidemiologic Studies Depression Scale (CES-D) [94].	Loneliness	NA
Vance [82] USA	XS 158	52.5% male [65-91 years] 74.8 (5.8)	SR: PA Questionnaire	All types of LTPA separated		Lubben Social Networks Scale [91]	Social engagement (General SS)	
Wilcox [78] Rural USA	XS 102	All female [50+ years] M = 70.6	SR: PASE; [110]	LTPA, OPA, HHPA, (summed)		SS for ex. scale [42] (15 friends, 5 family)	SSPA	Family and friends. Average of 2 used or for analysis (overall SS)
Yeom [79] USA	Quasi-exp. N = 64 n (IG) =33 n (CG) =31	23.4% male [60-89 years] 71 (7.4)	SR: Participation in any type of regular PA for a minimum 30 min 3x /week? (y/n)	LTPA (flexibility, balance, walking)	Answered 'Yes' to PA question	SS for ex. scale [42] 9 items friends and 9 family. Not clear exactly which questions.	SSPA	Friends and family (separate)

[1] XS = cross sectional, Exp. = experimental, N = total number of participants, n = number of participants in a group, ex. = exercise, IG = intervention group, CG = control group
[2] SR = Self-Report, /week = per week, /m = per month
[3] LTPA = Leisure time PA, TPA = Active Transport, HPA = Household PA, OPA = Occupational PA, MVPA = moderate- vigorous PA
[4] /day = per day, /week = per week, /m = per month, mod. = moderate, vig. = vigourous
[5] ex. = exercise, qs = questions

In the four female only studies, one found a significant association for SSPA overall [72] and one found an association for SSPA from family only [65]. In the four studies stratified for gender, two found an association for females only. One was for general SS [80] and the other was for loneliness [59]. Of the remaining two studies, which both focused on SSPA, one found a positive association for SSPA from family but not friends in both males and females [70]. See below for further details within each of the three categories.

General social support and physical activity levels

Five associations were reported in the four studies examining the association between generalised SS or social engagement and PA levels. Only two of these (40%) were positive and significant (greater SS being associated with greater likelihood of doing PA); one for both genders [83] and one for females only [80]. This suggests an overall unclear association between general SS and PA levels when using pre-defined cut-offs established by Sallis [57]. See Table 4 for details.

Social support specific to PA

Of these 17 studies, 11 described at least one significant positive association between SS for PA and PA levels. Of the eight studies where source of support was not delineated, five associations (63%) were found to be positive and significant. This suggests an overall positive association between PA levels and SSPA from all sources [57]. In the eight studies where the association between PA levels and SS from friends or family were examined separately, four (50%) reported a positive association for SSPA from friends [68, 74, 76, 79] and five (63%) found a positive association for SSPA from family. One study found a negative association between SS from family and PA [75]. The one study examining SSPA from an exercise group did not find any direct association between SSPA and PA levels [71]. These results suggest an overall positive association between PA levels and SSPA from family but not from friends [57]. See Table 4 for details. When low quality studies were removed from the synthesis, the trend above was further supported, with four of the five (80%) relevant moderate quality studies finding a positive association between SSPA from family members [65, 68, 74, 79] and an indeterminate overall association between PA levels and SSPA from friends. For more detail of these results, see Tables 3 and 4.

Loneliness and PA levels

Seven associations were examined in the six papers focusing on the association between loneliness and PA. Four (57%) of these were significant and negative [58, 59, 61, 63], indicating unclear support for the association between loneliness and PA levels [57]. When the one low quality study [60] was removed from the synthesis, the results suggest an overall negative association with 67% being significant and negative. See Tables 3 and 4 for details

Association between SS, loneliness and specific PA domains

Only LTPA and transport domains were assessed separately in the studies reviewed. LTPA was assessed in 15 studies and transport in one [31]. The other studies either assessed all, or a combination of several PA domains together. When placed into the three categories, the following overall trends were seen for LTPA: Three general SS studies examined LTPA [80, 82, 83]. One found a significant positive association between LTPA and SS, and one supported a significant positive association in females only [80]. This suggests an overall positive association between general SS and LTPA for females but not males [57]. Eight of the 17 SSPA studies assessed the LTPA domain. Two of these assessed SS from friends and family combined and both found significant positive associations, suggesting an overall positive association between LTPA and all sources of SS [57]. In the six studies that assessed the association between different sources of SS and LTPA, 67% of results supported a significant positive association for friends and 83% for family. This indicates an overall positive association between LTPA levels and SSPA from both friends and family [57]. Four loneliness studies examined LTPA [58, 59, 62, 63]. Within these, the results support an overall negative association between LTPA and loneliness for females only, with three of four associations [58, 59, 63] being negative and significant in females but only two of four in males [58, 63]. See Table 3 for more details. In the one study where transport PA was assessed separately, a positive association with SSPA was found [31].

Discussion

The aims of this review were to summarise the results of quantitative studies assessing whether SS or loneliness is associated with physical activity levels in older adults. Specifically, we investigated whether any potential associations differ between *types* (e.g. task specific support, general support) or *sources* of support (family or friends or exercise group); and whether any associations between SS and PA are specific to certain PA *domains* (e.g. LTPA, transport, household, occupational). SS is an important determinant of health, especially in older adults, as there are many important life events such as retirement, illness, and death causing SS to change in later life. Understanding how SS and loneliness are associated with PA in this population group may assist in development of more effective, targeted PA

Table 3 Results of association between SS and PA and quality rating

Primary Author (Year)	Type of SS[1]	Theory[2]	Type of analysis[3]	Adjustments	Results of association between PA and SS or loneliness[4]	Summary result[5]	Paper quality rating[6]
Booth [64]	SSPA	SCT [19] with comments on determinants for older adults from [112]	Forced entry logistic regression analysis	Age, sex, country of birth, marital status, employment status, living situation	Sig. greater number of active people had high social support (42.7% inactive Vs 55.6% active had high social support ($P = 0.010$). Partner or friends being active was sig. associated with being active.	+	Mod
Bopp [65]	SSPA	NS	Bivariate associations. Logistic regression analysis	nil	Sig. positive correlation between total social support (family) and strength training (ST) participation ($\beta = 1.10$, $p = 0.001$) and also hours per week of ST training ($\beta = 0.26$, $p = 0.003$). No sig. association SS (friends) and ST	+ (family) 0 friends)	Mod
Carlson [31]	SSPA	SEM	Mixed Effect regression models	*Total PA* - age, ethnicity and gender, *walk for transport* : age ethnicity, months at address, number of vehicles per adult, *walk for leisure*: ethnicity and months at address	SS sig. associated with total MVPA (min/ week). B = 14.35, $p < 0.01$). SS sig. associated with min/ week walking for transport (B = 7.35, $p < 0.05$). SS sig. associated with min/ week walking for leisure ($P < 0.05$)	+	Mod
Gellert [66]	SSPA	NS	ANOVA. Regression analysis using MODPROBE macro	gender, age	Mean PA (F (2, 299) = 4.39, $p < 0.05$) as well as SS (F (2, 299) =5.49, $p < 0.01$) was higher in the group with individuals whose partners took part in the intervention, compared to the other two groups.	+	Weak
Hall [67]	SSPA	Socioecological model [113]	MANOVAs	age	No Sig. difference between SSPA (friends or family) on whether participants did <10,000 steps or > = 10,000 steps per day. SSE Friends: F = 0.02, $p = 0.88$ SSE Family: F = 0.02, $p = 0.89$.	0 (friends or family)	Mod
Kaplan [80]	General SS	NS	Bivariate relationships	Gender, age, education, marital status, smoking, chronic conditions, BMI, injury, functional limitations, distress, region	Higher social support was sig. associated with greater odds of doing frequent PA in females. Females OR (95%CI) =1.08 (1.04-1.13), not significant for males. OR (95%CI) = 1.04 (0.99-1.09)	+ female) 0 (males)	Mod
Kim [68]	SSPA	SEM [114]	Correlation followed by Stepwise multiple regression analysis	gender, education level, living situation, self-efficacy	SS (family) pos. associated with amount of PA Fchange (2,279) =10.24, p = 0.012 (second most important contributor to PA after self-efficacy) No sig. effect of SS from friends.	+ (family) +(friend)	Mod

Table 3 Results of association between SS and PA and quality rating *(Continued)*

Kraithaworn [69]	SSPA	Health promotion model, socio-ecological model.	Path analysis using LISREL	Nil	SS did not significantly predict PA levels directly or indirectly. (Direct effect B = 0.1. Indirect effect B = 0.08, total effect B = 0.18) SS had an indirect effect on PA levels through sense of community.	0	Mod
Lian [70]	SSPA	PRECEDE health promotion framework	Multiple regression by stepwise method	Nil	More Family encouragement and higher proportion of family members exercising was significantly associated with greater frequency of at least 20 min of moderate to vigorous exercise per week; standardised β = 0.131 and standardised β = 0.108 respectively for men and standardised β = 0.154 and 0.138 for women. (For all $P < 0.001$) In addition, frequency of contact with people significantly associated with greater frequency of moderate to vigorous exercise per week in women. Standardised β = 0.052, $p < 0.05$). No association for friends	+ (family) 0 (friends)	Weak
Luo [58]	Loneliness	NS	Cross-lagged path analysis	Age, gender, ethnicity, residence (urban or rural), education, financial independence, relative economic status, number of visiting children in 2002.	Regular PA participation decreased odds of being lonely 3 years later and loneliness decreases odds of being active in 3 years. Lonely02-- > PE05 and lonely05-- > PE08 β = -0.028, $P < 0.001$. PE02-- > lonely05 and PE05-- > lonely08. B = -0.111, $p > 0.001$.	-	Mod
McAuley [25, 71]	SSPA	SCT (but also testing theoretical models).	Structural equation modeling	Nil	Those who reported more frequent PA, had higher levels of SS, which influenced both a better exercise experience and directly and indirectly a higher self-efficacy, which predicted higher exercise participation at both 6 and 18 months.* Model fit statistics: χ^2 (6) = 5.20, $P > .10$; NNFI, 1.0; CFI, 1.0; RMSEA, 0.027	0 (*Indirect* + associations: SS → Affect → SE → PASE 6 months → PASE 18 months)	Weak
Mowen [81]	General SS	Stress-buffering and main effect of SS on health.	Path analysis	Nil	Larger SS network size or SS satisfaction did not increase odds of having a moderate or vigorously active lifestyle. SS network β = 0.014, SS satisfaction β = 0.007	0	Mod
Netz [59]	Loneliness	NS.	ANOVA with Chi2 test and Multinomial stepwise logistic regressions	BMI, being religious versus secular, Self-rated health and education	No assoc. between odds of feeling lonely and PA level in men. In women it explained 20% of variance. Greater loneliness was	-(female) 0 (males)	Mod

Table 3 Results of association between SS and PA and quality rating *(Continued)*

					associated with lower odds of engaging in sufficient PA as compared to "inactive" OR (SE) = -0.52 (0.23). Adjusted OR (CI) 0.59 (0.38, 0.94). No significant association between living alone and activity levels.		
Newall et al. [60]	Loneliness	Fredrickson 's Broaden and Build Theory [115]	Regression analysis	Age, gender, income satisfaction, marital status, functional status, health status	Loneliness was not significantly associated with mean everyday PA ($\beta = 0.001$, $p > 0.05$). Also no interaction between loneliness and happiness ($B = 0.08$, $p > 0.05$). However, greater loneliness was associated with subjectively feeling less physically active compared to peers.	0	weak
O'Brien Cousins [72]	SSPA	Theory of Planned behaviour [116] SCT [117]	Multiple regression analysis	Education, marital status, employment status, country of origin	Exercise level (more PA per week) was associated with a greater composite SSPA. $B = 0.264$, $SE = 0.055$ ($P < 0.01$)	+	Mod
Oka. [73]	SSPA.	NS.	Chi2 analysis and an independent group *t*-test	Age, gender, marital status, BMI, smoking status, alcohol consumption, self-efficacy for exercise, advice from HCP, perceived neighbourhood environment	Greater SS did not increase the likelihood of meeting PA guidelines in either males or females. Adjusted Odd Ratio (AOR) for meeting national PA guidelines and having higher SS for exercise. AOR (95%CI) = 0.82 (0.63-1.07)	0 (males or females)	Mod
Orsega-Smith [33, 74]	SSPA	SCT	Correlation analysis, multiple regression analysis and ANCOVA	Age, physical health	More LTPA significantly associated with higher SSPA from both family and friends. SS (family) Adj. $B = 0.72$, $p < 0.05$, SS (friends) Adj. $B = 0.113$, $p < 0.0001$. Also, people who met the CDC recommended guidelines for PA were significantly more likely to have higher SS from friends and family.	+ (friends) + (family)	Mod
Park [75]	SSPA	NS	Multiple regression, independent 2 sample *t*-test for high vs low-active and SS	Nil	Multiple regression. No significant correlation between SS from friends and PA. Negative association between SS family and PA. SS family: $B = -0.220$, $t = -3.107$ $p < 0.01$. Both High and low active individuals scored low on SS from friends and family with no significant difference between them.	0 (friends) - (family)	Weak
Potts [83]	General SS		Ordinary least squares regression			+	Mod

Table 3 Results of association between SS and PA and quality rating *(Continued)*

		Health belief model (Becker, 1974 [118, 119]		Demographic factors (gender, age, education, marriage, income), health status, perceived frailty	People with stronger social support networks more likely to exercise regularly. B = 0.11 ($p < 0.01$).		
Sasidharan [76]	SSPA	SCT	Separate factor analyses for friends and family SS	Nil	Sig. positive association between SS (friends) and LTPA b (unstandardized) (SE) = 0.13 (0.09), $p < 0.05$ No significant association for family SSL. B (SE) = -0.05 (0.03)	+(friends) 0 (family)	Weak
Schuster [77]	SSPA	SCT	Hierarchical multiple regression	Perceived barriers	Perceived SS was significantly correlated with LTPA ($r = 0.474$, $p < 0.0001$). Perceived SS accounted for an additional 17.5% of the variance in intentional exercise ($P < 0.001$)' after perceived barriers had been entered into the model.	+	weak
Shankar [61]	Loneliness	NS	Multinomial logistic regression	Age, gender, limiting long-standing illness, depression, and marital status-adjusted wealth	Loneliness associated with a greater likelihood of being inactive. OR (95% CI) reference = risky behaviour. Loneliness OR = 1.08 (1.04-1.113) of being inactive vs active. Social isolation: 1.115 (1.11-1.19) of being active vs inactive	-	Mod
Shiovitz-Ezra [62]	Loneliness	NS	Multivariate logistic regression	Age, gender, education, income, ethnicity, self-rated health. Functional impairment	No sig. association between being lonely to some degree and doing any PA. PA OR (SE) [95% CI]: 0.8 (0.11) [0.6-1.07]	0	Mod
Theeke [63]	Loneliness	NS	Chi-square statistics and one-way analysis of variance	Marital status, self-reported health, education, functional impairment, number of chronic illnesses, age, annual household income, number of individuals in household.	Chi-squared testing showed significant difference in frequency of moderate activity in Never lonely, briefly lonely and chronically lonely groups. Chi2 = 438.347 ($P < 0.005$). The chronically lonely group did less average exercise than the briefly lonely or never lonely groups (no statistical test reported for this).	-	Mod
Vance [82]	General SS	NS	Correlation and step-wise regression	Nil	No significant association between social network and total PA ($r = 0.02$)	0	Weak
Wilcox [78]	SSPA	SCT	Hierarchical regression analysis	Sociodemographic measures (age, race, education, marital status),	Non-significant trend for greater social support from friends and family (total) to be associated with higher levels of PA. B = 0.16, $p = 0.09$. Qualitative discussion identified social support as being a very common motivator to PA.	0	Mod

Table 3 Results of association between SS and PA and quality rating (*Continued*)

Yeom [79]	SSPA	Wellness Motivation Theory [120]	Repeated measures ANOVA and Chi-Square test	Nil	Intervention group (IG) significantly increased support from family ($F = 21.87$, $p < 0.01$) and friends ($F = 24.72$, $p < 0.001$) compared to controls. IG more likely to engage in regular PA after the intervention, compared with controls. Chi-squared =25.01, $p < 0.001$.	+ (friends) + (family)	Mod

[1]SSPA = Social Support for PA
[2]NS = Not specified. SCT = Social Cognitive Theory
[3]ANOVA = Analysis of Variance
[4]Sig. = Significant, CI = confidence interval
[5]+ = positive association, - = negative association, 0 = no association
[6]Mod = Moderate quality

Table 4 Data synthesis - summary of results

SS/ loneliness	Assoc.	Studies (primary Author, Publication year)					Summary score[1]
SS general	No	Mowen, 2007	Kaplan, 2001 (males)	*Vance, 2006 (social engagement)*			?
	Positive	Kaplan, 2001 (females)	Potts, 1992 (social engagement)				
SSPA Sum total	No	Oka, 2012 (males or females)	Krathawom, 2011	Wilcox, 2003. RURAL FEMALE STUDY			+
	Positive	Carlson, 2012	Booth, 2000.	O'Brien Cousins, 1995. FEMALE STUDY	*Schuster, 1995*	*Gellert 2011; PA and SS higher in exercising spouse group*	
SSPA friends	No	Hall, 2010. FEMALE STUDY	Bopp, 2004. Strength training. FEMALE STUDY	*Park, 2014.*	*Lian, 1999. (males or females)*		?
	Positive	Yeom, 2014.	Orsega-Smith, 2007.	Kim, 2013.	*Sadisdharan, 2006*		
SSPA family	No	Hall, 2010. FEMALE STUDY	*Sadisdharan, 2006*				+
	Positive	Yeom, 2014.	Orsega-Smith, 2007.	Kim, 2013.	*Lian, 1999 (males and females)*	Bopp, 2004. Strength training. FEMALE STUDY	
	Negative	*Park, 2014*					
SSPA exercise group	No	*McAuley, 2003, 6 or 18 mo FU*					
Loneliness	No	Shiovitz-Ezra, 2014	Netz, 2013 (males)	*Newall, 2013*			?
	Negative	Luo, 2014.	Theeke, 2010.	Shankar, 2011.	Netz, 2013 (females)		

Key

SS/ loneliness	Assoc.	Studies (primary Author, Publication year)		Summary score[1]
		Experimental study	**High quality**	
		Longitudinal	Moderate quality	
		Cross sectional	*Low quality*	

1. 0 = No association (0%-33% of the findings supported the association), ? = indeterminate association (34-59% of the findings supported the positive or negative association), + = positive association, - = negative association; (60%-100% of the findings supported the association) [57]

interventions. This is the first review summarising the evidence in older adults.

Relationship between different types and sources of social support, loneliness and physical activity

Because of the differences in study designs and measurement of PA and SS, it was difficult to come to a clear consensus about differences in associations between types of SS and PA. However, the following advisory assessments can be made of associations between SS, loneliness and PA in older adults. There is moderate support that higher SS specific to PA from all sources combined, and from family specifically, is associated with higher levels of PA or meeting PA guidelines. This implies that older individuals with greater support to undertake PA, specifically from their family, will be more likely to be physically active in general. An unclear association was seen for SSPA from friends and PA levels but this relationship was clarified when leisure PA was examined alone (see results below). No clear overall association was supported for general support or loneliness, but after excluding the low quality studies from synthesis, moderate quality studies did suggest a significant negative association between loneliness and PA levels, indicating that people who were more lonely had lower PA levels. Given that there were far fewer studies in these two categories, further research would be warranted to confirm these above suggestions.

Association between SS, loneliness and specific PA domains

LTPA was the only domain examined in multiple studies. When these studies were synthesised, general SS in females and SSPA from friends and family were

consistently positively associated with LTPA, rather than just family, as was evident with all studies combined. LTPA was also consistently negatively associated with loneliness in females. These findings are in line with those of a systematic review in adolescents, where more consistent positive associations were found between SS from all sources and LTPA levels than when PA domains were not separated [51]. The authors of the above review noted that questions in the SSPA scales focused on provision of SS for leisure and sport PA, which may explain why there were less consistent associations when other domains of PA were included in the analysis. The same is likely to be true for the Sallis SSPA scale used in many of the papers in this study, as all the questions are focused around exercising specifically [42]. Older adults are unlikely to associate other domains of PA (e.g. household or transport) as forms of 'exercise' and thus are likely to exclude this PA when considering the questions in the scale. Additionally, there is a difference between leisure activities and other types of physical activity (such as house work, transport or employment) in that they are done for solely enjoyment rather than function [84]. Social interaction and enjoyment have been described as two key reasons for participating in sport or (leisure) physical activity in both children and adults [85]. In adults, emotional support from others has been found to be positively associated with intrinsic motivation for PA ("behaviour engaged for pleasure and enjoyment"; p37 [47]) and in turn, participation in moderate to vigorous PA and walking. This suggests that greater emotional support from others encourages greater enjoyment in physical activity, which in turn makes people feel more motivated to do leisure exercise [47]. It is, however, less likely that greater support will likely have any impact on transport, occupational or household PA. To further explore potential differences between SS and different PA domains, future studies would benefit from using more detailed PA measures (either accelerometers or detailed scales) and ensuring domain specific PA is assessed as well as total PA.

Other general findings of the review

There were some gender differences highlighted in this review. Of the four studies that stratified by gender, there was some suggestion that the PA levels of women are more likely than men to be influenced by general SS [80] or loneliness [59], but not by SSPA [35, 70]. Social support has been positively associated with self-rated health in older women but not men in a number of studies [86, 87]. Sex differences could exist in the association between SS or loneliness and PA as well, as PA is a health-related variable. Given the small number of studies exploring this association and the sex differences in the typical ageing process, with women more likely to live longer with more health conditions than men [1], this warrants further investigation.

Most studies in this review used a very generic definition for older adults, for example everyone aged 60+ years, and did not stratify by age in the analysis. However, in reality, there are great differences in life circumstances between people who are defined as young old, mid-old and older old. Social factors like social support may influence PA levels differently amongst those in different age groups, with different health statuses, and in response to different life events. For example, a longitudinal study of women found that the death of a spouse was associated with increased PA in women aged 55-60 years but the same event had no impact on the PA levels of women aged 70+ years [88]. Although the age range of people who retire is broadening, the typical retirement age is 65 years and retirement is therefore more likely to be associated with PA in people in their mid-sixties than other age groups. Retirement has indeed been positively associated with PA levels in middle aged women [88]. Therefore, further associations may have been seen in some studies if they had been stratified by age or life stage. It may be worthwhile for researchers to consider doing this in future studies to examine if the association differs between subgroups of 'older people'.

All studies in this review were rated as weak to moderate for their measures of the key variables SS and PA (see Table 1). Part of the reason for the low quality rating of the PA measures in particular was that a decision was made by the authors to include papers with adequate face validity of these measures. This was decided because the aim of this review was to provide an overview of the association between SS and PA in a variety of studies; individualised, detailed assessments of questionnaire quality were outside its' scope. Face validity was deemed an appropriate measure of validity, as it is important and relevant for all study designs and purpose [54]. The use of validated PA measures was included in the quality rating procedure and therefore studies without validated PA measures were rated as low quality. Less than half the studies used externally validated PA scales or objective PA measures. This was probably because the majority of these studies did not specifically aim to examine the association between SS and PA. Thus, these constructs were often measured as part of a large test battery, which included brief measures of PA rather than more extensive validated questionnaires or objective measurements. However, the sample sizes of these studies were all greater than 900, and in large studies these more generalised questions amongst large test batteries are more acceptable [89].

Study limitations and strengths

This systematic review has several limitations. Firstly, there are limitations with regards to the inclusion of

studies. Studies in older adults with specific medical conditions, such as obesity, cancer, heart conditions or other chronic illnesses, mental illness or disabilities were not included. This is likely to have excluded a number of potentially relevant studies because many older adults do have chronic illnesses and much research has been conducted with clinical populations. However, these studies were excluded due to the likelihood that SS relevant to clinical populations may differ to that more prevalent in the general population. In addition, qualitative studies, which can often offer more insight into a topic, were not included in this review to make comparison of studies more direct.

The variability of outcome measures used for assessing PA and SS or loneliness also made comparison of study results difficult. Specifically, there was almost no crossover between the types of SS scales used in the general SS studies, with only two of these SS studies using the same SS scale, the Lubben Social Network Scale [82, 83]. Scales measured one or a combination of the following: perception of support available, number of people available to provide support and satisfaction with support, indicating different components of SS that may have different associations with PA. There was also inconsistency in the measurement of SS for PA, with only one study [78] using the original scale developed by Sallis et al. [42] and 13 others using various versions of it. The original validation study had been conducted in people under the age of 45 [42], thus it may not be appropriate to measure SSPA in older people. The remaining three SSPA studies used different SSPA measures altogether [71–73]. Therefore, it is difficult to compare these studies conclusively. However, these SS measures do share some similar items such as family and/or friends offering verbal encouragement to do PA, or exercising together. The loneliness studies had much more overlap in loneliness measures, with three studies using the CES-D one item scale, assessing how often people felt lonely in the past week, and two of the other studies used scales with similar wording [58, 61]. While there were differences in the scales used, there was greater agreement in the way SSPA and loneliness were assessed, than for general SS. This implies that the overall findings for the associations between SSPA and loneliness and PA are more reliable, but the general SS measures varied too much to have a strong sense of the overall association.

Despite the above limitations, inclusion of different study designs and studies with a variety of PA measures in the review has provided a detailed overview of current knowledge about SS and PA in older adults. Use of a quality rating scale suitable for different designs has allowed the authors to differentiate studies of differing quality and make stronger assumptions about the overall association between SS and PA. Use of the quality rating scale has also highlighted a starting point for future research.

Future research

This review highlights a need for research with regards to measures of SS and PA in older people. The population is ageing at an unprecedented rate and as both SS and PA are key determinants of healthy ageing, it is important to develop and validate a general SS scale specific for older adults to be used consistently across studies examining factors associated with healthy ageing. Further validation in older adults of the Sallis SS for Exercise Scale [42], and consistent future use of this scale would also simplify and strengthen cross-study comparisons. Furthermore, the use of one well-validated PA scale which allows assessment of all modes of PA to be assessed but also be analysed separately would help inform whether other domains of PA are as influenced by SS as is the lifestyle domain.

Given the lack and variation of research available investigating the role of general support for PA levels in older adults firm conclusions were not able to be made in that category. But given the value of social support for the health and wellbeing of older adults, future research specifically in this area would be warranted.

The body of evidence for SSPA and PA was greater but nearly all these studies were cross-sectional. Therefore, it is not possible to make statements about the direction of the association, higher SSPA could be associated with higher PA, but it may also be the other way around. This field of research would therefore benefit from prospective or longitudinal studies assessing associations between SSPA and PA over time. Natural experiments could also help to elucidate the prospective association, for example, by observing the impact of joining sporting clubs or community groups offering PA options for older adults on PA levels and SSPA. There would also be great benefit in performing intervention studies where social support is manipulated to examine if changes in social support result in increased physical activity levels in older adults.

Conclusions and implications

Notwithstanding the large variability in study methodologies, in general it seems SS specific to PA is an important factor assisting older adults to be physically active, especially when coming from family members. The evidence also highlights the importance of friend support for leisure time PA in older adults. In terms of general SS, there does not seem to be an association with PA, however with far fewer studies investigating this relationship, more studies are needed to either confirm or challenge this finding. Finally, the moderate

quality loneliness studies suggest a negative association between loneliness and PA levels, especially in females.

The findings from this review suggest that PA interventions for older adults should specifically take into consideration family as important sources of SS for general PA promotion that aims to increase PA levels across a number of PA domains. Additionally, the importance of friends as sources of support for leisure time PA in older adults is highlighted here. 'Buddy' style interventions where participants are encouraged to exercise with a partner have been successful in the general population [32] and in older adults [90]. This review suggests that this type of intervention may benefit from targeting family members as buddies or to be otherwise involved in the intervention. Finally, generalised support in the lives of older adults, as well as loneliness, may also significantly influence leisure-time PA participation, especially in women. As such, the promotion of the social benefits of PA participation should be part of interventions aimed at older adults.

Additional files

Additional file 1: PubMed search strategy. (DOCX 16 kb)

Additional file 2: Further detail about PA measurement and analysis. (DOCX 13 kb)

Abbreviations

LTPA: Leisure time physical activity; MVPA: Moderate to vigorous physical activity; PA: Physical activity; SS: Social support; SSPA: Social support for physical activity

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Authors' contributions

GLS and LB conducted the literature search. GLS and GoS conducted the quality review with assistance from LB and JvU. All authors contributed to the study design, interpretation of results and manuscript preparation. All authors approve the final version of this paper.

Competing interests

The authors declare that they have no competing interests.

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Chapter 4 : Update of Review

Since the time of writing of the original systematic review, the area of social relationships and loneliness as they relate to PA for older adults, has received increased research attention. In addition to general social support, social support for physical activity and loneliness, which were included in the original review, social integration has received significant research interest. Social integration is a complex construct incorporating both social network size and structure and regular participation in a variety of types of social relationships (Berkman & Syme, 1979a; House et al., 1988). Whereas social support typically reflects the quality of individual relationships, social integration relates to the availability and structure of the relationships in one's life and is sometimes referred to as structural social support (Broadhead, Gehlbach, DeGruy, & Kaplan, 1989). An update of the review of the scientific evidence relating to social relationships, and physical activity in older adults was conducted, to summarise the additional literature published between August 2014, the end date of the search in the published systematic review (Chapter 3), and November 2018.

The research objectives for the rapid review were to:

1. Review and summarise the qualitative and quantitative studies examining the association between social support (including loneliness -as per the WHO definition) or social integration and physical activity in older adults.
2. Clarify if any potential associations differ between types or sources of support.

Methods

Study eligibility criteria

Studies examining the association between social support, including loneliness, or social integration and physical activity (PA) in older adults and meeting the following criteria were included:

- Generally healthy, community dwelling older adults with a mean age of at least 60 years, as per the definition of the United Nations (United Nations, 2013) and a minimum age of no less than 50. The paper was excluded If the mean age or age range of participants was not clear;

- Peer reviewed, quantitative or qualitative studies, regardless of study design, available in English.

For quantitative studies:

- A measure of social support or social integration with established validity and at least two items
- Objective or subjective measure of PA with established validity or with clear face validity (Terwee et al., 2010).

For qualitative studies:

- Physical activity was a primary topic of the qualitative work and social support or social integration factors were mentioned as a key theme relating to PA.

The methods employed were similar as for the published systematic review. However, in contrast to that review, qualitative studies were included in the current review to give additional context to the area.

Information sources and search

Systematic searches of MEDLINE, PSYCInfo, SportDiscus, CINAHL (Via EBSCOHost Megafile Premier) were conducted on 29 November 2018. Dates of coverage were limited to papers published after August 2014. As for the search for the published systematic review, free terms as well as appropriate thesaurus terms of each database were combined for the population, social support, social integration, loneliness, and PA.

Study selection

Results of the database searches were imported into Endnote X8 and duplicates were removed. Titles and abstracts were then screened to remove papers out of scope. Next, full texts were screened in detail to check if the inclusion criteria were met. Reference lists of included papers were screened to identify additional studies meeting the inclusion criteria. In case of any uncertainty during the review process, an additional reviewer was consulted and a consensus decision was made.

Data extraction

Data were extracted by one reviewer according to pre-defined categories. Because this was a rapid review, fewer categories were collected than the previous systematic review. The

categories were: type of study; country, number of participants; mean age; percent female; PA measure; social support/ social integration measure; and results of any association between social relationship factors and PA. For the qualitative studies, the final three categories were replaced with type of support described (e.g. within groups, from friends/family) and key themes/subthemes referring to PA and social relationships. This final category was extracted by searching within the text for any themes or subthemes discussing or describing a relationship between PA and social relationship factors within the results of the study. These are summarised in the final column of Table 4.3.

Data synthesis

The studies were categorised as focusing on loneliness, general social support or social support specific to PA, or social integration. For the quantitative studies, each paper was rated as a '+' or a '- ' if a statistically significant association was found; 0 was assigned if no statistically significant association was found. Studies reporting differences in results for males and females, or in the type, source and/or domain or PA were coded multiple times. To summarize the associations found in the studies, the following overall ratings, as suggested by Sallis et al. (2000), were given to each section: "0" (No association; 0%-33% of the findings supported the association), "?" (indeterminate association; 34-59% of the findings supported the positive or negative association), "+" or "- "(positive or negative association; 60%-100% of the findings supported the association) (see Table 4.1 and Table 4.2). For the qualitative studies, the themes summarised in Table 4.3 were condensed into overarching themes for the studies. The number of studies citing each main theme identified was used to summarise the findings of the studies overall.

Results

Study selection

Of the 2335 papers identified in the search, 1233 remained after removing duplicates. After screening titles and abstracts to remove papers out of scope, the full text of 46 papers was checked. Of these, 23 papers met the inclusion criteria. See Figure 4-1 for the search process flow chart.

General study characteristics

The majority of the included studies were cross-sectional (10 studies) or qualitative (nine studies), three were longitudinal and one was a pilot intervention study. Details of included papers are summarised in Table 4.1, Table 4.2 and Table 4.3 and a description of the findings is below.

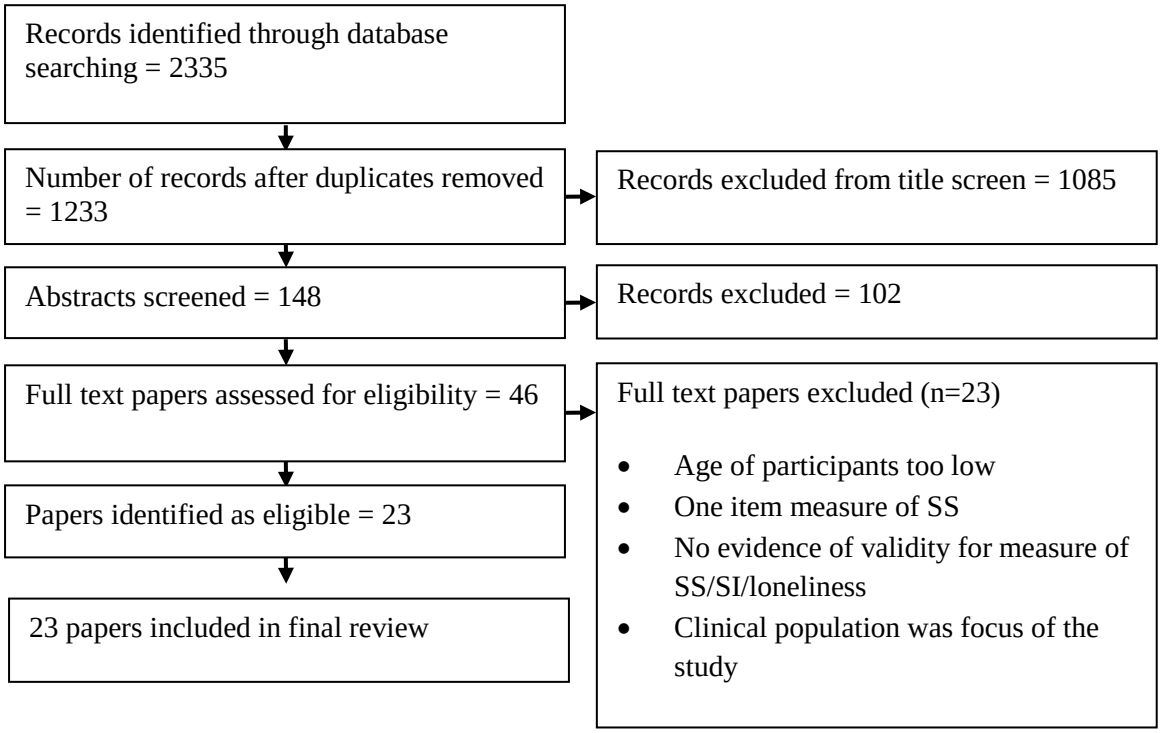

Figure 4-1 Search process flow chart

Relationship between Social Support, Social Integration or loneliness and Physical Activity

General Social Support

There were two cross-sectional studies related to general social support and PA (Doubova, Sánchez-García, Infante-Castañeda, & Pérez-Cuevas, 2016; Hakola et al., 2015). Social support was measured differently in each study, with emotional support being measured in one (Hakola et al., 2015), and a combination of types of support measured in the other study (Doubova et al., 2016). Neither study found any significant association between social

support and PA. Overall, these two studies suggest a lack of evidence supporting an association between general social support and PA in older adults, but it is difficult to make any conclusions based on two studies with different definitions of social support.

Social support for physical activity studies

Eight studies examined the association between social support for physical activity and physical activity levels in older adults. Two were longitudinal (Fernández, Montenegro, Knoll, & Schwarzer, 2014; Shimura, Winkler, & Owen, 2014) and six were cross-sectional (Böhm, Mielke, Cruz, Ramires, & Wehrmeister, 2016; Fisher et al., 2018; Giehl, Hallal, Brownson, & d'Orsi, 2017; Mudrak, Slepicka, & Elavsky, 2017; Newsom et al., 2018; Thornton et al., 2017). Overall, there were 12 direct and two indirect associations reported. Of the direct associations, nine were positive and significant. Two associations were negative (Fisher et al., 2018; Shimura et al., 2014) and one was not significant (Shimura et al., 2014). These will be described in more detail below.

Four studies examined the association between social support for PA (SSPA) from friends and family separately (Böhm et al., 2016; Fisher et al., 2018; Giehl et al., 2017; Shimura et al., 2014). Three of the studies found a significant positive association between SSPA from friends and family and PA levels (Böhm el al., 2016; Fisher et al., 2018; Giehl et al., 2017). Of note was that Bohm (2016) found exercising together with a friend or family member was strongest association compared to other types of support or encouragement.

Finally, two studies found evidence that some kinds of support may have a negative association with PA in older adults. For example, direct encouragement to PA from friends or family (Fisher et al., 2018) and support for walking for leisure were both negatively associated with PA (Shimura et al., 2014). Overall, the findings suggest that SSPA from friends and family is likely to assist older adults to be physically active, but it may be perceived to be a negative influence in some cases.

Social integration studies

Five studies measured an association between an aspect of social integration and PA (Clarke et al., 2017; Doubova et al., 2016; Hakola et al., 2015; Ho, Hawkley, Dale, Waite, & Huisingh-Scheetz, 2018; McKay et al., 2018). A variety of aspects of social integration were measured, including social network size (Ho et al., 2018), satisfaction with social network

(Clarke et al., 2017), social exclusion/ social isolation (Doubova et al., 2016; McKay et al., 2018), strength of social network (Hakola et al., 2015) and various types of social interactions (socialising with friends, proportion of friends in network, participating in formal groups (Hakola et al., 2015). All the studies except one (Doubova et al., 2016) found a positive association with one or more aspects of social integration and PA levels. Of the 10 associations reported, six were positively significant and the remainder were not significant. This supports an overall positive association between social integration factors and PA. The synthesis of the findings of these study suggest that satisfaction with friendship networks and having a greater proportion of friends in one's social network, attending formal groups or having a larger social network are positively associated with PA, but greater satisfaction with family relationships or purely considering the frequency of contact with friends or family do not have any associations with PA. Additionally, a socially-oriented pilot PA intervention found that social exclusion declined in adults aged 60-75 years (McKay et al., 2018). In summary, a variety of social integration factors is likely to be associated with PA in older adults. It appears that of particular importance is having a larger overall pool of friends or acquaintances (through a greater proportion of friends in network, or having a larger network or attending formal groups).

Table 4.1: Study characteristics for social support and social support for PA studies

First Author	Country	Type of study[1]	N	Age (mean (SE) or range)	n/% female	PA measure[3]	Social support Measure (all self-report)	Association between social support (SS) and PA[4]	Summary of social support and PA association in paper	Group summary score
General SS studies										
Doubova (2016)	Mexico	XS	948	>/ 60 yrs	542 (57%)	SR scale LTPA 1 item (number dpw[2] doing PA) >/3dpw defined as active)	Medical Outcomes Study SS survey (Sherbourne & Stewart, 1991)	No association between SS and likelihood of doing regular PA	0	0
Hakola, (2018)	Finland	XS	1303	57-78	667 (51%)	SR scale. LTPA; transport PA, gardening (SR scale added).	General SS scale added together (availability of concrete help, advice, and emotional support from other people.)	No association between SS and likelihood of being inactive	0	
SSPA studies										
Fernández (2014)	Costa Rica	Long.	54	> 50yrs	NA	SR scale. 1 item (frequency of moderate physical activity days per week (1-7)	SSPA 2 items: encouragement and support to do PA	Indirect. SSPA mediates action control and therefore PA	Indirect	+

First Author	Country	Type of study[1]	N	Age (mean (SE) or range)	n/% female	PA measure[3]	Social support Measure (all self-report)	Association between social support (SS) and PA[4]	Summary of social support and PA association in paper	Group summary score
Shimura (2014)	Australia	Long. 4-year follow up	445	median = 57	240 (54%)	SR scale. Long form IPAQ - declining walking classified as bottom 20% people. Equated to roughly 20mins per day walking decline over 4 years	SSPA friends and SSPA family	Positive association between family SSPA and transport PA. Negative association between family SSPA and walking. No association between SSPA from friends and PA.	+ Family for transport PA- Family and walk 0 friends and PA	
Böhm (2016)	Brazil	XS	1285	70.7 (8.2)	814 (63%)	SR scale. IPAQ	SSPA scale (Brazilian version- modified and revalidated)	Positive association between SSPA from friends and family and total SSPA and MVPA. Especially doing PA with friends/family	+ friends + family	
Fisher (2018)		XS	601	76.8	475 (79%)	SR scale . PASE (Washburn, McAuley, Katula, Mihalko, & Boileau, 1999)	SSPA scale (Sallis, Grossman, Pinski, Patterson, & Nader, 1987)	Positive association with SSPA friends and family total score. Negative association friend/family encouragement and PA.	+ friends + family -family/ friend encouragement	

First Author	Country	Type of study[1]	N	Age (mean (SE) or range)	n/% female	PA measure[3]	Social support Measure (all self-report)	Association between social support (SS) and PA[4]	Summary of social support and PA association in paper	Group summary score
Giehll (2017)	Brazil	XS	1705	70.3 (7.7)	1046 (64%)	SR scale . IPAQ	SSPA friends and SSPA family	Positive association between SSPA from friend and family likelihood of doing >150 mins/week compared to no SS.	+ Friend +family	
Mudrak (2017)	Czech	XS	546	68 (6.26)	432 (79%)	2 SR scales Leisure Time Exercise Questionnaire (LTEQ) (Godin & Shephard, 1985) and PA Survey for the Elderly (PASE) (Washburn et al., 1999)	SSPA scale (Sallis et al., 1987)	Indirect positive association via self-regulation.	Indirect	
Thornton (2017)	USA	XS	726	74.4 (6.3)	385 (53%)	Accelerometer, SR walking for leisure, SR walking for errands	Family support for physical activity was measured with a four-item scale from a validated measure; also same for friends and coworkers	Greater SS positively associated with doing more PA. All PA types	+	

First Author	Country	Type of study[1]	N	Age (mean (SE) or range)	n/% female	PA measure[3]	Social support Measure (all self-report)	Association between social support (SS) and PA[4]	Summary of social support and PA association in paper	Group summary score
							(total of the 8 items)			
Newsom (2018)	NA	XS	217	72.5	126 (58%)	SR scale. CHAMPS	PA related social interactions.	Emotional and instrumental support for PA significantly associated with PA	+	

Key: [1] XS= cross sectional; long. = longitudinal study; [2] dpw = days per week; [3]SR scale = self-report scale. [4]All positive or negative associations shown in the table are statistically significant. If not significant they are described as no association.

Table 4.2: Study characteristics for social integration and loneliness studies

First Author	Country	Type of study[1]	N	Age (mean (SE) or range)	N female (%)	PA measure[2]	SS scale	Association between SS and PA[3]	Summary of paper findings	Group Summary score
Social integration studies										
Clarke et al (2017)	Scotland	Long.(26 month follow-up)	339	77	185 (55%)	PA accelerometer	Various social capital measures (satisfaction with friend and family networks, neighbourliness, number of people that can be turned to)	Satisfaction with friendship network significant independent predictor of PA at follow up. No differences	+ Friends 0 Family	+

First Author	Country	Type of study[1]	N	Age (mean (SE) or range)	N female (%)	PA measure[2]	SS scale	Association between SS and PA[3]	Summary of paper findings	Group Summary score
								found in other social capital variables		
McKay (2018)	NA	Pilot PA intervention. Social group activities 1xper month for 3 months, no group in follow up 3 months	458	50+ (range)	353 (77%)	SR scale. CHAMPS (Stewart et al., 2001)	Measures of contact with others to assess level of social exclusion (3 item). 3 item loneliness scale	Younger participants (60-74), social exclusion decreased from baseline to 3 (+ 0.6; $p < 0.001$) and 6 months (+ 0.4; $p = 0.02$). No change over time in older participants >/75 years).	+ younger 0 older	
Doubova, (2016)	Mexico	XS	948	>/ 60 years	NA	SR scale . LTPA/exercise.1 item (number days per week. >/3dpw defined as active)	Social isolation (measured using Lubben Social Network Scale (LSN-6) based on the cut- off point score <12)	Increased risk of social isolation was not associated with regular physical exercise	0	

First Author	Country	Type of study[1]	N	Age (mean (SE) or range)	N female (%)	PA measure[2]	SS scale	Association between SS and PA[3]	Summary of paper findings	Group Summary score
Hakola, (2015)	Finland	XS	1303	57-78	NA	SR scale . LTPA; transport PA, gardening.	Strength of social network scale (neighborhood, meeting friends and family, social participation.)	Strong social network (including neighbours, social participation, meeting friends and family) positively associated with PA	+	
Ho (2018)	NA	XS	673	71.9 years	363 (54%)	Wrist accelerometry	7 Social relationship / social integration questions. Each compared to PA separately	Larger network size and higher proportion network friends and attending regular group meetings positively associated with PA No sig. associations between number of times per	+network size + higher proportion friends and + attending organized group meetings 0 socializing with friends/ relatives	

First Author	Country	Type of study[1]	N	Age (mean (SE) or range)	N female (%)	PA measure[2]	SS scale	Association between SS and PA[3]	Summary of paper findings	Group Summary score
								week socialising with friends relatives		
Loneliness studies										
McKee (2015)	XS	Ireland	3499	72.6 (5.2)	1854 (53%)	SR scale. IPAQ short form (Cronin, O'Regan, Finucane, Kearney, & Kenny, 2013)	UCLA (Russell, 1996)	No significant association between loneliness and PA. beta =0.041 (-0.007-0.079), p=0.105	0	0
McKay (2018)	Pilot PA intervention. Social group activities 1xper month for 3 months, no group in follow up 3 months	Canada	458	50+ (range)	353 (77%)	SR scale. CHAMPS (Stewart et al., 2001)	Short UCLA (Hughes et al., 2004)	Loneliness decreased significantly in the active intervention phase (baseline to 3 months) and remained lower at 6 months in younger and	McKay (2018)	

First Author	Country	Type of study[1]	N	Age (mean (SE) or range)	N female (%)	PA measure[2]	SS scale	Association between SS and PA[3]	Summary of paper findings	Group Summary score
								older participants ($p<0.001$)		

Key: [1] XS= cross sectional; long. = longitudinal study; [2]SR scale = self-report scale. [3]All positive or negative associations shown in the table are statistically significant. If not significant they are described as no association.

Loneliness studies

Two studies examined the association between loneliness and PA (McKay et al., 2018; McKee, Kearney, & Kenny, 2015). One cross sectional study found no significant association between loneliness and PA in older adults (McKee et al., 2015). Loneliness significantly decreased during the active phase and was maintained at the same level three months after the program completion of a pilot PA intervention where social connectivity was incorporated in the intervention. The same result was observed for both younger (60-75) and older (75+) older adults (McKay et al., 2018). Overall these findings suggest an equivocal relationship between loneliness and PA, but it is difficult to draw any conclusions based on only two studies.

Qualitative studies

Of the nine qualitative studies that were included, Seven examined factors associated with adherence to PA programs (Bennett et al., 2018; Choi et al., 2018; Hawley-Hague, Horne, Skelton, & Todd, 2016; Killingback, Tsofliou, & Clark, 2017; Mobily, Smith, & Chmielewski, 2017; Sims-Gould et al., 2018; South et al., 2017) and two examined the factors that older adults perceived to be facilitators and barriers to participation in PA in general (Kosteli, Williams, & Cumming, 2016) or following an intervention (Wahlich et al., 2017). All six studies investigating individual older adults' perception of factors facilitating attendance to sport or PA programs mentioned connecting socially with others in the group as a key factor for maintaining enjoyment and adherence. A sense of camaraderie or social cohesion was mentioned as an important factor for maintaining adherence to programs, because this encouraged a greater commitment to the program (Hawley-Hague et al., 2016; Mobily et al., 2017). Friendship was mentioned as a benefit of group programs but it was acknowledged that friendships take time to develop (Killingback et al., 2017).

Socialising in a group situation was reported as being as important as the PA itself in multiple studies (Bennett et al., 2018; Kosteli et al., 2016; South et al., 2017) and the group environment was seen as a way of developing new social connections, especially after times where their connections may change such as around significant life events (Bennett et al., 2018; Choi et al., 2018; South et al., 2017).

Social support was generally perceived to be valuable for enabling continued motivation to participate in PA, either by exercising together, or giving them encouragement to push themselves (Kosteli et al., 2016; Sims-Gould et al., 2018; Wahlich et al., 2017). In one study however, it was also noted that some types of support could have a negative influence on participation in PA programs (Hawley-Hague et al., 2016). For example, if another person made or strongly encouraged the older adult to attend a program this would discourage them from taking part in the activity because they would perceive the act as removing their ability to be in control (Hawley-Hague et al., 2016).

Overall, the qualitative studies help to demonstrate the importance for many older adults of the social atmosphere around PA for increasing the enjoyment of the activity and motivating adherence to PA. The group environment appears to be used as an opportunity to improve social connectivity in the lives of older adults.

Table 4.3: Characteristics of qualitative studies

		Study type	Country	N[1]	Mean age/ age range % female	Type of support described	Key themes/subthemes relating PA and social relationships
1	Hawley-Hague (2016)	Interviews with instructors of exercise classes for older adults	UK	19	56.3yrs ; 84% female	Within PA groups	• Class fitting with social identity was major factor influencing attendance. Could have a negative or positive influence (e.g. sometimes society enforced to them that they were 'old' and therefore didn't need to exercise). • Perceived choice also important factor for attendance. Perceiving a lack of choice because friends, family or doctor told them to go to class increased likelihood of dropout or non-attendance. • Sense of social cohesion and social identity amongst group keeps people attending.
2	Mobily & Chmielewski (2017)	Interviews. Case study of an exercise class. Women primarily middle class and professionals retired	USA	7	67.1yrs, all female	Within PA groups	• SS and social interaction were important aspects of the exercise class that helped the women complete any given session and 'stick with it'. Especially was a sense of camaraderie with the others in the group
3	Choi (2018)	Focus groups Participants of a softball team	USA	64	69.3yrs; all female	Within sporting team (softball)	• Friendship and social connections played a large role in players' motivations to join the team and enjoyment of socializing with these friends maintains motivation to continue playing • Playing softball facilitated social connections with others both in and outside the team;

		Study type	Country	N[1]	Mean age/ age range % female	Type of support described	Key themes/subthemes relating PA and social relationships
							• social network developed through softball helped cope with life stress and replacing lost network members after significant life event
4	Killingback (2017)	Multiple case-study. Focus groups with participants, observation, semi-structured interviews with instructors.	UK	27	Median = 69yrs; 85% female	Within PA groups	• Sociable, friendly, group aspects of the program important for adherence to the exercise program. The social atmosphere was enjoyable. It was noted that it took some time for friendships to develop. • Perceived physical and psychological benefits also motivated adherence.
5	Sims-Gould (2018)	Photovoice study of men enrolled in a choice exercise program for low active men.	USA	14	75yrs ; all male	From friends/ family	• Social connections in the men's lives encouraged the men to engage in regular PA and exercising with others made PA more enjoyable.
6	South (2017)	Semi-structured focus group Interview study of walking groups -	UK	92	Over 55 years. 63% female	Within PA groups	• Key motivators for starting walks – social factors. E.g. wanting to connect with new people or prevent social isolation are significant life events (e.g. retirement, retirement, moving house). Desired health benefits of exercise also motivated choice to join. • Key barriers to joining was apprehension about the level of the walks and not knowing anyone. Having short introductory walks was a solution to this and some people brought friends or family to first walk or friendliness of group was another factor facilitating entry.

		Study type	Country	N[1]	Mean age/ age range % female	Type of support described	Key themes/subthemes relating PA and social relationships
							• Positive social experience was key reinforcement to continue walking. • Social benefits were perceived to be integral to the processes of engagement and maintenance of activity.
7	Kosteli (2016)	Focus groups x 7. Psychosocial determinants of PA	UK	37	64yrs; 65% female	From friends/ family	• SS was a key motivator for PA. Socializing was a main reason why most people in the study engaged in the PA and the social side seemed as important as the PA itself. • Having an exercise partner was seen as an enabler and not having one seen as a barrier
8	Bennett (2018)	Semi structured interviews following PA program	Canada	31	70yrs ; 45% female	Within PA groups	• 28 participants (16 men and 12 women) described enjoying and deriving benefits from exercising with others in the program. They appreciated the social connection, companionship, and encouragement from their classmates. • 13 people (4 men, 9 women felt that they gained social connection from the interactions in the group classes and felt that this helped mitigate social isolation experienced with ageing.
9	Wahlich (2017)	Telephone interviews. three years after a PA trial	UK	60	45-75 years 62% female	Support from friends and family	• Many participants described the importance of having friends and family to motivate them to participate in PA after the program. Either through making a commitment to exercise with someone else or confidence to try new activities or encouragement to push themselves further.

Key: [1] N= number of participants, SS= social support; SSPA = social support for physical activity.

Discussion and Conclusion

There were 24 new studies published examining the association between either social support, social integration or loneliness and PA since the completion of the search for the published systematic review. There was no support that general social support had any association with PA levels in older adults and the findings relating to loneliness were inconclusive. The qualitative and quantitative studies also suggested that there is an overall positive association between support for PA from friends or family, especially when this involves exercising together. Finally, there was qualitative and quantitative support that a degree of social participation (as opposed to none) or greater social integration are associated with higher PA levels for older adults.

There were only two general social support studies that met the inclusion criteria for this review and they both used different scales for social support. There was no significant association found between social support and PA in either study. This is in line with the findings from the earlier published systematic review, where the synthesised results suggested that the association between general social support and PA was equivocal. It is however, difficult to draw conclusions with only two studies included in this review.

There was an overall positive association between social support for PA (SSPA) and PA levels in older adults. This is in line with the earlier systematic review. In the studies in this review however, both sources of social support (family and friends) were positively associated with PA in most cases. In the earlier review only support from family was positively associated with PA overall. In contrast to this overall finding, one study in the previous review found that support from family could discourage PA (Park, Elavsky, & Koo, 2014). In the present review there were two quantitative and one qualitative studies indicating a negative association between SSPA and PA levels (Fisher et al., 2018; Hawley-Hague et al., 2016; Shimura et al., 2014). In particular, encouragement to do PA provided by family and friends was negatively associated with PA (Fisher et al., 2018). It was postulated by the authors of the study that the reason for this association was that this kind of direct encouragement may be perceived as corrective rather than supportive by those receiving it and result in a negative reaction to the support (Lox, Martin, & Petruzzello, 2003). This has been observed in prior studies where perceived emotional support had a positive association with health behaviours, but perceived

control or corrective support had a negative association with health behaviours (Franks et al., 2006). The qualitative studies also shed light on this observation (Hawley-Hague et al., 2016). Whilst social support was an important motivator for commencement of PA, the other important factor for PA commencement was perceived choice. When social support was perceived as being controlling or taking away choice, then this demotivated older people from joining PA programs or made them drop out early (Hawley-Hague et al., 2016).

In summary, the findings of this review are in line with those of the original published systematic review, with the additional support that sometimes social support may have a negative influence on PA. Also, in this review, support from family and friends were both positively associated but in the previous review, only family support for PA was positively associated with PA levels in older adults.

There were a variety of scales or aspects of social integration measured in the quantitative studies reviewed. Some of these were found to be associated with PA and some were not. For example, satisfaction with friendship networks, having a greater proportion of friends in one's social network, attending formal groups or having a larger social network were positively associated with PA (Clarke et al., 2017; Hakola et al., 2015; Ho et al., 2018). However, greater satisfaction with family relationships or purely having greater frequency of social contact with friends or family did not seem to be associated with PA (Clarke et al., 2017; Doubova et al., 2016). The earlier systematic review did not specifically investigate the association between social integration and PA because it was not previously identified as a relevant aspect of relationships. However, two cross sectional studies included in the review did investigate social integration using the Lubben Social Network Scale (Lubben, 2004). One study found a positive association (Potts, Hurwicz, Goldstein, & Berkanovic, 1992) and one found no association (Vance, Ross, Ball, Wadley, & Rizzo, 2008). Therefore, it is difficult to summarise the past literature based on only two studies, but recent literature does support a positive association between social integration and PA.

There were only two additional studies investigating loneliness and PA and the combined results were inconclusive. This in line with the overall findings of the earlier systematic review, which also found an equivocal overall association between loneliness and PA from the six studies included. It is important to note however that it is

not possible to determine any summary association based on only two studies in the current review.

The qualitative studies all support that social connections in a PA group increased the perceived enjoyment of PA and was often a key motivator for adherence to exercise programs. This is supported by other previous studies also, which concluded that social factors are important for enjoyment of PA in older adults, thus increasing intrinsic motivation to do PA (Anderson-Bill, Winett, Wojcik, & Williams, 2011). Additionally, some of the studies suggested that group PA programs could be a means of developing new connections at times of significant events. Qualitative studies were not included in the earlier review but the synthesis of the findings from the recent qualitative studies support the importance of the social side of PA groups for older adults.

In conclusion, most of the findings were in line with those found in the original systematic review. For example, there was no support for a relationship between general social support or loneliness and PA in either study. But only two studies from each of the two categories met the inclusion criteria in this review, so caution should be taken when interpreting these results. Additionally, both reviews supported an association between SSPA from family and friends and PA levels in older adults.

Some new evidence emerged from this review update that had not been observed in the original systematic review. Firstly, there was qualitative and quantitative support that social participation or a higher degree of social integration (especially meeting with friends) is associated with higher physical activity levels for older adults. It also emerged from the quantitative and qualitative aspects of the review that whilst in most cases SSPA can positively influence PA levels in older adults, in some cases it can be perceived to be a controlling influence or removing choice from an older adult. This can then lead to a reduction in PA levels.

Chapter 5 : A Mixed Methods Case Study Exploring the Impact of Membership of a Multi-Activity, Multicentre Community Group on Social Wellbeing of Older Adults

This chapter sets out the first part of the findings relating to the mixed methods case study of Life Activities Clubs Victoria. Specifically, the focus is on the impact of becoming a member of a community organisation on social wellbeing of members over one year. A one-year survey study collected social wellbeing data on the variables functional social support and loneliness and a focus group study explored the perceptions of participants relating to the impact of involvement in these community groups on their social relationships.

The paper in this chapter contributes to answering the second research sub-question of this program of research which is: *What is the potential role of community groups for older adults offering a socially supportive environment in improving physical activity, health and wellbeing?*

The following paper: *A mixed methods case study exploring the impact of membership of a multi-activity, multicentre community group on social wellbeing of older adults by* Gabrielle Lindsay-Smith, Grant O'Sullivan, Rochelle Eime, Jack Harvey and Jannique G. Z. van Uffelen was Published in BMC Geriatrics (2018)18: 226 https://doi.org/10.1186/s12877-018-0913-1

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This declaration is to be completed for each conjointly authored publication and placed at the beginning of the thesis chapter in which the publication appears.

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3. CO-AUTHOR(S) DECLARATION

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A mixed methods case study exploring the impact of membership of a multi-activity, multicentre community group on social wellbeing of older adults

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Abstract

Background: Social wellbeing factors such as loneliness and social support have a major impact on the health of older adults and can contribute to physical and mental wellbeing. However, with increasing age, social contacts and social support typically decrease and levels of loneliness increase. Group social engagement appears to have additional benefits for the health of older adults compared to socialising individually with friends and family, but further research is required to confirm whether group activities can be beneficial for the social wellbeing of older adults.

Methods: This one-year longitudinal mixed methods study investigated the effect of joining a community group, offering a range of social and physical activities, on social wellbeing of adults with a mean age of 70. The study combined a quantitative survey assessing loneliness and social support ($n = 28$; three time-points, analysed using linear mixed models) and a qualitative focus group study ($n = 11$, analysed using thematic analysis) of members from Life Activities Clubs Victoria, Australia.

Results: There was a significant reduction in loneliness ($p = 0.023$) and a trend toward an increase in social support ($p = 0.056$) in the first year after joining. The focus group confirmed these observations and suggested that social support may take longer than 1 year to develop. Focus groups also identified that group membership provided important opportunities for developing new and diverse social connections through shared interest and experience. These connections were key in improving the social wellbeing of members, especially in their sense of feeling supported or connected and less lonely. Participants agreed that increasing connections was especially beneficial following significant life events such as retirement, moving to a new house or partners becoming unwell.

Conclusions: Becoming a member of a community group offering social and physical activities may improve social wellbeing in older adults, especially following significant life events such as retirement or moving-house, where social network changes. These results indicate that ageing policy and strategies would benefit from encouraging long-term participation in social groups to assist in adapting to changes that occur in later life and optimise healthy ageing.

Keywords: Ageing, Social support, Social engagement, Friendship, Loneliness, Retirement, Group activity

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Background

Ageing population and the need to age well

Between 2015 and 2050 it is predicted that globally the number of adults over the age of 60 will more than double [1]. Increasing age is associated with a greater risk of chronic illnesses such as cardio vascular disease and cancer [2] and reduced functional capacity [3, 4]. Consequently, an ageing population will continue to place considerable pressure on the health care systems.

However, it is also important to consider the individuals themselves and self-perceived good health is very important for the individual wellbeing and life-satisfaction of older adults [5]. The terms "successful ageing" [6] and "healthy ageing" [5] have been used to define a broader concept of ageing well, which not only includes factors relating to medically defined health but also wellbeing. Unfortunately, there is no agreed definition for what exactly constitutes healthy or successful ageing, with studies using a range of definitions. A review of 28 quantitative studies found that successful ageing was defined differently in each, with the majority only considering measures of disability or physical functioning. Social and wellbeing factors were included in only a few of the studies [7].

In contrast, qualitative studies of older adults' opinions on successful ageing have found that while good physical and mental health and maintaining physical activity levels are agreed to assist successful ageing, being independent or doing something of value, acceptance of ageing, life satisfaction, social connectedness or keeping socially active were of greater importance [8–10].

In light of these findings, the definition that is most inclusive is "healthy ageing" defined by the World Health Organisation as "the process of developing and maintaining the functional ability (defined as a combination of intrinsic capacity and physical and social environmental characteristics), that enables well-being in older age" (p28) [5].This definition, and those provided in the research of older adults' perceptions of successful ageing, highlight social engagement and social support as important factors contributing to successful ageing, in addition to being important social determinants of health [11, 12].

Social determinants of health, including loneliness and social support, are important predictors of physical, cognitive and mental health and wellbeing in adults [12] and older adults [13–15]. Loneliness is defined as a perception of an inadequacy in the quality or quantity of one's social relationships [16]. Social support, has various definitions but generally it relates to social relationships that are reciprocal, accessible and reliable and provide any or a combination of supportive resources (e.g. emotional, information, practical) and can be measured as perceived or received support [17]. These types of social determinants differ from those related to inequality (health gap social determinants) and are sometimes referred to as 'social cure' social determinants [11]. They will be referred to as 'social wellbeing' outcome measures in this study.

Unfortunately, with advancing age, there is often diminishing social support, leading to social isolation and loneliness [18, 19]. Large nationally representative studies of adults and older adults reported that social activity predicted maintenance or improvement of life satisfaction as well as physical activity levels [20], however older adults spent less time in social activity than middle age adults.

Social wellbeing and health

A number of longitudinal studies have found that social isolation for older adults is a significant predictor of mortality and institutionalisation [21–23]. A meta-analysis by Holt-Lunstadt [12] reported that social determinants of health, including social integration and social support (including loneliness and lack of perceived social support) to be equal to, or a greater risk to mortality as common behavioural risk factors such as smoking, physical inactivity and obesity. Loneliness is independently associated with poor physical and mental health in the general population, and especially in older adults [13–15]. Adequate perceived social support has also been consistently associated with improved mental and physical health in both general and older adults [20, 24–29]. The mechanism suggested for this association is that social support buffers the negative impacts of stressful situations and life events [30]. The above research demonstrates the benefit of social engagement for older adults; in turn this highlights the importance of strategies that reduce loneliness and improve social support and social connectedness for older adults.

Socialising in groups seems to be especially important for the health and wellbeing of older adults who may be adjusting to significant life events [26, 31–33]. This is sometimes referred to as social engagement or social companionship [26, 30, 31]. It seems that the mechanism enabling such health benefits with group participation is through strengthening of social identification, which in turn increases social support [31, 34, 35]. Furthermore, involvement in community groups can be a sustainable strategy to reduce loneliness and increase social support in older adults, as they are generally low cost and run by volunteers [36–39].

Despite the demonstrated importance of social factors for successful ageing and the established risk associated with reduced social engagement as people age, few in-depth studies have longitudinally investigated the impact of community groups on social wellbeing. For example, a non-significant increase in social support and reduction in depression was found in a year-long randomised controlled trial conducted in senior centres in

Norway with lonely older adults in poor physical and mental health [37]. Some qualitative studies have reported that community groups and senior centres can contribute to fun and socialisation for older adults, however social wellbeing was not the primary focus of the studies [38, 40, 41]. Given that social wellbeing is a broad and important area for the health and quality of life in older adults, an in-depth study is warranted to understand how it can be maximised in older adults. This mixed methods case study of an existing community aims to: i) examine whether loneliness and social support of new members of Life Activities Clubs (LACs) changes in the year after joining and ii) conduct an in-depth exploration of how social wellbeing changes in new and longer-term members of LACs.

Methods

Design

A mixed methods study was chosen as the design for this research to enable an in-depth exploration of how loneliness and social support may change as a result of joining a community group. A case study was conducted using a concurrent mixed-methods design, with a qualitative component giving context to the quantitative results. Where the survey focused on the impact of group membership on social support and loneliness, the focus groups were an open discussion of the benefits in the lived context of LAC membership. The synthesis of the two sections of the study was undertaken at the time of interpretation of the results [42].

The two parts of our study were as follows:

a) a longitudinal survey (three time points over 1 year: baseline, 6 and 12 months). This part of the study formed the quantitative results;
b) a focus group study of members of the same organisation (qualitative).

Ethics approval to conduct this study was obtained from the Victoria University Human Research Ethics Committee (HRE14–071 [survey] and HRE15–291 [focus groups]) All participants provided informed consent to partake in the study prior to undertaking the first survey or focus group.

Setting and participants

Life activities clubs Victoria

Life Activities Clubs Victoria (LACVI) is a large not-for-profit group with 23 independently run Life Activities Clubs (LACs) based in both rural and metropolitan Victoria. It has approximately 4000 members. The organisation was established to assist in providing physical, social and recreational activities as well as education and motivational support to older adults managing significant change in their lives, especially retirement.

Survey

Eighteen out of 23 LAC clubs agreed to take part in the survey study. During the sampling period from May 2014 to December 2016, new members from the participating clubs were given information about the study and invited to take part. Invitations took place in the form of flyers distributed with new membership material.

Inclusion/ exclusion criteria Community-dwelling older adults who self-reported that they could walk at least 100 m and who were new members to LACVI and able to complete a survey in English were eligible to participate. New members were defined as people who had never been members of LACVI or who had not been members in the last 2 years.

To ensure that the cohort of participants were of a similar functional level, people with significant health problems limiting them from being able to walk 100 m were excluded from participating in the study.

Once informed consent was received, the participants were invited to complete a self-report survey in either paper or online format (depending on preference). This first survey comprised the baseline data and the same survey was completed 6 months and 12 months after this initial time point. Participants were sent reminders if they had not completed each survey more than 2 weeks after each was delivered and then again 1 week later.

Focus groups

Two focus groups (FGs) were conducted with new and longer-term members of LACs. The first FG ($n = 6$) consisted of members who undertook physical activity in their LAC (e.g. walking groups, tennis, cycling). The second FG ($n = 5$) consisted of members who took part in activities with a non-physical activity (PA) focus (e.g. book groups, social groups, craft or cultural groups). LACs offer both social and physical activities and it was important to the study to capture both types of groups, but they were kept separate to assist participants in feeling a sense of commonality with other members and improving group dynamic and participation in the discussions [43]. Of the people who participated in the longitudinal survey study, seven also participated in the FGs.

The FG interviews were facilitated by one researcher (GLS) and notes around non-verbal communication, moments of divergence and convergence amongst group members, and other notable items were taken by a second researcher (GOS). Both researchers wrote additional notes after the focus groups and these were used in the analysis of themes. Focus groups were recorded and later

transcribed verbatim by a professional transcriptionist, including identification of each participant speaking. One researcher (GLS) reviewed each transcription to check for any errors and made any required modifications before importing the transcriptions into NVivo for analysis. The transcriber identified each focus group participant so themes for individuals or other age or gender specific trends could be identified.

Dependent variables

Social support

Social support was assessed using the Duke–UNC Functional Social support questionnaire [44]. This scale specifically measures participant perceived functional social support in two areas; i) confidant support (5 questions; e.g. chances to talk to others) and ii) affective support (3 questions; e.g. people who care about them). Participants rated each component of support on a 5-item likert scale between *'much less than I would like'* (1 point) to *'as much as I would like'* (5 points). The total score used for analysis was the mean of the eight scores (low social support = 1, maximum social support = 5). Construct validity, concurrent validity and discriminant validity are acceptable for confidant and affective support items in the survey in the general population [44].

Loneliness

Loneliness was measured using the de Jong Gierveld and UCLA-3 item loneliness scales developed for use in many populations including older adults [45]. The 11-item de Jong Gierveld loneliness scale (DJG loneliness) [46] is a multi-dimensional measure of loneliness and contains five positively worded and six negatively worded items. The items fall into four subscales; feelings of severe loneliness, feelings connected with specific problem situations, missing companionship, feelings of belongingness. The total score is the sum of the items scores (i.e. 11–55): 11 is low loneliness and 55 is severe loneliness. Self-administered versions of this scale have good internal consistency (> = 0.8) and inter-item homogeneity and person scalability that is as good or better than when conducted as face-to face interviews. The validity and reliability for the scale is adequate [47]. The UCLA 3-item loneliness scale consists of three questions about how often participants feel they lack companionship, feel left out and feel isolated. The responses are given on a three-point scale ranging from hardly ever (1) to often (3). The final score is the sum of these three items with the range being from lowest loneliness (3) to highest loneliness (9). Reliability of the scale is good, (alpha = 0.72) as are discriminant validity and internal consistency [48]. The scale is commonly used to measure loneliness with older adults ([49] – review), [50, 51].

Sociodemographic variables

The following sociodemographic characteristics were collected in both the survey and the focus groups: age, sex, highest level of education, main life occupation [52], current employment, ability to manage on income available, present marital status, country of birth, area of residence [53]. They are categorised as indicated in Table 2.

Health variables

The following health variables were collected: *Self-rated general health (from SF-12)* [54] and *Functional health (ability to walk 100 m- formed part of the inclusion criteria)* [55]. See Table 2 for details about the categories of these variables.

Analysis

Survey

The effects of becoming a member on quantitative outcome variables (i.e. Social support, DJG loneliness and UCLA loneliness) were analysed using linear mixed models (LMM). LMM enabled testing for the presence of intra-subject random effects, or equivalently, correlation of subjects' measures over time (baseline, 6-months and 12 months). Three correlation structures were examined: independence (no correlation), compound symmetry (constant correlation of each subjects' measures over the three time points) and autoregressive (correlation diminishing with increase in spacing in time). The best fitting correlation structure was compound symmetry; this is equivalent to a random intercept component for each subject. The LMM incorporated longitudinal trends over time, with adjustment for age as a potential confounder. Statistical analyses were conducted using SPSS for windows (v24).

UCLA loneliness and social support residuals were not normally distributed and these scales were Log10 transformed for statistical analysis.

Analyses were all adjusted for age, group attendance (calculated as average attendance at 6 and 12 months) and employment status at baseline (Full-time, Part-time, not working).

Focus groups

Focus group transcripts were analysed using thematic analysis [56, 57], a flexible qualitative methodology that can be used with a variety of epistemologies, approaches and analysis methods [56]. The transcribed data were analysed using a combination of theoretical and inductive thematic analysis [56]. It was theorised that membership in a LAC would assist with social factors relating to healthy ageing [5], possibly through a social identity pathway [58], although we wanted to explore this. Semantic themes were drawn from these codes in order to conduct a pragmatic evaluation of the LACVI programs

[56]. Analytic rigour in the qualitative analysis was ensured through source and analyst triangulation. Transcriptions were compared to notes taken during the focus groups by the researchers (GOS and GLS). In addition, Initial coding and themes (by GLS) were checked by a second researcher (GOS) and any disagreements regarding coding and themes were discussed prior to finalisation of codes and themes [57].

Results

Survey

Sociodemographic and health characteristics of the 28 participants who completed the survey study are reported in Table 1. The mean age of the participants was 66.9 and 75% were female. These demographics are representative of the entire LACVI membership. Education levels varied, with 21% being university educated, and the remainder completing high school or technical certificates. Two thirds of participants were not married. Some sociodemographic characteristics changed slightly at 6 and 12 months, mainly employment (18% in paid employment at baseline and 11% at 12-months) and ability to manage on income (36% reporting trouble managing on their income at baseline and 46% at 12 months). Almost 90% of the participants described themselves as being in good-excellent health.

Types of activities

There were a variety of types of activities that participants took part in: physical activities such as walking groups ($n = 7$), table tennis ($n = 5$), dancing class ($n = 2$), exercise class ($n = 1$), bowls ($n = 2$), golf ($n = 3$), cycling groups ($n = 1$) and non-physical leisure activities such as art and literature groups ($n = 5$), craft groups ($n = 5$), entertainment groups ($n = 12$), food/dine out groups ($n = 18$) and other sedentary leisure activities (e.g. mah jong, cards),($n = 4$). A number of people took part in more than one activity.

Frequency of attendance at LACVI and changes in social wellbeing

At six and 12 months, participants indicated how many times in the last month they attended different types of activities at their LAC. Most participants maintained the same frequency of participation over both time points. Only four people participated more frequently at 12 than at 6 months and nine reduced participation levels. The latter group included predominantly those who reduced from more than two times per week at 6 months to 2×/week at 6 months to one to two times per week ($n = 5$) or less than one time per week ($n = 2$) at 12 months. Average weekly club attendance at six and 12 months was included as a covariate in the statistical model.

Outcome measures

Overall, participants reported moderate social support and loneliness levels at baseline (See Table 2). Loneliness, as measured by both scales, reduced significantly over time. There was a significant effect of time on the DJG loneliness scores ($F\ (2, 52) = 3.83$, $p = 0.028$), with Post-Hoc analysis indicating a reduction in DJG loneliness between baseline and 12 months ($p = 0.008$). UCLA loneliness scores (transformed variable) also changed significantly over time ($F\ (2, 52) = 4.08$, $p = 0.023$). Post hoc tests indicated a reduction in UCLA loneliness between baseline and 6 months ($p = 0.007$). There was a small non-significant increase in social support ($F\ (2, 53) = 2.88$, $p = 0.065$) during the first year of membership (see Table 2 and Figs. 1 and 2).

Focus groups

In total, 11 participants attended the two focus groups, six people who participated in PA clubs (four women) and five who participated in social clubs (all women). All focus group participants were either retired ($n = 9$) or semi-retired ($n = 2$). The mean age of participants was 67 years (see Table 2 for further details). Most of the participants (82%) had been members of a LAC for less than 2 years and two females in the social group had been members of LAC clubs for 5 and 10 years respectively.

Analysis of the focus group transcripts identified two themes relating to social benefits of group participation; i) Social resources and ii) Social wellbeing (see Fig. 3). Group discussion suggested that membership of a LAC provides access to more social resources through greater and diverse social contact and opportunity. It is through this improvement in social resources that social wellbeing may improve.

Social resources

The social resources theme referred to an increase in the availability and variety of social connections that resulted from becoming a member of a LAC. The social nature of the groups enabled an expansion and diversification of members' social network and improved their sense of social connectedness. There was widespread agreement in both the focus groups that significant life events, especially retirement, illness or death of spouse and moving house changes one's social resources. Membership of the LAC had benefits especially at these times and these events were often motivators to join such a club. Most participants found that their social resources declined after retirement and even felt that they were grieving for the loss of their work.

> *"I just saw work as a collection of, um, colleagues as opposed to friends. I had a few good friends there. Most were simply colleagues or acquaintances ....*

Table 1 Sociodemographic and health characteristics of survey and focus group respondents at baseline

Sociodemographic characteristics		Survey respondents (*n* = 28)	Focus groups (*n* = 11)
Age in years, mean (SD)		66.9 (9.0)	67.1 (5.9)
Sex, n (%)	Male	7 (25)	2 (18)
	Female	21 (75)	9 (82)
Highest level of education, n (%)	Completed primary school	0 (0)	1 (9)
	Up to year 12	10 (36)	3 (27)
	Technical studies/ trade certificate	10 (36)	4 (36)
	Tertiary studies	6 (21)	3 (27)
	Missing	2 (7)	0
Main life occupation, n (%)	Manager	4 (14)	2 (18)
	Professional	10 (36)	4 (3)
	Clerical	9 (32)	5 (45)
	Trade, production or labour	5 (18)	0
Current employment, n (%)	Full-time	2 (7)	0
	Part-time/casual	3 (11)	2 (18)
	Not in paid employment	23 (82)	9 (81)
Ability to manage on Income, n (%)	Very difficult	2 (7)	0
	Somewhat difficult	8 (29)	3 (27)
	Not difficult	18 (64)	8 (18)
Present marital status, n (%)	Not married	17 (61)	8 (73)
	Married/defacto	11 (40)	3 (27)
Country of birth, n (%)	Australia	23 (82)	8 (73)
	Other	5 (18)	3 (27)
Area of residence, n (%)	Urban	23 (82)	9 (82)
	Rural	5 (18)	2 (18)
Health			
General health, n (%)	Very good- excellent	16 (57)	NA
	Good	9 (32)	NA
	Fair	3 (11)	NA
Functional health (Walking limitation), n (%)	Some limitation	2 (7)	NA
	No limitation	26 (93)	NA

Table 2 Means and standard errors for social wellbeing variables over time

Variable	Baseline (*n* = 28)	6 months (*n* = 27)	12 months (*n* = 28)	*p*-value
Duke social support[a]	3.83 (0.2)	4.08 (0.2)	4.09 (0.2)	0.065[d]
DJG loneliness[b]	27.95 (1.94)	26.18 (1.94)	25.17 (1.94)	0.028*
UCLA loneliness[c]	5.31 (0.39)	4.64 (0.39)	4.93 (0.39)	0.023*[d]

*significant effect of time for the indicated variable at $p < 0.05$
All analyses are adjusted for age, employment at baseline, and mean weekly LAC attendance
[a]Duke_UNC functional social support scale. Range 1–5. High social support = 5. *p*-value represents the *p*-value for the log-transformed variable
[b]De Jong Gierveld loneliness scale. Scored as a 5 item likert scale from Yes!, yes, more or less, no, No! Range = 11–55. Highest loneliness = 55.
[c]UCLA 3-item loneliness scale. Range = 3–9. Highest loneliness = 9
[d]*p*-value presented here are log-transformed variable analyses

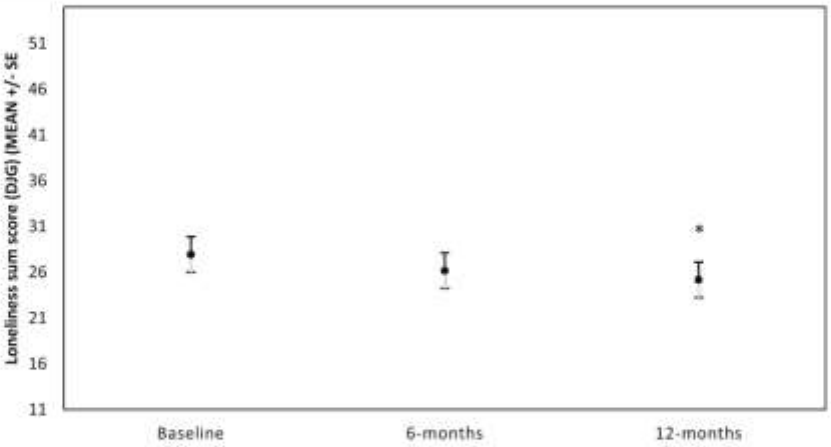

Fig. 1 DJG loneliness for all participants over first year of membership at LAC club ($n = 28$).
*Represents significant difference compared to baseline ($p < 0.01$)

[interviewer- Mmm.] ..Okay, you'd talk to them every day. You'd chatter in the kitchen, oh, pass banter back and forth when things are busy or quiet, but... Um, in terms of a friendship with those people, like going to their home, getting to know them, doing other things with them, very few. But what I did miss was the interaction with other people. It had simply gone..... But, yeah, look, that, the, yeah, that intervening period was, oh, a couple of months. That was a bit tough.... But in that time the people in LAC and the people in U3A.... And the other dance group just drew me into more things. Got to know more people. So once again, yeah, reasonable group of acquaintances." (Male, PAFG)

Group members indicated general agreement with these two responses, however one female found she had a greater social life following retirement due to the busy nature of her job.

Within the social resources theme, three subthemes were identified, *i) Opportunity for social connectedness, ii) Opportunity for friendships, and iii) Opportunity for social responsibility/leadership*. Interestingly, these subthemes were additional to the information gathered in the survey. This emphasises the power of the inductive nature of the qualitative exploration employed in the focus groups to broaden the knowledge in this area.

The most discussed and expanded subtheme in both focus groups was *Opportunity for social connectedness*, which arose through developing new connections, diversifying social connections, sharing interests and experiences with others and peer learning. Participants in both focus groups stated that being a member of LAC

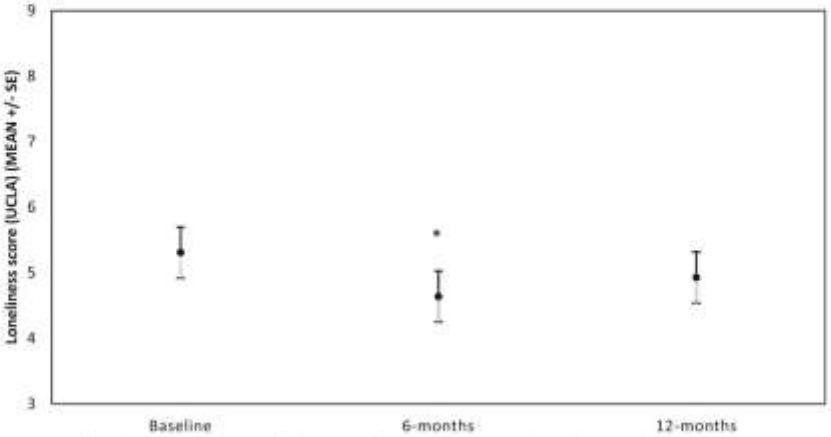

Fig. 2 UCLA loneliness score for all participants over first year of membership at LAC club ($n = 28$).
*Indicates log values of the variable at 6-months were significantly different from baseline ($p < 0.01$)

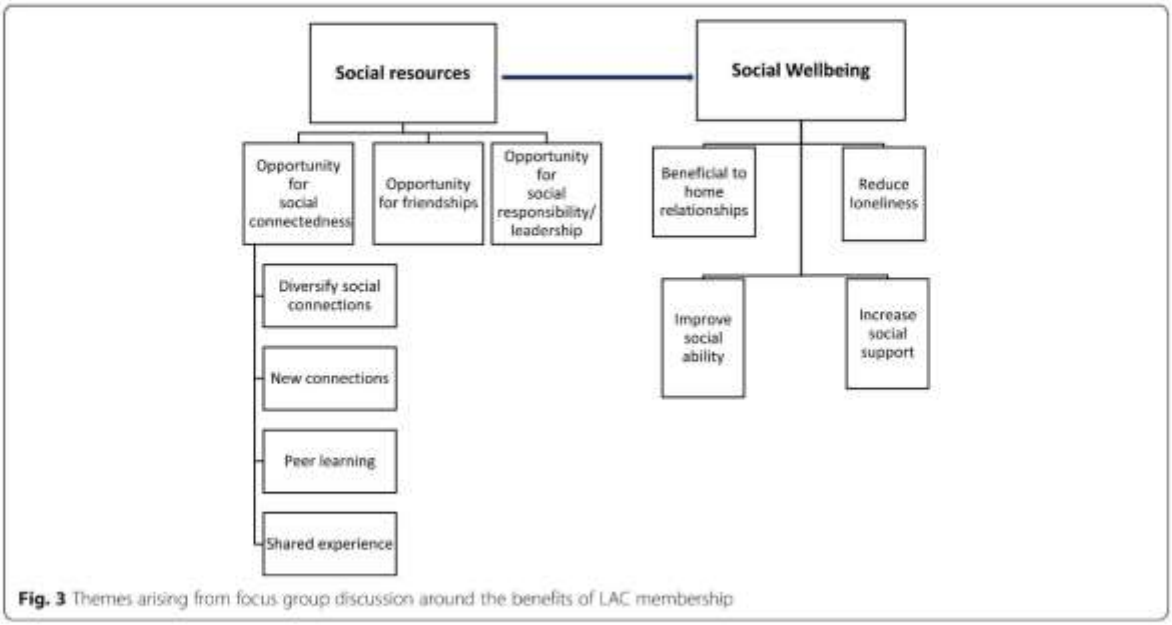

Fig. 3 Themes arising from focus group discussion around the benefits of LAC membership

facilitated their socialising and connecting with others to share ideas, skills and to do activities with, which was especially important through times of significant life events. Furthermore, participants in each of the focus groups valued developing diverse connections:

> *"Yeah, I think, as I said, I finished up work and I, and I had more time for wa-, walking. So I think a, in meeting, in going to this group which, I saw this group of women but then someone introduced me to them. They were just meeting, just meeting a new different set of people, you know? As I said, my work people and these were just a whole different group of women, mainly women. There's not many men. [Interviewer: Yes.]..... Although our leader is a man, which is ironic and is about, this man out in front and there's about 20 women behind him, but, um, so yeah, and people from different walks of life and different nationalities there which I never knew in my work life, so yeah. That's been great. So from that goes on other things, you know, you might, uh, other activities and, yeah, people for coffee and go to the pictures or something, yeah. That's great." (Female, PAFG)*

Simply making new connections was the most widely discussed aspect related to the opportunity for social connectedness subtheme, with all participants agreeing that this was an important benefit of participation in LAC groups.

> *"Well, my experience is very similar to everybody else's.....: I, I went from having no social life to a social life once I joined a group." (Female, PAFG)*

There was agreement in both focus groups that these initial new connections made at a LAC are strengthened through development of deeper personal connections with others who have similar demographics and who are interested in the same activities. This concurs with the Social Identity Theory [58] discussed previously.

> *"and I was walking around the lake in Ballarat, like wandering on my own. I thought, This is ridiculous. I mean, you've met all those groups of women coming the opposite way, so I found out what it was all about, so I joined, yeah. So that's how I got into that.[Interviewer: Yeah.] Basically sick of walking round the lake on my own. [Interviewer: Yeah, yeah.] So that's great. It's very social and they have coffee afterwards which is good."* (female, PAFG)

The subtheme *Opportunity for development of friendships* describes how, for some people, a number of LAC members have progressed from being just initial social connections to an established friendship. This signifies the strength of the connections that may potentially develop through LAC membership. Some participants from each group mentioned friendships developing, with slightly more discussion of this seen in the social group.

"we all have a good old chat, you know, and, and it's all about friendship as well." (female, SocialFG)

The subtheme *Opportunity for social responsibility or leadership* was mentioned by two people in the active group, however it was not brought up in the social group. This opportunity for leadership is linked with the development of a group identity and desiring to contribute meaningfully to a valued group.

"with our riding group, um, you, a leader for probably two rides a year so you've gotta prepare for it, so some of them do reccie rides themselves, so, um, and also every, uh, so that's something that's, uh, a responsibility." (male, PAFG)

Social wellbeing

The social resources described above seem to contribute to a number of social, wellbeing outcomes for participants. The sub themes identified for Social wellbeing were, *i) Increased social support, ii) Reduced loneliness, iii) Improved home relationships* and *iv) Improved social skills.*

Increased social support

Social support was measured quantitatively in the survey (no significant change over time for new members) and identified as a benefit of LAC membership during the focus group discussions. However, only one of the members of the active group mentioned social support directly.

'it's nice to be able to pick up the phone and share your problem with somebody else, and that's come about through LAC. ……'Cos before that it was through, with my family (female, PAFG)

There was some agreement amongst participants of the PA group that they felt this kind of support may develop in time but most of them had been members for less than 2 years.

"[Interviewer: Yeah. Does anyone else have that experience? (relating to above quote)]*" There is one lady but she's actually the one that I joined with anyway. [Interviewer: Okay.] But I, I feel there are others that are definitely getting towards that stage. It's still going quite early days. (female1, PAFG) [Interviewer: I guess it's quite early for some of you, yeah.] "yeah" (female 2, PAFG)*

Social support through sharing of skills was mentioned by one participant in the social group also, with agreement indicated by most of the others in the social focus group.

Discussion in the focus groups also touched on the subthemes *Reduced loneliness* and *Improved home relationships,* which were each mentioned by one person. And focus groups also felt that group membership *Improved social skills* through opening up and becoming more approachable (male, PAFG) or enabling them to become more accepting of others' who are different (general agreement in Social FG).

Discussion

This case study integrated results from a one-year longitudinal survey study and focus group discussions to gather rich information regarding the potential changes in social wellbeing that older adults may experience when joining community organisations offering group activities. The findings from this study indicate that becoming a member of such a community organisation can be associated with a range of social benefits for older adults, particularly related to reducing loneliness and maintaining social connections.

Loneliness

Joining a LAC was associated with a reduction in loneliness over 1 year. This finding is in line with past group-intervention studies where social activity groups were found to assist in reducing loneliness and social isolation [49]. This systematic review highlighted that the majority of the literature explored the effectiveness of group activity interventions for reducing severe loneliness or loneliness in clinical populations [49]. The present study extends this research to the general older adult population who are not specifically lonely and reported to be of good general health, rather than a clinical focus. Our findings are in contrast to results from an evaluation of a community capacity-building program aimed at reducing social isolation in older adults in rural Australia [59]. That program did not successfully reduce loneliness or improve social support. The lack of change from pre- to post-program in that study was reasoned to be due to sampling error, unstandardised data collection, and changes in sample characteristics across the programs [59]. Qualitative assessment of the same program [59] did however suggest that participants felt it was successful in reducing social isolation, which does support our findings.

Changes in loneliness were not a main discussion point of the qualitative component of the current study, however some participants did express that they felt less lonely since joining LACVI and all felt they had become more connected with others. This is not so much of a contrast in results as a potential situational issue. The lack of discussion of loneliness may have been linked to

the common social stigma around experiencing loneliness outside certain accepted circumstances (e.g. widowhood), which may lead to underreporting in front of others [45].

Overall, both components of the study suggest that becoming a member of an activity group may be associated with reductions in loneliness, or at least a greater sense of social connectedness. In addition to the social nature of the groups and increased opportunity for social connections, another possible link between group activity and reduced loneliness is an increased opportunity for time out of home. Previous research has found that more time away from home in an average day is associated with lower loneliness in older adults [60]. Given the significant health and social problems that are related to loneliness and social isolation [13–15], the importance of group involvement for newly retired adults to prevent loneliness should be advocated.

Social support

In line with a significant reduction in loneliness, there was also a trend ($p = 0.056$) toward an increase in social support from baseline to 12 months in the survey study. Whilst suggestive of a change, it is far less conclusive than the findings for loneliness. There are a number of possible explanations for the lack of statistically significant change in this variable over the course of the study. The first is the small sample size, which would reduce the statistical power of the study. It may be that larger studies are required to observe changes in social support, which are possibly only subtle over the course of 1 year. This idea is supported by a year-long randomised controlled trial with 90 mildly-depressed older adults who attended senior citizen's club in Norway [37]. The study failed to see any change in general social support in the intervention group compared to the control over 1 year. Additional analysis in that study suggested that people who attended the intervention groups more often, tended to have greater increases in SS ($p = 0.08$). The researchers stated that the study suffered from significant drop-out rates and low power as a result. In this way, it was similar to our findings and suggests that social support studies require larger numbers than we were able to gain in this early exploratory study. Another possible reason for small changes in SS in the current study may be the type of SS measured. The scale used gathered information around functional support or support given to individuals in times of need. Maybe it is not this type of support that changes in such groups but more specific support such as task-specific support. It has been observed in other studies and reviews that task-specific support changes as a result of behavioural interventions (e.g. PA interventions) but general support does not seem to change in the time frames often studied [61–63].

There were many social wellbeing benefits such as increased social connectivity identified in focus group discussion, but the specific theme of social support was rarely mentioned. It may be that general social support through such community groups may take longer than 1 year to develop. There is evidence that strong group ties are sequentially positively associated between social identification and social support [34], suggesting that the connections formed through the groups may lead increased to social support from group members in the future. This is supported by results from the focus group discussions, where one new member felt she could call on colleagues she met in her new group. Other new members thought it was too soon for this support to be available, but they could see the bonds developing.

Other social wellbeing changes

In addition to social support and loneliness that were the focus of the quantitative study, the focus group discussions uncovered a number of other benefits of group membership that were related to social wellbeing (see Fig. 3). The social resources theme was of particular interest because it reflected some of the mechanisms that appeared enable social wellbeing changes as a result of being a member of a LAC but were not measured in the survey. The main social resources relating to group membership that were mentioned in the focus groups were social connectedness, development of friendships and opportunity for social responsibility or leadership. As mentioned above, there was wide-spread discussion within the focus groups of the development of social connections through the clubs. Social connectedness is defined as "the sense of belonging and subjective psychological bond that people feel in relation to individuals and groups of others." ([25], pp1). As well as being an important predecessor of social support, greater social connectedness has been found to be highly important for the health of older adults, especially cognitive and mental health [26, 32, 34, 35, 64]. One suggested theory for this health benefit is that connections developed through groups that we strongly identify with are likely to be important for the development of *social identity* [34], defined by Taifel as: *"knowledge that [we] belong to certain social groups together with some emotional and value significance to [us] of this group membership" (Tajfel, 1972, p. 31 in* [58] *p 2).* These types of groups to which we identify may be a source of "personal security, social companionship, emotional bonding, intellectual stimulation, and collaborative learning and……allow us to achieve goals." ([58] p2) and an overall sense of self-worth and wellbeing. There was a great deal of discussion relating to the opportunity for social connectedness derived

through group membership being particularly pertinent following a significant life event such as moving to a new house or partners becoming unwell or dying and especially retirement. This change in their social circumstance is likely to have triggered the need to renew their social identity by joining a community group. Research with university students has shown that new group identification can assist in transition for university students who have lost their old groups of friends because of starting university [65]. In an example relevant to older adults, maintenance or increase in number of group memberships at the time of retirement reduced mortality risk 8 years later compared to people who reduce their number of group activities in a longitudinal cohort study [66]. This would fit with the original Activity Theory of ageing; whereby better ageing experience is achieved when levels of social participation are maintained, and role replacement occurs when old roles (such as working roles) must be relinquished [67]. These connections therefore appear to assist in maintaining resilience in older adults defined as "the ability to maintain or improve a level of functional ability (a combination of intrinsic physical and mental capacity and environment) in the face of adversity" (p29, [5]). Factors that were mentioned in the focus groups as assisting participants in forming connections with others were shared interest, learning from others, and a fun and accepting environment. It was not possible to assess all life events in the survey study. However, since the discussion from the focus groups suggested this to be an important motivator for joining clubs and potentially a beneficial time for joining them, it would be worth exploring in future studies.

Focus group discussion suggested that an especially valuable time for joining such clubs was around retirement, to assist with maintaining social connectivity. The social groups seem to provide social activity and new roles for these older adults at times of change. It is not necessarily important for all older adults but maybe these ones identify themselves as social beings and therefore this maintenance of social connection helps to continue their social role. Given the suggested importance of social connectivity gained through this organisation, especially at times of significant life events, it would valuable to investigate this further in future and consider encouragement of such through government policy and funding. The majority of these types of clubs exist for older adults in general, but this study emphasises the need for groups such as these to target newly retired individuals specifically and to ensure that they are not seen as 'only for old people'.

Strengths and limitations

The use of mixed –methodologies, combining longitudinal survey study analysed quantitatively, with a qualitative exploration through focus group discussions and thematic analysis, was a strength of the current study. It allowed the researchers to not only examine the association between becoming a member of a community group on social support and loneliness over an extended period, but also obtain a deeper understanding of the underlying reasons behind any associations. Given the variability of social support definitions in research [17] and the broad area of social wellbeing, it allowed for open exploration of the topic, to understand associations that may exist but would have otherwise been missed. Embedding the research in an existing community organisation was a strength, although with this also came some difficulties with recruitment. Voluntary coordination of the community groups meant that informing new members about the study was not always feasible or a priority for the volunteers. In addition, calling for new members was innately challenging because they were not yet committed to the club fully. This meant that so some people did not want to commit to a year-long study if they were not sure how long they would be a member of the club. This resulted in slow recruitment and a resulting relatively low sample size and decreased power to show significant statistical differences, which is a limitation of the present study. However, the use of Linear Mixed Models for analysis of the survey data was a strength because it was able to include all data in the analyses and not remove participants if one time point of data was missing, as repeated measures ANOVAs would do. The length of the study (1 year) is another strength, especially compared to previous randomised controlled studies that are typically only 6–16 weeks in length. Drop-out rate in the current study is very low and probably attributable to the benefits of working with long-standing organisations.

The purpose of this study was to explore in detail whether there are any relationships between joining existing community groups for older adults and social wellbeing. The lack of existing evidence in the field meant that a small feasibility-type case study was a good sounding-board for future larger scale research on the topic, despite not being able to answer questions of causality. Owing to the particularistic nature of case studies, it can also be difficult to generalise to other types of organisations or groups unless there is a great deal of similarity between them [68]. There are however, other types of community organisations in existence that have a similar structure to LACVI (Seniors centres [36, 40], Men's Sheds [38], University of the Third Age [34, 69], Japanese salons [70, 71]) and it may be that the results from this study are transferable to these also. This study adds to the literature around the benefits of joining community organisations that offer social and physical activities for older adults and suggests that this engagement may assist with reducing loneliness and

maintaining social connection, especially around the time of retirement.

Directions for future research

Given that social support trended toward a significant increase, it would be useful to repeat the study on a larger scale in future to confirm this. Either a case study on a similar but larger community group or combining a number of community organisations would enable recruitment of more participants. Such an approach would also assist in assessing the generalisability of our findings to other community groups. Given that discussions around social benefits of group membership in the focus groups was often raised in conjunction with the occurrence of significant life events, it would be beneficial to include a significant life event scale in any future studies in this area. The qualitative results also suggest that it would be useful to investigate whether people who join community groups in early years post retirement gain the same social benefits as those in later stages of retirement. Studies investigating additional health benefits of these community groups such as physical activity, depression and general wellbeing would also be warranted.

Conclusion

With an ageing population, it is important to investigate ways to enable older adults to age successfully to ensure optimal quality of life and minimisation of health care costs. Social determinants of health such as social support, loneliness and social contact are important contributors to successful ageing through improvements in cognitive health, quality of life, reduction in depression and reduction in mortality. Unfortunately, older adults are at risk of these social factors declining in older age and there is little research investigating how best to tackle this. Community groups offering a range of activities may assist by improving social connectedness and social support and reducing loneliness for older adults. Some factors that may assist with this are activities that encourage sharing interests, learning from others, and are conducted in a fun and accepting environment. Such groups may be particularly important in developing social contacts for newly retired individuals or around other significant life events such as moving or illness of loved ones. In conclusion, ageing policy and strategies should emphasise participation in community groups especially for those recently retired, as they may assist in reducing loneliness and increasing social connections for older adults.

Abbreviations

FG: Focus group; LAC: Life Activities Club; LACVI: Life Activities Clubs Victoria; LMM: Linear mixed model; PA: Physical activity; WHO: World Health Organisation

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Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due the ethics approval for this study not allowing open access to the individual participant data but are available from the corresponding author on reasonable request.

Authors' contributions

GLS, RE and JVU made substantial contributions to the conception and design of the study. GLS and GOS supervised data collection for the surveys (GLS) and focus groups (GOS and GLS). GLS, GOS, RE, JH and JVU were involved in data analysis and interpretation. All authors were involved in drafting, the manuscript and approved the final version.

Ethics approval and consent to participate

Ethics approval to conduct this study was obtained from the Victoria University Human Research Ethics Committee (HRE14–071 [survey] and HRE15–291 [focus groups]). All survey participants provided informed consent to partake in the study prior to undertaking the first survey by clicking 'agree' in the survey software (online participants) or signing a written consent form (paper participants) after they had read all participant information relating to the study. Focus group participants also completed a written consent form after reading and understanding all participant information regarding the study.

Consent for publication

Focus group participants have given permission for their quotes to be used in de-identified form prior to undertaking the research.

Competing interests

The authors declare that they have no competing interests.

Publisher's Note

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Chapter 6 : A Mixed-Methods Case Study Exploring the Impact of Participation in Community Activity Groups for Older Adults on Physical Activity, Health and Wellbeing.

This Chapter sets out the second part of the findings relating to the mixed methods case study of Life Activities Clubs Victoria. Specifically, the focus is on the impact of becoming a member of a community organisation on physical activity, health and wellbeing of members over one year.

For the purpose of this research, health was defined as health-related quality of life (HR QoL) and measured the physical component score of the Short Form 12 quality of life scale (Ware, 1996) and the subjective health reported by focus group participants. Wellbeing was defined as mental wellbeing in this study, which is a common utilisation of the term (Steptoe, Deaton & Stone, 2015). It was measured in the one-year survey study survey study using the mental health component score of the Short Form 12 quality of life scale (Ware, 1996). In the focus group study wellbeing was assessed as mental health or subjective wellbeing factors reported by focus group participants. Two main types of activity programs are typical at the community activity group chosen for this case study. These are physical activities and social activities. The survey study data was analysed comparing the impact of membership for one year on physical activity health and wellbeing between participants of the two different types of programs.

The paper in this chapter contributes to answering the second research sub-question of this program of research which is: *What is the potential role of community groups for older adults offering a socially supportive environment in improving physical activity, health and wellbeing?*

The following paper: *A mixed-methods case study exploring the impact of participation in community activity groups for older adults on physical activity, health and wellbeing* by Gabrielle Lindsay-Smith, Grant O'Sullivan, Rochelle Eime, Jack Harvey and Jannique G. Z. van Uffelen is currently under a second round of review with BMC Geriatrics (first submitted on 21 Sept, 2018 and revision submitted on 2 Feb, 2019.)

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2. CANDIDATE DECLARATION

I declare that the publication above meets the requirements to be included in the thesis as outlined in the HDR Policy and related Procedures – policy.vu.edu.au.

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Name(s) of Co-Author(s)	Contribution (%)	Nature of Contribution	Signature	Date
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Rochelle Eime	5	Study design, and manuscript preparation		28/2/19
Grant O'Sullivan	7.5	Data collection and analysis and manuscript preparation		28/2/19
Jack Harvey	5	Data analysis and manuscript preparation		28/2/19

A Mixed-Methods Case Study Exploring the Impact of Participation in Community Activity Groups for Older Adults on Physical Activity, Health and Wellbeing.

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Abstract

Background: Regular physical activity (PA) has many health benefits but declines with age. Community multi-activity groups offering volunteer-led socially-oriented activity programs could provide an opportunity for older people to maintain or increase PA levels and promote their health. The aim of this study was to examine the potential effect of becoming a member of an existing community activity group on PA levels, physical and mental health-related quality of life (HR QoL), comparing any impacts associated with participation in physical activity or social activity programs.

Methods: This mixed-methods case study, combining a longitudinal quantitative-survey with qualitative focus groups to contextualise the survey results, focused on an Australian community organisation called Life Activities Clubs (LACs). LACs provide various physical activities (e.g. walking, cycling, dancing) and social activities (e.g. book groups, dine-outs, craft). Data were collected using a self-report survey administered at baseline, six and twelve-months after joining and group differences between participants of PA programs (PA group) and social programs (social group) were analysed using linear mixed-models. Two focus groups with LAC members were held, one representing each activity type and analysed using content and thematic analysis.

Results: 35 people (mean age 67) completed the surveys and 11 people participated in the focus groups. PA levels and physical health-related QoL were maintained over one year in the PA group, and declined between baseline and 12-months in the social group. Focus groups suggested social aspects of PA programs increased motivation to maintain regular attendance and do more PA than participants would on their own and that physical activities provided health benefits. Mental HR QoL did not change in either group, focus groups suggested this was because the social aspects of both types of program provide benefits relating to mental health including stress relief, enjoyment and adapting to major life events, to prevent a decline in QoL.

Conclusions: Community PA programs appear to maintain PA levels and physical HR QoL in older adults, and both social and PA programs may maintain mental HR QoL. Organisations offering both social and PA programs can cater for the interests of a variety of older adults and warrant further investigation.

Keywords

Ageing, longitudinal, wellbeing, health, social-engagement

Introduction

Between 2015 and 2050 it is predicted that the number of people globally over the age of 60 will more than double (1). Ageing is typically associated with increased risk of non-communicable diseases, functional decline and age-related conditions such as dementia, as well as a greater risk of being lonely or socially isolated (2-4). This places significant burden on health and social care systems and can be detrimental to the quality of life of older adults themselves. It is therefore an individual and public health priority to focus on strategies that promote 'Active Ageing' (also sometimes referred to as healthy or successful ageing); defined as "the process of developing and maintaining the functional ability (physical and social characteristics) that enables well-being in older age" (5,pp28)

Physical activity is an essential component of such strategies because of its vast known mental and physical health benefits such as chronic disease prevention (6-8), maintenance of functional capacity and cognitive health (9-13). Despite the wide-ranging benefits of participating in regular PA, global inactivity levels are high and increase with age. Approximately 60-70% of older adults in developed countries such as Canada, the United States of America (USA) and Australia are not sufficiently active (14-17). Based on this evidence, there is clearly a need for exploration of ways to improve PA levels of older adults that can be sustainable in the long-term Older adults place greater importance on enjoyment and socialisation than their younger counterparts (18), and socially-oriented strategies are more effective for PA initiation and maintenance than purely individual strategies such as action planning, goal setting or barrier management in older adults (19-23). Therefore, exploration of the potential of socially focused sustainable PA interventions for older adults is warranted.

One place where such strategies are integral to the service they offer are community organisations that run a variety of socially focused physical activity and social programs

for older adults. For ease, these will be referred to as community activity groups. Such groups are generally sustainable, cost effective, often run by volunteers and developed by community members, making them an ideal setting for the promotion of Active Ageing (24-29). These organisations offer people the opportunity to do the things they enjoy in a group environment, which can provide social wellbeing benefits such as social connection, reduced perception of loneliness and possibly increase social support (30). Socialising in groups is also important for the cognitive and physical health and wellbeing of older adults (31-34). In particular, older adults who participate in either sports or hobby groups have a lower risk of onset of functional disability and better QoL four years later compared to those who did not participate in any groups (35).

One potential mechanism is that group participation may strengthen social identification, leading to increased perceived social support (31, 36, 37). Social support may buffer stressful situations (38-40) and/or encourage positive health behaviours, including PA (41-43). Community based PA programs can increase PA levels in older adults (44), and appear to have good adherence of approximately 70% (45). Some of the key factors that impact adherence to these types of programs are social connection, fun from socialising and social support from the group (45-47). Community groups offering socially-focused PA may therefore have potential to increase PA levels and wellbeing for older adults.

Evaluation of community activity groups would help to identify strategies that promote healthy ageing and are sustainable in a real-life community-based setting. However, research in this setting is scarce, with most of the research in the field incorporating community PA groups as just one option in larger PA interventions in addition to individual strategies (48-51). There is also a lack of longitudinal studies evaluating the impact of programs run in existing community organisations for older adults on PA and QoL. Given that community organisations are low cost and sustainable and offer physical activity programs with the socially oriented focus that some older adults prefer, the potential of these organisations warrants further investigation

Research objectives

The aim of this concurrent mixed-methods case study was to examine the potential effect of becoming a member of an existing community activity group on PA levels and

quality of life (QoL) and to compare the effects participating in physical activity or social activity programs on these outcomes (quantitative research), and to explore this in depth with both new and longer-term members of the same community organisation (qualitative research).

Methods

Setting

Life Activities Clubs Victoria

Life Activities Clubs Victoria (LACVI) are a large not-for-profit community organisation with 23 independently run Life Activities Clubs (LACs) with approximately 4000 members based in both rural and metropolitan Victoria, Australia. The organisation was established in 1972 to provide physical, social and recreational activities, as well as education and motivational support, to older adults managing retirement and other significant changes in their lives. LACs offer a variety of types of activities depending on the individual club. Some examples of social activities include book groups, dine-outs, travel, craft or cultural activities. PA programs typically include walking, table-tennis, cycling or dancing (28). Individuals can take part in unlimited activities at their LACs for a small yearly fee membership fee. Eighteen out of 23 LACs agreed to participate in the survey study.

Participants

Survey

During the sampling period from May 2014 to December 2016, new members from participating LACs were given information about the survey study and invited to take part. Invitations in the form of flyers were included with new membership material. Eligibility criteria were as follows: 1) community-dwelling older adults who self-reported that they could walk at least 100m; 2) new members of LACVI (defined as people who had never been members of LACVI or who had not been members in the last two years); 3) able to complete a survey in English. Thirty-five participants enrolled in the survey study (See Figure 1 for full flow chart of survey participant recruitment). Due to the observational nature of the study, individuals self-selected their preferred programs rather than being randomly allocated. Seventeen participants chose to take

part in social programs (social group) and 18 participants took part in PA programs (PA group).

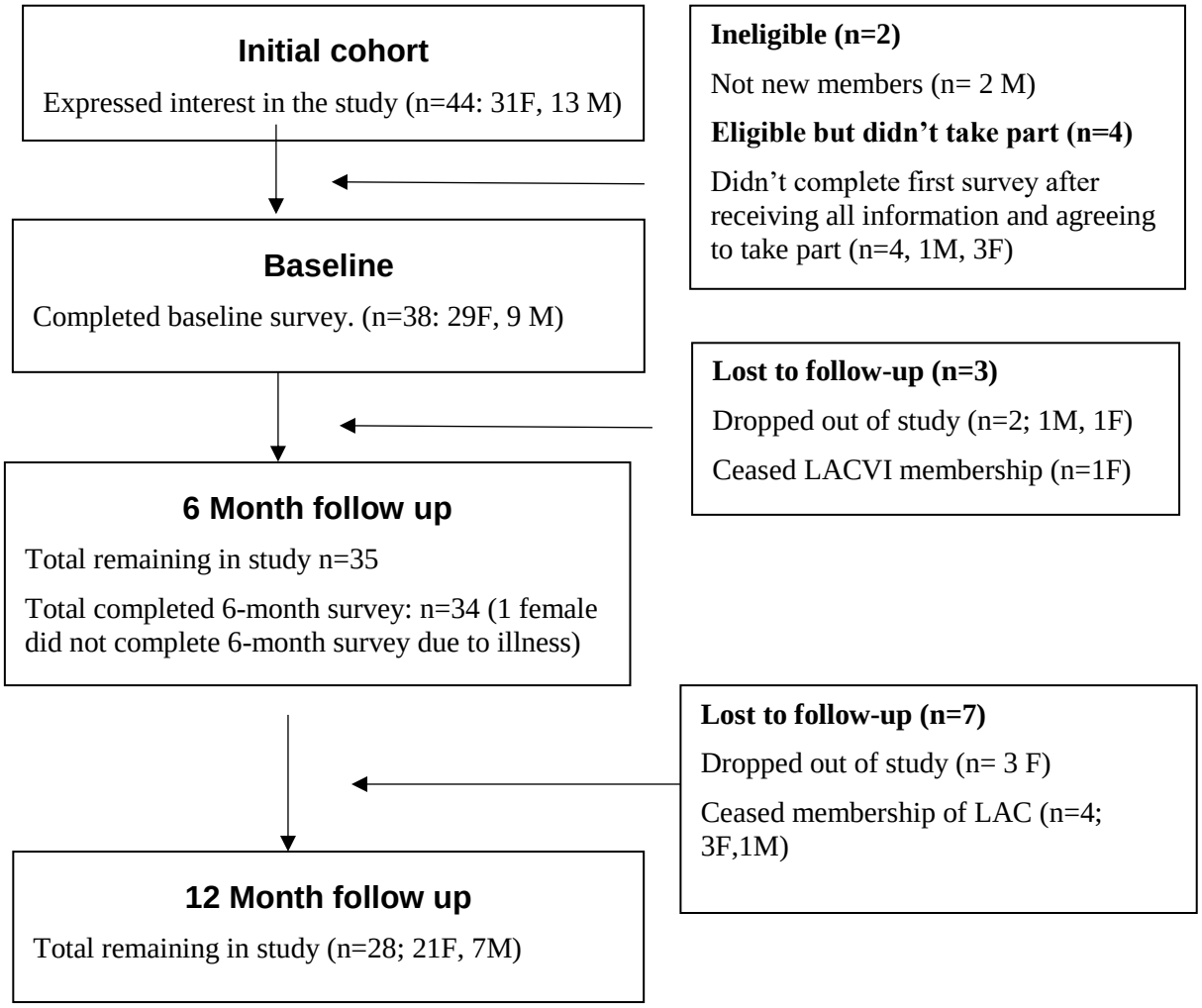

Figure 1 Participant recruitment flow chart

Focus groups

Each of the survey participants were given an opportunity to participate in the focus groups (FGs). To gather additional views from longer-term members of the club, recruitment for the FGs was opened to all LACVI members and advertised through the LACVI newsletter. Eleven members participated in the FG study, seven of whom also completed the survey study. Two FGs were conducted to allow for comparison between groups; one containing social program participants (e.g. book groups, social groups,

craft or cultural groups, n=5) the other with PA program participants (e.g. walking groups, tennis, cycling; n=6).

Design

Survey

The survey was administered upon becoming a member and six and 12 months after joining. It was completed via self-report, either online or paper depending on participant preference. 13 participants (37%) completed the survey on paper and 22 were online (63%).

Dependent variables

a) Physical activity (PA)

PA was assessed using the validated Active Australia Survey (52). It assesses total minutes of PA undertaken in the previous week by summing bouts of 10 minutes of PA in each of the three categories (walking, moderate-intensity PA and vigorous-intensity PA) (53). This measure has acceptable validity and reliability in adults and older adults (54, 55). A total PA score in MET.hours/week was calculated by multiplying minutes in each activity type by an assigned metabolic equivalent (MET), summing and dividing by 60 (walking=3.0 METs; moderate-intensity PA=4.0 METs; vigorous-intensity PA=7.5 METs) (56, 57). PA was then truncated to a maximum of 112 MET.hours/week (56, 57). PA was categorised as: 1) no PA (<0.67 MET.hours/week); 2) insufficient PA (0.67<10 MET.hours/week); 3) sufficient PA (>10-20 MET.hours/week) which was calculated as meeting WHO guidelines equivalent to 150 minutes/week or 2.5 hours/week of moderate-intensity PA (2.5hours x 4 METS = 10 MET.hours) (8); 4) double the recommended levels to gain health benefits (8) = 20 MET.hours/week) (58). Missing data for this variable were not imputed. One participant (3%) had missing data on the Active Australia questionnaire at six months.

b) Quality of life

Physical and mental health-related quality of life (HR QoL) was assessed using the Short form 12-item Health Survey Questionnaire version 2 (SF-12) (59). The SF-12 consists of 12 questions relating to eight concepts of physical and mental health and how they impact one's QoL, i.e., physical functioning, role-physical, bodily pain,

general health, energy, social functioning, role emotional and mental health. The concepts are divided into two summary scores using norm-based criterion referred to as a physical component score (PCS) and mental component score (MCS), representing physical and mental HR QoL. The scores for each component are presented as standardised scores (M=50, SD=10). For example, a score of 60 represents a QoL rating one standard deviation higher than the average rating of the general population (60). SF-12 has good internal consistency and test-retest reliability (for both alpha > 0.7), as well as good construct validity for use in older adults (61).

Sociodemographic and health variables

The following sociodemographic characteristics were collected in both the survey and the FGs to describe the study sample: age, sex, highest level of education, main life occupation (62), current employment, ability to manage on income available, present marital status, country of birth, area of residence (63). They are categorised as indicated in Table 1.

Self-rated general health: was assessed with the question ‘In general, would you say your health is: excellent, very good, good, fair, poor?’ (60)

Focus groups

Qualitative data were collected in FGs discussions utilising a semi-structured interview format. The questions focused on the perceived health, wellbeing and PA benefits of being a member of a LAC and the perceived mechanisms for these benefits. This provided an opportunity for participants to disclose knowledge that was not otherwise captured through the survey alone. A semi-structured interview guide and the use of open-ended questions elicited broad discussion around health and wellbeing changes through program participation (64).

Procedure

Survey

All participants provided written informed consent to participate in this study. See (30) for further details of data collection procedures for this study.

Focus groups

The FG interviews were facilitated by one researcher (GLS) and notes around non-verbal communication, moments of divergence and convergence amongst group members, and other notable items were taken by a second researcher (GOS). See (30) for further procedural details.

Ethics approval to conduct this study was obtained from the Victoria University Human Research Ethics Committee (HRE14-071 and HRE15-291) All participants provided written informed consent to partake in the study

Analysis

In line with recommendations, the synthesis of survey and FG data was undertaken during interpretation of the results (65).

Survey

Dependent variables (PA, SF-12 (MCS and PCS), were analysed in SPSS for windows (v25) using linear mixed models (LMM). LMM enables testing for the presence of intra-subject random effects, or equivalently, correlation of subjects' measures over time (baseline, six-months and twelve months) and does not automatically remove cases from analysis if a single data point is missing. Three correlation structures were examined: independence (no correlation), compound symmetry (constant correlation of each subjects' measures over the three time-points) and first-order autoregressive (AR1) (correlation diminishing with increase in spacing in time). The best fitting correlation structure for the three dependent variables was AR1. The LMMs incorporated terms for differences between the two groups (PA and social group), longitudinal trends over time and group-time interactions, with adjustment for age, employment and weekly frequency of attendance at the LAC program as potential confounders. Group by time interactions represent differences in the changes over time between the two groups. Residuals for PA were not normally distributed and the scores for these variables were therefore square-root transformed for statistical analysis and the median (Interquartile range = IQR: 25th-75th percentile) was reported in Table 3. An alpha level of 0.05 indicates statistical significance for main effects. A Bonferroni corrected alpha of 0.025 was utilised for post-hoc testing.

Focus groups

Focus group transcripts were analysed using a hybrid of descriptive content analysis (66) and thematic analysis (64, 67). The transcribed data were analysed using a combination of deductive and inductive thematic analysis (67). Deductive thematic analysis sought to assess the hypothesis that membership of a LAC would promote PA and QoL. Semantic themes were inductively drawn from these codes to conduct a pragmatic evaluation of the LAC programs (67). Analytic rigour in the qualitative analysis was ensured through source and analyst triangulation (64). Transcriptions were compared to notes taken during and immediately after the FGs by the researchers (GOS and GLS). In addition, initial coding and themes (by GLS) were checked by a second researcher (GOS) and any disagreements regarding coding and themes were discussed to find consensus on final codes and themes. Descriptive content analysis sought to describe the frequency of code and theme mentions. Frequency was determined by counting of mentions of each theme within the text. Counts were determined both by number of participants who mentioned a code (if more than one participant says the same thing), and by number of mentions by the same participant (if a participant says the same thing more than once). However, if the group indicated agreement with a point made by one participant by nodding or saying “Mmm” or “yeah" and thus, were not individually identified, this was not counted as extra mentions. The content analysis sought to identify the range and prominence of physical and psychological benefits of participation in LAC programs. The benefit themes and codes that were identified were then compared across the social and PA groups. Further exploration of thematic content was conducted once group differences had been identified. Group agreement with themes was considered at this point. See Table 4 for themes and numeric results of the content analysis and text below for detail of thematic analysis between individuals and groups in the study.

Results

Survey

There were no significant differences between the sociodemographic characteristics of the participants of the PA group and social group; with a mean age of 67 (range 45-80)

and 77% female. The demographic characteristics were also similar between the survey participants and the FG participants (see Table 1 for full details).

Frequency of attendance at LACVI and intensity of PA sessions at LAC:

At six and 12 months, survey participants indicated how many times in the previous month they had attended activities at their LAC (see Table 2). Most participants maintained the same frequency of participation over both time points, although participation rates in some people declined. This was similar for both the Social and PA group (see Table 2). PA participants were asked to indicate the type and average intensity of PA done at their LAC. The main types of PA which participants were involved were walking, table tennis, bowls and dancing. At six-month and 12-month follow-up the majority of participants (78% and 88% respectively) rated the intensity of sessions they attended as moderate-vigorous and the rest rated it as low.

Table 1. Baseline Demographic and health characteristics of survey and focus group respondents n (%)

Sociodemographic characteristics		Survey (n=35)			FGs (n=11)
		Social (n=17)	PA (n=18)	Total	
Age in years, mean (SD)		67(7)	67(9)	67(8)	67 (6)
Sex, n (%)	Male	2(12)	6(33)	8(23)	2 (18)
	Female	15(88)	12(67)	27(77)	9 (82)
Highest level of education, n (%)	Completed primary school			0 (0)	1 (9)
	Up to year 12	8(47)	6(33)	14(40)	3 (27)
	Technical studies/ trade certificate	6(35)	8(44)	14(40)	4 (36)
	Tertiary studies	3(18)	4(22)	7(20)	3 (27)
Main life occupation, n (%)	Manager	4(23.5)	2(11)	6(17)	2 (18)
	Professional	4(23.5)	8(44)	12(34)	4 (36)
	Clerical	6(35)	5(28)	11(31)	5 (45)
	Trade, production or labour	3(18)	3(17)	6(17)	0
Current employment, n (%)	Full-time	1(6)	2(11)	3(9)	0
	Part-time/casual	3(18)	1(6)	4(11)	2 (18)
	Not in paid employment	13(76)	15(83)	28(80)	9 (81)
Ability to manage on income, n (%)	Very difficult	1(6)	1(6)	2(6)	-
	Somewhat difficult	6(35)	3(17)	9(26)	3 (27)
	Not difficult	10(59)	14(78)	24(68)	8 (18)
Present marital status, n (%)	Not married	11(65)	8(44)	19(54)	8 (73)
	Married/de-facto	6(35)	10(56)	16(46)	3 (27)
Country of birth, n (%)	Australia	17(100)	10(56)	27(77)	8 (73)
	Other	0(0)	8(44)	8(23)	3 (27)
Area of residence, n (%)	Urban	13(76)	17(94)	30(86)	9 (82)
	Rural	4(24)	1(6)	5(14)	2 (18)
General health, n (%)	Very good- excellent	11(65)	11(60)	22(63)	
	Good	4(23)	6(33)	10(28.5)	
	Fair	2(12)	1(5.5)	3(8.5)	
PA levels n (%)	No PA	0	1 (6)	1 (3)	

	Insufficient PA	4 (24)	2 (11)	6 (17)	
	Sufficient PA	5 (29)	0	5 (14)	
	Enough PA for additional health benefits	8 (47)	15 (83)	23 (66)	

Key: SD = standard deviation.

Table 2. Frequency of attendance at LAC in last month for social and PA groups indicated in the survey n (valid n%)

	Social group		PA group	
	6 months n(%)	12 months n(%)	6 months n(%)	12 months n(%)
Never	0	3 (21)	0	4 (29)
Infrequent (<1xpw)	7 (50)	5 (36)	9 (56)	4 (29)
Moderate (1-2xpw)	5 (36)	5 (36)	1 (6)	3 (21)
Frequent (>2xpw)	2 (14)	1(7)	6 (38)	3 (21)

Outcome measures

a) Physical activity

All participants had high initial levels of PA (see table 1), with the majority (80%) undertaking sufficient amounts of PA and 66% doing more than double the recommended minimum to achieve health benefits. This was especially the case for the PA group, with 83% doing more than double the recommended minimum; a significantly greater proportion than the social group (47%) (χ^2=0.024, DF=1, p<0.05), There was a significant between-group effect of membership over time on PA (F(1,32)=8.97, p=0.005), with the PA group having significantly greater mean PA levels over time compared to the social group. The was no significant change in PA levels over time in either group (main effect of time) and there were no significant differences between groups (group by time interaction). However, participants in the focus group felt that PA program participation was beneficial for their PA levels (see FG results below). Therefore, post hoc analyses were conducted. There was no significant difference in PA between the groups at baseline or six months (F(1,71)=3.37, p=0.061), but the difference became significant by twelve months, with the PA group having an median total PA of 38.5 MET.hours/week of PA compared to 7.5MET.hours/week in the social group (F(1,74)=9.29, p=0.003). In addition, there was a trend toward a

significant decline in PA levels in the social group between baseline and 12 months (p=0.05 – not significant with a Bonferroni-adjusted p-value of 0.025).

b) Quality of Life

There was a significant difference between the mean physical HR QoL scores (PCS) of the participants in the two groups with the PA group having significantly higher mean PCS scores than the social group. Means and standard errors were 53.2 (2.06) for the PA group versus 44.8 (2.1) for the social group ($F(1,30)=13.1$, $p=0.001$). The was no significant change in PCS scores over time in either group (main effect of time time) and there were no significant differences between groups (group by time interaction). However, the FG discussion suggested that PA program participants felt they gained physical health benefits from group membership (see FG results below), thus post-hoc analyses were conducted. The social group participants had significantly lower PCS scores than the PA group at six-months $F(1, 52) = 9.36$, $p=0.003$ and twelve-months $F(1,56)=13.75$, $p=0.001$) but not baseline and there was a trend toward significant decline in PCS scores in the social group between baseline and twelve-months ($p= 0.107$).

There were no significant differences in mental component of HR QoL over time (i.e. time effect), between groups (i.e. group effect) or differences in MCS over time between groups (group by time interaction).

Table 3. Physical wellbeing variables over time in full group, and social and PA groups separated.

	Group	**B/L (n=35)**		**6 month (n=35)**		**12 month (n=32)**		**Time effect**	
		Med	**IQR**	**Med**	**IQR**	**Med**	**IQR**	**F**	**P**
PA	Total	33.3	12.2-55.4	22.6	10.5-50.3	32.5	7.5-42	1.34	0.270
	Social	15.0	11.5-36.8	10.5	7-50	7.5	3-39.8	2.04	0.140
	PA	42.0	25.5-65.3	36.2	21.5-56	38.5	13.5-51.5	0.12	0.884
	Group effect: F=8.97; p= 0.005*				Group x time: F= 0.830; p=0.441				
PCS[b]		**M**	**SE**	**M**	**SE**	**M**	**SE**	**F**	**P**
	Total	49.4	1.3	49.2	1.3	48.0	1.3	0.549	0.581
	Social	46.8	1.8	45.6	1.9	43.3	1.9	1.37	0.261
	PA	51.9	1.8	52.9	1.8	52.8	1.9	0.169	0.845
	Group effect: F=13.1; p=0.001*				Group x time: F=0.999; p=0.374				
MCS [c]	Total	53.4	1.4	54.5	1.4	54.7	1.4	0.561	0.573
	Social	53.4	1.9	54.5	2.0	54.6	2.0	0.257	0.774
	PA	53.4	1.9	54.4	1.9	54.8	2.0	0.311	0.734
	Group effect: F=0.001; p=0.981				Group x time :F=0.008; p=0.992				

*BL = Baseline, IQR = inter quartile range (25-75th percentile), Med = median (not adjusted), M= Mean, SE= standard error. * indicates a significant result for the corresponding variable. p<0.05. All Analyses conducted using linear mixed model. AR1 correlation structure adjusted for age, employment, frequency of attendance. [a] PA= MET.hours/week of PA. The residuals were skewed; p-value was calculated using a square-root transformation in the LMM. For readability, actual MET. Hour values are reported in this table not the transformed variable. [b]PCS= Physical component of the SF-12 (Mean and SE age adjusted). [c] MCS= Mental component of the SF-12 (Mean and SE age adjusted).*

Focus groups

Six people (four women and two men) participated in the PA focus group and five (all women) participated in social focus group. FG participants were either retired (n=9) or semi-retired (n=2). The mean age of participants in the focus groups was 67 years (range 55-78 years) (see table 1 for further details). Most of the participants (82%) had been members of a LAC for less than two years and two females in the social group had been members of LACs for 5 and 10 years respectively. Analysis of the FG transcripts identified three themes relating to health benefits of group participation; 1) PA benefits, 2) physical benefits and 3) psychological benefits. In addition to benefits that were derived from both the PA and the social programs, several benefits were derived only from one type of program, as discussed below.

Table 4. Content analysis of mentions in each theme from the focus group study.

Theme	Subtheme	PA[a]	Social[a]
Physical benefits	Improved physical capacity*	2	0
	General physical health*	5	0
Total		7	0
PA benefits	Decrease sitting time *	1	0
	New opportunities to do PA *	0	2
	More PA quantity/ intensity *	5	0
	PA Maintenance*	5	0
Total		18	2
Psychological benefits	Adapt to major life events	9	3
	Cognitive stimulation	4	2
	Improved mental health (general)*	5	0
	Improved life gratitude/ life satisfaction/ QoL	2	2

	Stress reduction/ relaxation	1	2
	Enjoyment	5	6
Total		26	15

[a] *These columns are counts of the number of mentions relating to each theme within each FG discussion. * Indicates that the subtheme was only mentioned in one group*

PA benefits of participation in community activity groups

The transcripts were coded for any discussion relating group membership to PA levels. Analysis of the codes showed themes relating to impacts of membership on PA (*PA benefits*) and also some discussion of mechanisms relating program involvement to PA benefits (*PA Mechanisms*). Within the PA benefits theme, four subthemes were identified, *i)Maintain PA* , *ii) More PA quantity/intensity iii) Decrease sitting time* and iv) *new opportunities to do PA*. Three of these related to involvement in PA programs only and one *new opportunities to do PA* related to social program involvement only (see table 4 for content analysis results).

PA benefits from PA programs *i) Maintain PA:* This was the primary theme of this subsection. All the participants interviewed in the PA group agreed that the group assisted them in maintaining regular physical activity. For example, when asked about benefits of joining LACs, *"for me it's mainly health benefits, more activity"(M, 67) (others agree)*

ii) More PA quantity/intensity: Approximately half the participants felt that they group enabled them to do a greater volume or intensity of PA than they would if they were exercising alone e.g., *"I wouldn't be exercising as much as what I do now if it wasn't for LAC" (M 67).*

iii) Decrease sitting time was mentioned as a benefit relating to group membership by one participant who felt that preparation relating to his chosen activity made him less sedentary in his normal life outside the group. *"every week you've gotta prepare. … the bike and make sure that it's right to go, and that's a matter of just doing something different, you know, you're not sitting on your backside at home.*" (M, 67).

PA Mechanisms: Four subthemes identified in the PA coding referring to mechanisms for *how* the participants perceived membership of these PA programs groups influenced their PA levels *i) enjoyment of the company of others ii) leadership opportunities through group membership iii) regular commitment of an activity and iv) social norm or friendly comparison of PA. Figure 2* shows how each of the subthemes related to the type of PA benefit. The first three subthemes appeared to be related to decreased sitting time or maintenance of PA and the last subtheme specifically related to increased PA quantity.

i*) Enjoyment of the company of others* was the most mentioned subtheme in this section, with all members in the FG mentioning that they enjoyed socialising in their PA group and this motivated their continued attendance. One lady in the group made a pertinent point summarising the feeling of the group

"Yeah, if, if you're enjoying, say, something like table tennis or, or you're bike riding or anything like that or dancing, I mean, if you're enjoying the company of the people… that you're sharing the activity with, I think it's enough to sort of make you keep, keep going" (F, 67).

ii) Leadership opportunities through group membership: One male in the group mentioned that there was potential for leadership activities; to lead the rest of the group in the activity for the week, which he found motivating for his PA levels and attendance.

"You are a leader for probably two (sessions) a year so you've gotta prepare for it, so that's something that's a responsibility" (M, 67).

iii) Regular commitment of an activity: Approximately half the group stated they found a regular group commitment of PA very motivating for continuing to exercise, especially when they had a set-back such as an injury or holiday. For example, one lady said she had to cease exercise because of a chronic condition, *"but I'm happy to get back in it when the flare up dies down again. And I'm very glad there's always something to go back to"* (F, 67). It appeared that some of the other participants in the group did not require this motivation because they just wanted to exercise no matter what.

iv) Social norm or friendly comparison of PA: The final subtheme specifically related to how being a part of the PA group motivated participants to do more than they would alone, or to work at a greater intensity. This was achieved through the social norm of the group or friendly comparison with others doing a high level of PA and the participant did what they were doing. For example,

"*Another aspect that I thought about then was the activity that I'm doing ... can be quite strenuous, and that is two or three hours so I've got that length of exercise which I probably wouldn't do if I was doing it by myself"* (M, 69).

There were two final factors noted in the coding related to PA adherence specific to these types of voluntary community activity groups. Firstly, there was strong agreement from members that availability of the group programs was at very *low cost* compared to other types of PA options available. They were typically provided by volunteers with a small yearly fee to cover costs. For example, *"the other advantage or the, the good part about it–with, LAC groups. Is the cost, you know? (All participants agreed)…To, such a minimum cost per year. Because it's all voluntary work. And so that's a great advantage really... Because, you know, you just don't mind spending that small amount of money to stay in a group like that"* (M, 67). The second factor mentioned by some people that motivated their continued membership was that the health benefits from the exercise (see next section). See Figure 2 for a diagram of the linkages between these themes

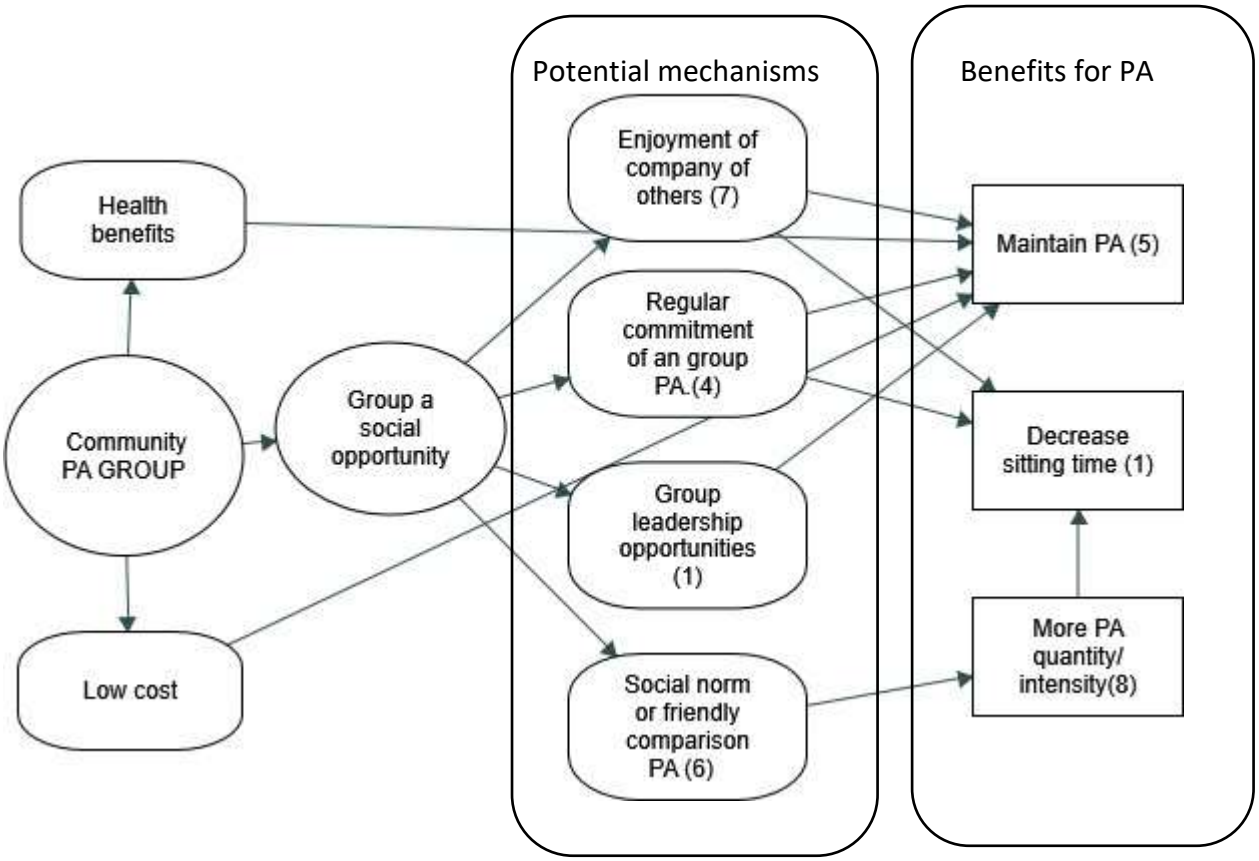

Figure 2. Potential mechanisms linking participation in a PA program and changes in PA

PA benefits from social programs: There were two mentions and moderate agreement in the social focus group discussions that there was potential for social programs to provide PA benefits. The theme was coded as *'new opportunities to do PA'.* The discussions revealed that socialisation in the groups led participants to learn about PA new opportunities both inside and outside of the LAC. This could be considered both a mechanism and a benefit because if the socialisation is accompanied by a supportive environment it may eventually increase PA levels. For example, *"Mixing with other people in other different groups; several of them have said to me, "Why don't you come to our dancing class?" So that's how I found, you know, um, other avenues into the social fabric of where I am and opportunities" (F, 69).*

Physical health benefits of participation in community activity groups

Only PA focus group participants felt that they gained physical benefits from participating in their LAC PA programs. These fell into two major subthemes (see Table 4): *i) improved physical capacity* and *ii) improved general physical health*.

Improved physical capacity was a theme describing benefits of program participation on physical ability such as strength and fitness and this translated into an ease of activity of daily living, feeling better and having more energy. For example,

"*And so I'm very, very active now and just do everything, that's so much easier, whether you're walking or… Whatever you're doing at home, it's just so much easier. You just feel so much better*" (M, 69).

Improved general physical health was mentioned by more than half the participants. In nearly all cases the benefits were not further elaborated, but one person did specifically mention reduced disease burden of an existing chronic condition

"*I needed the health benefits, joys of being diabetic… dancing three or four times a week to here does help keep, keep you active"* (M, 62).

There was reflection by the participants that the perceived benefits of participating in PA at their group was an additional motivator for continued attendance. For example,

"*And the motivator's health, continuing good health as long as you can"* (F, 67).

Psychological health benefits of participation in community activity groups

Focus group participants in both groups discussed a variety of psychological benefits relating to involvement in LAC programs. The FG data revealed six main subthemes; *i) adapt to major life events (such as moving-house, retirement or unwell loved ones) ii) cognitive stimulation iii) improved mental health (general) iv) improved life gratitude/life satisfaction/ or QoL v) stress reduction/relaxation vi) enjoyment (enjoying the activities or company of others in the groups or looking forward to the activities).* The number of mentions of each subtheme can be found in Table 4. Many participants described their reason for joining their LAC and the main benefit of membership as being to help them adapt to a major life event (nine mentions). Both program types appeared to offer this benefit equally. It appears that the PA or social programs offer a *common activity of interest* for connecting socially with others who have similar interests and making new friends at these times of social network flux. For example,

"I've got a new life. [INV: In what way?] . Absolutely. Oh, just meeting people. I'm happier in myself, um, I've l-, I was losing all my dance friends because of my partner because with the Alzheimer's taking over" (F,78 PA) and

"I do find that most of the enquiries I get for the (for joining a LAC) club are from people who have moved to the area. They've moved from interstate to live with their children or be near their children. And they're looking to start a new social life. And a lot of them do come along to our activities and then gradually get to meet other people" (F, 65 social)

ii) Cognitive stimulation was derived predominantly from the activities themselves in ways such as remembering dance steps, learning new skills and mentally challenging games such as Mah-Jong. Though mentioned in both groups, this theme was more prominent in the PA group. For example,

"*But though dancing's such a mental thing too. [M1 Yeah]. To remember all the routines and over toes and all the shaping, and there's just so much to think of all at one time. Uh, so it's good for the brain"* (F,78 PA).

The PA group was the only group to mention benefits of group membership as being good for their *general non-specific mental health* but this difference is likely to reflect a different line of discussion in the two groups. Both groups mentioned specific mental health benefits to a similar degree; these included improved *QoL, reduced stress or relaxation, and enjoyment.* There were a number of reasons given for these benefits including socialising and sharing of experiences. For example,

"*If someone's got a problem with…someone'll say, "Does anyone know how to do this?" and we learn from each other. We have lots of fun, and, um, and, uh, yeah, and we can learn some more crafts. So, yeah, it's, it's really good"* (F, 63).

Discussion

This mixed methods case study examined the potential effect of becoming a member of an existing community activity group on PA levels and quality of life (QoL), comparing any effects associated with participation in physical activity or social activity programs. Qualitative data obtained through focus group interviews assisted with interpretation of quantitative survey data and gave context to the results (65).

The findings of this study suggest that participation in PA programs at an existing community activity group for older adults may assist in maintaining PA levels or motivating older people to do more PA than if they exercised independently. These

programs are likely to offer physical health benefits, related to participation in regular PA. In addition, both social and PA community activity programs appear to offer a variety of psychological benefits. The results from the quantitative and qualitative sections of the study are synthesised in the discussion below.

Whilst the study population was described as 'older adults' the age range of participants in this study was wide, being between 45-80 years. There is a wide variety in what is generally considered as the age cut-off for 'old adults'. The generally agreed definition is 65 years of age, based on usual retirement age (WHO) (5). The United Nations (UN) defines older adult 60 years of age (1). In some cases, such as sport research where physical health limitations may limit ability at a younger age, 50 is considered 'older' (68). The age of participants was not restricted in the study because LAC accepts members from age 45 to encourage people to consider group membership before retirement. The mean age of participants included in the study sits around the accepted definition of older adults by the UN (60). Age was included as a covariate in the analysis.

Physical Activity (PA)

The synthesis of survey and FG findings suggest that the primary benefit offered through attending a PA program at a LAC was to maintain PA levels. The survey results demonstrated that PA levels of the PA program participants remained stable over one-year and the PA levels in the social group appeared to decline; which likely reflects age-related declines in PA (14-17). There was a high degree of variance in PA scores in both groups and this made interpretation challenging with a small sample size. However, the FG study results broadly supported the findings of the survey. The findings complement those from a number of previous, slightly different studies, reporting on the benefits of utilisation of social strategies for physical activity promotion in older adults; which have all reported positive findings. For example, a cross-sectional study of people involved in similar community activity groups as the current study found that older adults who participated physical activity programs had significantly higher outcome expectations for exercise than the social group, although the PA levels were not assessed directly (69). A number of large PA intervention studies for older adults have incorporated community PA programs as an exercise option in addition to individual behavioural motivational strategies and found that the intervention groups had

significantly greater PA than control groups at follow up (48-51). A study that examined the effect of participation in multi-component exercise programs at existing community facilities found that people who took part in these programs had significantly high PA levels than a control group (44). The study not however, mentioned whether socialisation in the group exercise setting was present or promoted as part of the programs.

There was widespread agreement that the group PA environment, social interaction, as well as perceived health and wellbeing benefits from group participation, helped maintain enjoyment and motivation to attend the PA programs each week (see Figure 2). This is in line with past literature. For example, a recent qualitative study found that inactive older men who undertook team sport activity were more likely to continue PA than men in individual sport activity. In line with the present study, they felt the team sport environment improved their motivation for attending through enjoyment of socialisation and relatedness with others (70). This was echoed in a more recent qualitative study of older women where the social connections and support in the group were a reason to 'stick with' their exercise classes (71). Furthermore, a recent systematic review highlighted the importance of a social setting to older adult PA participation (72). This article reviewed 132 qualitative studies on the older adult perspectives of most important influences on their PA levels. In 64% of 84 studies, a key motivator for PA was interaction with peers for both continued motivation and enjoyment of the activity (72).

As mentioned above, the survey study findings indicated that joining a community group PA program maintains but may not increase PA levels in those who are already very physically active, like the participants in this study. However, the FG study results suggest that some people who joined the PA group felt that they did more PA or at a greater intensity than if they exercised alone. A mechanism for this finding was also touched upon in the FGs. Participants felt that being part of the group provided a 'social norm' for PA which was motivating and higher than they achieve alone. This social norm for good behaviour is an established mechanism linking cohesive social groups and good health (73). Although the majority agreed that they needed the group to enable them to do more, some participants didn't agree, reflecting individual differences in perceived benefits of group membership on PA. There are several potential contributors to the lack of observed change in PA over time in the survey study. The first is that the

participants were very active to start with, with 80% meeting international PA guidelines (8), making a significant increase in PA beyond baseline more difficult, particularly for older adults (i.e. a ceiling effect). This has been observed previously in a 12-month study examine the effects in a group-based walking program on PA levels in Australia. The inactive individuals increased their PA over 12-months, but the active individuals maintained their PA levels (74). Another 20-week community-based PA intervention study using weekly group support meetings(without exercise) and individual exercise found that the participants with lowest initial PA levels had the largest gains in PA as a result the intervention (49). The use of a self-report measure of PA may have also added error into the quantitative results. It is well-known that self—report scales are less accurate than objective measures such as accelerometers due to factors such as recall bias (74). A recent factorial study found that interpersonal strategies (e.g. SSPA, incorporating PA into social routines) were effective in increasing the PA levels of sedentary adults compared to no intervention. However, this change was only evident in objectively measured PA levels and not when using a self-reported PA scale (28). Thus, it is possible that the self-report method used for PA reporting in the current study, was not sensitive enough for the small numbers in this sample or the likely small changes that would have occurred due to the active baseline.

One interesting and unexpected FG finding from the current study was that some people in the social group gained PA benefits from joining their LAC through finding out about other PA opportunities from fellow LAC participants. This is a particularly useful benefit of offering both social and PA activities at one organisation. The novel benefit of being part of a large diverse club offering both PA and non-PA type activities, that would not be possible in single-activity clubs, has not been previously identified in the research literature.

Physical health-related quality of life

Physical health-related quality of life (HR QoL) was significantly higher at baseline in the PA group than the social group. This is in line with a cross-sectional study investigating the impact of similar community groups in the UK, which also found that physical HR QoL was higher in people who took part in PA groups compared to social groups (68). It is likely that people who are in better physical health are likely to join PA program and people with poorer health may prefer social groups or potentially that

people who naturally enjoy PA and have been active during their lives will gravitate toward physical activity programs. This is evidenced in literature showing that being physically activity through the life-course is a significant predictor of PA in older adults (76). These people would be likely to have better physical health gained through regular PA prior to joining a group.

Synthesising the results of the focus group and survey results suggest that physical health benefits are gained through the PA programs but not necessarily through social programs. The impact of becoming a member on physical HR QoL did not differ over time between groups (i.e. no significant group by time interaction). A significant interaction effect would have confirmed this finding but post-hoc analysis did suggest some group differences may have been present. The lack of strong statistical evidence relating physical HR QoL to group activity is likely to be due to type II error from a small sample. However the focus group discussions suggested that participants perceived that the PA they did at their LAC gave them significant physical health and physical capacity benefits; known to be associated with regular PA (6-8). This contrast in results suggest that larger studies are warranted in future to confirm any association.

In addition to the small sample size limiting the likelihood of observing significant differences between groups, it may also be that some physical benefits can be derived from either kind of program or that membership of such programs increasing time out of home maintain physical function. Other studies have found a significant protective effect of being a member of either hobby groups (social groups) or PA groups, on the onset of disability and against declines in self-rated physical health in older adults when following up over a four-year period (35) and that better physical function is signifcantly related to more time out of home in older adults (77). Mental health-related quality of life

The MCS scores in the survey study did not change significantly over the one-year study in either program group, and there were also no differences in change over the one year between groups. However, focus group participants felt that both social and PA programs provide a number of mental health benefits. One factor that may have prevented seeing any significant increase in MCS scores in the first year after joining a LAC was that participants already reported good mental health-related quality of life (HR QoL) at baseline, making further improvements less likely (a ceiling effect).

Another option is that participation in these kinds of group programs may maintain mental HR QoL or subjective wellbeing. This was confirmed by the focus group discussions. These findings confirm past research, which has consistently found that either social activity or physical activity participation can be beneficial for protecting against declining mental health (including depression) and promoting good quality of life in older adults (68, 78, 79). Some of the benefits discussed by participants of the focus groups in this study included adaptation to major life events, activity based cognitive stimulation, improved QoL and stress reduction, activity enjoyment, and socialisation. These have been noted as being valuable for older adults and likely to be associated with better wellbeing (80,81) and an ability to age 'Actively' or 'Successfully' (5).

This study adds to the literature around the benefits for physical activity, physical and mental HR QoL through participation in multi-activity community groups for older adults. It suggests that group PA programs in such organisations may assist with maintenance of and possibly increasing PA levels of older adults, especially when they require new avenues for social participation (e.g. after moving or retiring). It would be worthwhile investigating if the same associations would be observed in participants with low physical activity levels or who are initially inactive. In relation to physical health-related QoL, the LAC PA programs appear to offer benefits in line with undertaking regular PA. A larger sample size would be recommended to investigate this in future studies because the results of the survey study were not conclusive. There was also some support from the synthesised results that participation in these kinds of groups may maintain mental health-related QoL compared to not being involved in any group and larger studies are warranted.

Strengths and limitations of the study

This mixed-method case study combined a longitudinal quantitative study with qualitative FG discussions. The strength of this approach was that observations relating to the variables of interest (PA, and physical and mental HR QoL) could be explained, contextualised or expanded upon with the qualitative data. This was particularly beneficial in this study where the quantitative data suffered from limited power due to a small sample size, caused by recruitment difficulties common to observational studies. The primary problems faced during recruitment for the study Recruitment challenges in

this study included fewer than expected new members joining LACVI during the period of recruitment and a lower than anticipated rate of promotion of the study by some of the individual LAC clubs, resulting in low take up by new members of LACs to the study. These factors were considered in planning for the study but the impact of each factor was impossible to determine initially. It was challenging to increase recruitment without comprising the ethics of the study and co-ercing participants to take part. The recruitment period was increased to two years from an initial planned one year. The focus group discussions were able to illuminate program impacts not observed in the survey study, further reinforcing the possibility that the lack of results in the survey study may have been more to do with sample size rather than lack of program impact. Embedding the research in an existing community organisation was a major strength of this study. The real-life setting allowed us to evaluate whether existing programs can be effective with the types of people who naturally choose them. In our case, with an interest in the different impact of two types of groups (PA and Social), this was particularly relevant because people with different interests may choose these two groups but the effect of individual preferences on results would have been lost in a more controlled or randomised setting (82). The real life setting also made it low cost and made drop-out very low, as people were already choosing to join the club. However, there are also clear limitations of a self-selecting participant group. People who chose to take part in the study were already quite active and reported good health-related QoL and were not isolated. This made it more difficult to evaluate whether these organisations may increase PA and QoL in inactive older adults or those who are harder to reach and not naturally inclined to join a community organisation. It also means that the findings can only really be generalised to club seekers of similar organisations (84). Future studies expanding on this work would aim to explore how to encourage people who are less active and not club seekers to these programs. Self-selection also meant that more women than men took part.

The sophisticated statistical analyses of the survey data are another strength of the study as the linear mixed models allowed for inclusion of cases with missing data in the analysis. As mentioned earlier in the discussion, use of self-report surveys is a limitation of this study, especially in relation to PA estimations. It is well known that self-report surveys may suffer from recall bias due to a reliance on memory and subjective nature of interpretation of the questions. This is especially the case in older people (83).

Objective markers of PA such as accelerometer are more accurate in assessing PA levels. This was evidenced in the large standard errors and interquartile range in our study, which made detection of any statistically significant changes in PA levels over time in small sample group difficult. The use of objective measures such as accelerometers would have been preferable in a small sample because they have better accuracy. Unfortunately, resource and practical constraints made this impossible.

Because the study involved LAC members volunteering for the study there was a degree of self-selection and this would have impacted results also. For example, fewer men chose to take part than women.

The purpose of this study was to examine the potential effect of becoming a member of an existing community activity group on PA levels and quality of life (QoL), comparing any effects associated with participation in physical activity or social activity programs. The lack of existing evidence in the field meant that a small case study provided a good sounding-board for future larger scale research on the topic. Owing to the particularistic nature of case studies, it can also be difficult to generalise to other types of organisations or groups unless there is a great deal of similarity between them (84). There are however, other types of community organisations in existence that have a similar structure to LACVI (Seniors centres (26), University of the Third Age (36), Japanese salons (85), and it may be that the results from this study are transferable to these also.

Directions for future research

The results of this small study were promising and suggest that future larger studies would be warranted to evaluate existing multi-activity community groups for older adults on a larger scale. The population group in this study was already quite physically active, therefore it would be beneficial to assess if community organisations for older adults may also assist inactive older adults. This would probably require a specific strategy for recruitment of inactive participants to the organisations. The case study nature of the research made generalisability difficult, so it would be beneficial to expand the qualitative and quantitative studies to include other types of community organisations to investigate if this finding is indeed generalizable outside LACVI. We would recommend use of objective PA measurements (e.g. accelerometers) if possible

to accurately collect PA data. Sex-stratified FGs would also be beneficial to investigate whether there are any differences that exist between men and women.

Given the novel finding that social relationships developed in social programs may encourage previously inactive people to try new things such as physical activities, there may also be scope for interventions to gently introduce opportunities to do PA within the same organisation. One option may be for members of PA programs to join some social programs and gently promote another, low impact enjoyable activity such as social walking or dancing available through the same organisation.

Conclusion

With an ageing population it is important to investigate ways to enable older adults to age successfully to ensure optimal QoL. Community activity programs offering group physical activities may maintain PA levels in older adults. It appears that either social or PA groups may also offer benefits to maintain good perceived physical health and mental health-related QoL in older adults through socialisation and enjoyment. In conclusion, ageing policy and strategies should consider community activity groups for older adults as potential low-cost and sustainable options for promoting PA and QoL for older adults.

Abbreviations

LAC – Life Activities Club
LACVI – Life Activities Clubs Victoria
LMM – linear mixed model
FG – focus group
PA- Physical activity
WHO – World Health Organisation
QoL – Quality of life
HR QoL – Health-related quality of life
PCS- Physical health component of SF-12
MCS- mental health component of SF-12
AR1 –First-order autoregressive correlation structure
IQR- Interquartile range

M- mean

SE – standard error

Declarations

Ethics approval and consent to participate

Ethics approval to conduct this study was obtained from the Victoria University Human Research Ethics Committee (HRE14-071 [survey] and HRE15-291 [focus groups]). All survey participants provided informed consent to partake in the study prior to undertaking the first survey by clicking ‘agree’ in the survey software (online participants) or signing a written consent form (paper participants) after they had read all participant information relating to the study. Focus group participants also completed a written consent form after reading and understanding all participant information regarding the study.

Consent to publish

Focus group participants have given permission for their quotes to be used in de-identified form prior to undertaking the research.

Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due the ethics approval for this study not allowing open access to the individual participant data but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' Contributions

GLS, RE and JVU made substantial contributions to the conception and design of the study. GLS and GOS supervised data collection for the surveys (GLS) and focus groups (GOS and GLS). GLS, GOS, RE, JH and JVU were involved in data analysis and interpretation. All authors were involved in drafting, the manuscript and approved the final version.

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Chapter 7 Important Psychosocial Factors for Subjective Wellbeing in Older Adults Engaged in Community Groups: A Qualitative Comparison of Social and Physical Activity Programs

This Chapter provides findings relating to the qualitative study undertaken for this program of research. Specifically, the focus of the study was to explore the perceptions of older adult participants of community activity groups around benefits of membership of social and physical activity programs. The study incorporated perceptions of members of Life Activities Clubs as well as a number of other groups included Men's Shed, University of the Third Age and Keeneagers Table Tennis groups. The data from this study were analysed exploring the mechanisms for wellbeing associated with community activity group membership. Detachment/Recovery, 2) Autonomy, 3) Mastery, 4) Meaning And 5) Affiliation (DRAMMA) model of subjective wellbeing through leisure was utilised as a framework for the qualitative analysis for this study.

The paper in this chapter contributes to answering the second research sub-question of this program of research which is: *What is the potential role of community groups for older adults offering a socially supportive environment in improving physical activity, health and wellbeing?*

The following paper: *Important Psychosocial Factors for Subjective Wellbeing In Older Adults Engaged in Community Groups: A Qualitative Comparison of Social and Physical Activity Programs* by Gabrielle Lindsay-Smith, Grant O'Sullivan, Rochelle Eime and Jannique G. Z. van Uffelen is currently under review with the Journal of Aging and Physical Activity (submitted on 17 January, 2019)

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GRADUATE RESEARCH CENTRE

DECLARATION OF CO-AUTHORSHIP AND CO-CONTRIBUTION: PAPERS INCORPORATED IN THESIS BY PUBLICATION

This declaration is to be completed for each conjointly authored publication and placed at the beginning of the thesis chapter in which the publication appears.

1. PUBLICATION DETAILS (to be completed by the candidate)

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College:	College of Sport and Exercise Science
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2. CANDIDATE DECLARATION

I declare that the publication above meets the requirements to be included in the thesis as outlined in the HDR Policy and related Procedures – policy.vu.edu.au.

[redacted]	28/2/19
Signature	Date

3. CO-AUTHOR(S) DECLARATION

In the case of the above publication, the following authors contributed to the work as follows:

The undersigned certify that:

1. They meet criteria for authorship in that they have participated in the conception, execution or interpretation of at least that part of the publication in their field of expertise;
2. They take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. There are no other authors of the publication according to these criteria;
4. Potential conflicts of interest have been disclosed to a) granting bodies, b) the editor or publisher of journals or other publications, and c) the head of the responsible academic unit; and

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5. The original data will be held for at least five years from the date indicated below and is stored at the following **location(s)**:

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Name(s) of Co-Author(s)	Contribution (%)	Nature of Contribution	Signature	Date
Jannique van Ulfelen	5	Study design, and manuscript preparation	[redacted]	28/2/19
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Important Psychosocial Factors for Subjective Wellbeing in Older Adults Engaged In Community Groups: A Qualitative Comparison Of Social And Physical Activity Programs

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Brief running head – Wellbeing through older adult community programs.

Declarations

Ethics approval and consent to participate

Ethics approval to conduct this study was obtained from the Victoria University Human Research Ethics Committee (HRE15-291). Focus group participants completed a written consent form after reading and understanding all participant information regarding the study.

Consent to publish

Focus group participants have given permission for their quotes to be used in de-identified form prior to undertaking the research.

Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due the ethics approval for this study not allowing open access to the individual participant data but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' Contributions

GLS, RE and JVU made substantial contributions to the conception and design of the study. GLS and GOS supervised data collection for the focus groups. GLS, GOS, RE, and JVU were involved in data analysis and interpretation. All authors were involved in drafting, the manuscript and approved the final version.

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Abstract

Objectives: Community leisure activities may positively influence subjective wellbeing in older adults. Key psychosocial factors to incorporate to maximize the effectiveness of these programs is not fully understood. **Method:** This qualitative study was conducted with 24 older adult members of community organisations in Victoria, Australia utilizing semi-structured focus groups analysed thematically. A purposive sample was collected to compare factors relating to wellbeing in social or physical programs. Initial themes were compared to a five-part model shown to be relevant in general populations: 1)Detachment/Recovery, 2)Autonomy, 3)Mastery, 4)Meaning and 5)Affiliation(DRAMMA). **Results:** All DRAMMA mechanisms were provided through social or physical activity programs with some variation between programs. Unique older-adult specific subthemes were present within each mechanism. Affiliation appears to be a particular important factor for older adults. **Conclusion:** Consideration of the DRAMMA mechanisms when planning community leisure programs for older adults may increase their effectiveness for improving wellbeing.

Keywords: Community group, retirement, program evaluation, Active Ageing

Introduction

Ageing Population and Successful Ageing

With an ageing population, there is an increasing prevalence of chronic illness and disability, and a concomitant rise in demand on health care systems. Although physical health is important for ageing well, older adults view psycho-social factors such as self-perceived wellbeing, life satisfaction, doing something of value and social connectedness as being at least as important for their overall wellbeing (Bowling & Dieppe, 2005; Phelan et al., 2004; Song & Kong, 2015; Tate et al., 2003). As such, researchers and public health officials have sought broader descriptions of wellbeing outside the absence of illness and impairment and are incorporated into descriptions such as "successful ageing"(Rowe & Kahn, 1997) and "healthy ageing" (World Health Organisation, 2015). For instance, "healthy ageing" is defined as "the process of developing and maintaining the functional ability (a combination of intrinsic capacity, physical and social environmental characteristics), that enables well-being in older age" (World Health Organisation, 2015; p28). With 'healthy' and 'successful' ageing definitions and older adults themselves both emphasising self-perceived wellbeing as being important, it is clearly a key factor for ageing well.

Subjective Wellbeing and Older Adults

Subjective wellbeing (SWB) is a multifaceted concept reflecting a combination of an individual's life satisfaction, evaluation of domain specific factors such as relationships and work, and positive and negative affect (moods or emotions) (Diener and Suh 1998). SWB appears to both be influenced by health and influence it, especially in older adults (Wikman et al., 2011; Steptoe et al., 2012). The presence of chronic illness reduces SWB, with more chronic illnesses increasing the risk of experiencing lower quality of life and less happiness in older adults (Wikman et al., 2011). In addition, good self-perceived health is a predictor of higher positive affect in older adults (Gana et al., 2015). There is also strong support that all three main aspects of SWB (positive and negative affect and life satisfaction) are strong influencers of health and longevity (Steptoe et al., 2012; Diener & Chan, 2011). Therefore, it is important to promote good SWB in older adults.

The Association Between Subjective Wellbeing and Participation in Leisure Activities In Older Adults

With SWB contributing to older adults living "successful" lives, it is important to determine the most appropriate ways to enable good SWB in this age group. Leisure activities are relevant to consider as participation in these can improve SWB in the general population (Stebbins, 2018) and in older adults specifically (Lera-López et al., 2017; Zhang et al., 2017; Ku et al., 2016). Because older adults have more time to spend in leisure, it is likely that leisure is even more important for SWB in this population group. Studies examining leisure and SWB have found that retired older adults have a stronger association between leisure engagement and SWB than their working colleagues (Kuykendall et al., 2015) and that the SWB leisure association strengthens with age (Nimrod & Shrira, 2016). It appears that social and physical activity leisure activities are particularly beneficial for SWB in older adults (Alidoust et al., 2019; Bøen et al., 2012 ; Zhang et al., 2017).

How Does Participation in Leisure Actvities Improve Subjective Wellbeing? The DRAMMA Model

There a number of psychological mechanisms which may explain the positive association between leisure and SWB, which are derived from both general and gerontological wellbeing theories (see appendix 1). Newman and Colleagues systematically evaluated the related theories and evidence to develop a model encompassing the key psychological mechanisms, and showed that these mechanisms could be interpreted as potential mediating factors relating leisure to SWB (Newman et al. 2014). The process involved a systematic review (SR) of SWB and leisure literature, followed by culmination of mechanisms identified in studies where theories were utilised and a final testing of the model with a subset of studies from the SR. The final model included five overarching mechanisms linking leisure to SWB: 1) Detachment/Recovery, 2) Autonomy, 3) Mastery, 4) Meaning And 5) Affiliation (DRAMMA).

Detachment/recovery

Drawn from the field of work psychology, detachment/recovery describes the importance of leisure time for rebuilding psychological and physical resources and

satisfying other needs that cannot be meet during work time. For example, leisure activities can reduce stress and increase SWB in working adults (Korpela & Kinnunen, 2010; Sonnentag & Niessen, 2008; Sonnentag & Zijlstra, 2006). Time-use in one's day significantly changes upon retirement or reduction of work in older age. Work time significantly declines and home duties and chores, screen time and quiet time significantly increases (Olds et al., 2018). Detachment/recovery in an older population group may relate to how leisure assists in detaching from these duties or experiences to improve their SWB. Some older adults participate in community PA programs as they feel this provides a means of 'escape' (Killingback et al., 2017) and there is also strong evidence that time spent in nature(which would probably stimulate detachment or recovery) is beneficial for SWB in older adults (Jansen, 2008; Hawkins et al., 2011). However, there is very little direct evidence around how detachment may play out in older retired or semi-retired individuals and how it impacts SWB, suggesting further investigation is warranted.

Autonomy

The mechanism of autonomy suggests that when activities are intrinsically or autonomously motivated, that is undertaken by choice and for enjoyment, they can improve SWB (Deci & Ryan, 1985). SWB (Dattilo et al. 2018), and higher self-determination(autonomy) in leisure has been linked to lower depression and lower distress and stress in cross sectional studies with older adults (Narushima et al., 2016; Chang 2017).

Mastery

Mastery can be defined as putting effort into developing new or existing skills, or achieving goals. Where autonomy relates to the availability of choice within activity, mastery relates to challenge provided by an activity (Newman et al., 2014). Participating in social leisure activities can be positively associated with higher levels of mastery, and mastery positively related to retirement adjustment (Earl et al., 2015) and SWB in older adults (Narushima et al., 2016; Jenkins & Mostafa, 2015; Heo et al., 2018).

Meaning

In the leisure context meaning is defined as allowing one to achieve something that perceive to be valuable (Iwasaki 2008). As people age, doing activities that are meaningful is likely to become increasingly important for their wellbeing (Activity Theory,Havighurst, 1961). The benefit of being involved in meaningful leisure for SWB in older adults has been supported by a number of studies, with leisure satisfaction and leisure meaningfulness being negatively associated with depressive symptoms (Lu 2011), and higher satisfaction with leisure activities at the time of retirement being associated with greater positive affect in men but not women (Ryser a& Wernli, 2017).There is also a growing body of evidence in support of serious leisure pursuits being beneficial for SWB in older adults (Yang et al., 2018; Heo et al., 2018).

Affiliation

Affiliation is sense of belonging or connection with others and Newman and colleagues argue that social leisure activities rather than solitary activities better meet our requirements for affiliation and therefore are more beneficial for SWB (Newman et al., 2014). The importance of affiliation for SWB has been supported in studies with the general population as well as older adults. A greater number of positive exchanges with friends is positively associated with greater positive affect in all age groups (Windsor & Anstey, 2010). Giving and receiving social support have both been found to be associated with lower levels of stress in older adults (Chang, 2017). Finally, a systematic review of the social needs of older adults reported that staying active by participating in social leisure activities satisfies social needs in these people. Feelings of connectedness to others and to a community or neighbourhood contributes to wellbeing (Bruggencate et al., 2017).

As seen above, there is some evidence for most of the mechanisms of the DRAMMA model (except Detachment) and their association with SWB individually, but there has not yet been a study utilising the DRAMMA model to explore the mechanisms by which leisure impacts SWB in older adults.

Physical Activity Compared to Social Leisure for SWB in Older Adults

Research shows that physical and social leisure activities can both improve SWB (Yang et al., 2018; Heo et al., 2014; Dupuis & Alzheimer, 2008; Cheng & Pegg, 2016; Broughton et al., 2017). A cross-sectional study found that participation in social activities was a better predictor of positive affect in older retirees than light or vigorous PA (Earl et al., 2015). However, that study did not take into consideration whether physical activities were done in a social or individual environment. Another study (Lindsay-Smith et al., 2018) found that both types of leisure activity appear to be beneficial for SWB. There are no studies that we know of comparing whether the mechanisms linking physical and social leisure to SWB are the same. This study aims to fill this gap by exploring these issues.

In order to provide a holistic view of the mechanisms associated with SWB in older adults involved in community PA and social groups, the aim of this study was to:

- Explore which DRAMMA model mechanisms for SWB are identified by older adults when discussing their participation in social and PA community programs
- Explore how social and physical based activity programs for older adults differ in the types of DRAMMA mechanisms identified by participants

Methods

Theoretical Framework

This study forms part of a larger program of research, which takes a pragmatic standpoint to evaluating the impact of community groups for older adults on their health, wellbeing and PA. Appropriate to the overall epistemology of the research this particular study took the form of a generic qualitative enquiry seeking insights to inform action. With a pragmatic standpoint we have made pragmatic decisions relating to real-world constraints (including time, recruitment issues and resource limitations) (Patton, 2015).

Participants and Recruitment

A stratified purposive sample of 24 older adults from Melbourne, Australia took part in the focus group study. They were recruited through a number of methods including

being part of the wider study mentioned above and responding to an email bulletin from LACVI to their mailing list of LACI members and members of the general public who had previously contacted the organisation. Typical of recruitment of older adults to ageing research (Mody et al., 2008) and especially studies including PA (Rogers et. al., 2014), recruiting participants for this study was difficult and time consuming and initially males were under-represented. A men's group was invited participate in the study to increase representation of men's views in the study. The resulting sample was still smaller than would be ideal.

Four focus groups conducted and contained between five and seven members. Two focus groups represented community-run social activity programs (e.g. book groups, social groups, creative or productive activities such as woodwork or cultural groups) and two represented PA-focused programs (e.g. e.g. walking groups, tennis, cycling). The demographic information for each focus group is presented in table 1.

Table 1. Sociodemographic and health characteristics of participants

		FG1	FG2	FG3	FG4
Program type		PA	PA	Social	Social
Community Group/s		Live longer live stronger, walking, orienteering, U3A	Life Activities Clubs Victoria	Life Activities Clubs Victoria	Men's shed
		n	n	n	n
Age	55 to 69	2	5	3	3
	70 to 79	4	1	2	4
Sex	Female	5	4	5	0
	Male	1	2	0	7
Education	Primary school and/or some high school /Trade cert	0	4	1	6

	Completed high school	1	1	2	0
	University	5	1	2	1
Main occupation	Manager	2	2	0	2
	Professional	2	1	3	2
	Clerical	2	3	2	1
	Tradesperson	0	0	0	2
Current employment	Part-time	0	1	1	0
	Retired	6	5	4	7
Ability to manage on income	Difficult some of the time	2	3	0	2
	Not too bad/easy	4	3	5	5
Marital status	Not married	3	4	2	0
	Widowed	2	0	2	0
	Married	1	2	1	7
Ethnicity	Australian/NZ	6	5	4	4
	UK/Europe	0	1	1	3

Procedure

The data for this study were collected in 2016. Following ethics approval, new and existing members from several Victorian community organisations that included physical activities and/or social activities for older adults were invited to take part in a focus group study investigating the association between membership of such organisations and wellbeing in older adults. The focus groups were divided by activity and/or gender where possible and this gave two mixed gender groups, one female group and one men's group (see Table 1). The goal of this division was to assist participants in feeling a sense of commonality with other members and improve group dynamic and

participation (Loeb et al. 2006). All participants provided informed consent to partake in the study prior to undertaking the focus group.

The focus group interviews were facilitated by one researcher (GLS), who had been trained in undertaking focus groups. Notes around non-verbal communication, moments of divergence and convergence amongst group members, and other notable items were taken by a second researcher (GOS) who had significant experience conducting qualitative research. Participants were encouraged to introduce themselves and their activities to the other members of the group at the beginning of the session to develop trust and rapport amongst the group and with the researchers (Loeb et al. 2006). Each focus group took approximately 90 minutes. Both researchers wrote additional notes after the focus groups to be used in the analysis of themes. Focus groups were audio recorded and later transcribed verbatim by a professional transcriptionist. The transcriptionist identified each focus group participant so themes for individuals or other age or gender specific trends could be identified. Participant names were then changed to pseudonyms to ensure overall confidentiality.

Ethics approval to conduct this study was obtained from the Victoria University Human Research Ethics Committee (HRE15-291). All participants provided written informed consent to partake in the study prior to undertaking a focus group.

Interview guide

A semi-structured interview guide was used for this study, with questions kept broad to encourage free discussion around how programs impacted group members. This included questions around motivation for joining community group programs, how they impact health, PA levels, social environment and other ways that being a member of the program impacts their lives.

Analysis

Transcripts of the focus group interviews were analysed using thematic analysis in three parts. Part 1 utilised a deductive/theoretical approach by coding all mentions of benefits of program membership using the five DRAMMA psychological mechanisms (Newman et al., 2014). DRAMMA mechanisms were coded within the transcripts whenever they were mentioned in relation to participation in group programs. In part two, we used a deductive approach to investigate the subthemes within each of the five mechanisms. In

part three we inductively assessed the nature of the discussions around the DRAMMA themes and subthemes and how they were similar or different between the two program types or any other differences in discussion that were noted (e.g. between sexes).

One researcher reviewed each transcription to check for any errors and made any required modifications before saving final versions of the text for analysis. Each transcription was read a number of times for familiarity before coding. Analytic rigour in the qualitative analysis was ensured through source and analyst triangulation (Patton 2015). Transcriptions were compared to notes taken during the focus groups by the researchers (GLS, GOS). In addition, initial coding and themes (GLS) were checked by a second researcher (GOS) and any disagreements regarding coding and themes were discussed in order to find consensus on final codes and themes.

Results

The DRAMMA Subjective Wellbeing Mechanisms Identified in Social and Physical Activity Based Programs for Older Adults

Analysis of the focus group discussions identified each of the five DRAMMA mechanisms as major themes in both social and PA groups. Within the themes there were a number of subthemes, reflecting how each mechanism was specifically relevant to older adults undertaking leisure activities (see Figure 1).

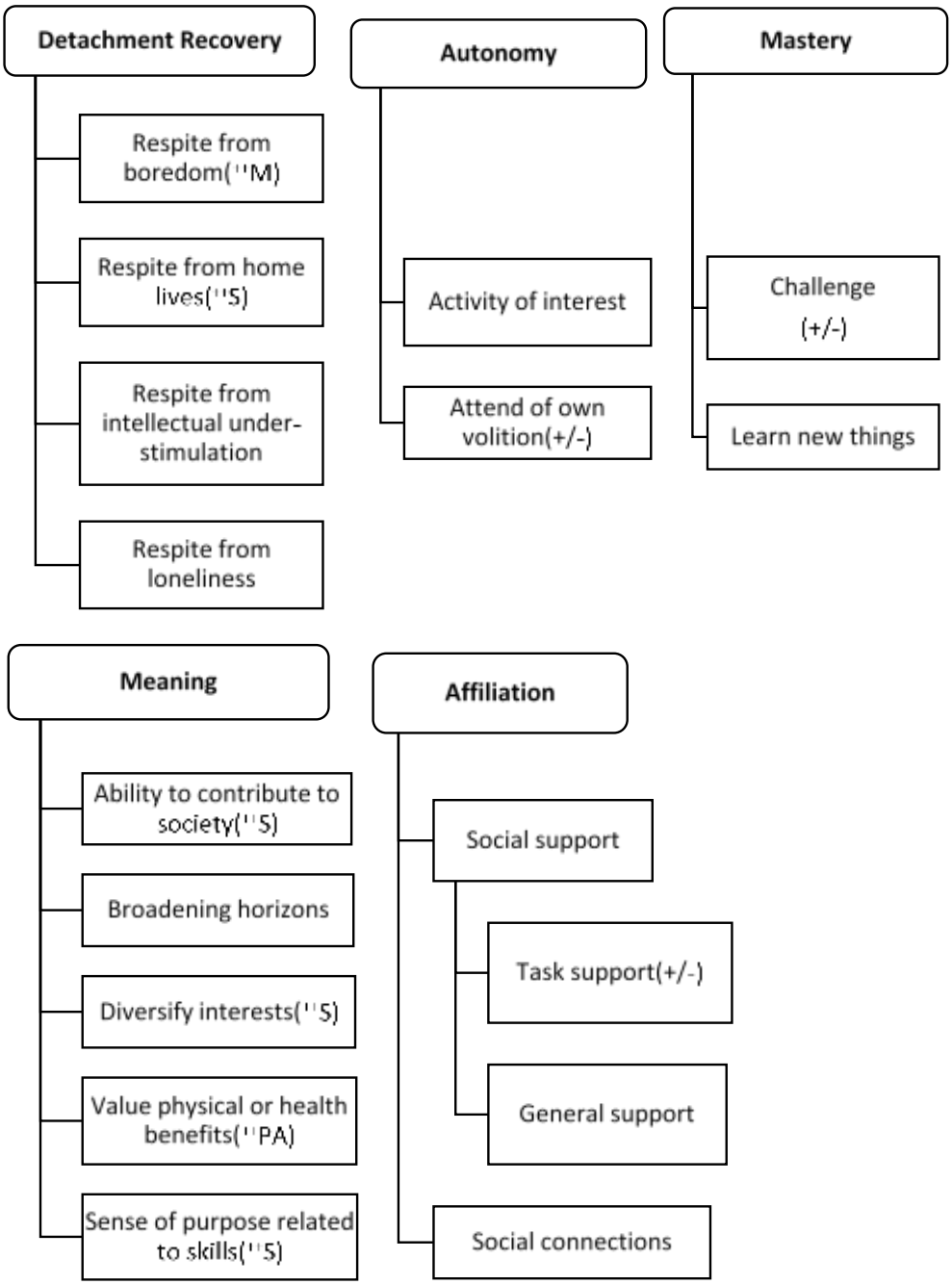

Figure 1. Themes and subthemes of focus groups relating to DRAMMA mechanisms

Legend: Subthemes with no additional script are the same for both group. $^{++}$*S = predominantly in social group,* $^{++}$*PA=predominantly in PA group,* $^{++}$*M = predominantly in men, +/- =present in both groups, in different ways*

Detachment / Recovery

Although the majority of the focus group participants were retired (92%), detachment/recovery was still a very important theme. It was identified as a way to break the monotony of retirement in some way or make life interesting. In this case 'work' was in fact daily lives, which may have involved daily house work or daily routines of solitary time or time with close family members. Four sub-themes were identified by older adults: i) Respite from boredom, ii) Respite from home lives, iii) Respite from intellectual under-stimulation, iv) Respite from loneliness.

i) Respite from boredom

Participants felt that both social and PA programs, provide something to do to break up the monotony of days during retirement, and give them something to look forward to. Although this was the case for women and men, it seemed more prominent amongst men, as it was discussed at great length by men in both social and PA groups. For example a man in one of the social groups said

"A friend of mine was there and said, "Why don't you come down?" and .....I was wandering around at home with not a lot to do and, yeah, it was good."

ii) Respite from home lives

Participants in both social and PA groups, sometimes felt that program participation allowed them an escape from their own (possibly stressful/difficult) personal lives. However, women appeared to find the group helpful for respite from stress or difficulty, whereas, for men, the respite was a change from spending all their time with their partners. A female in the social group said:

"it's lovely to just, sit down, enjoy everyone's company and be accepted. .. And, have a relaxing time, and then go home to reality afterwards,."

A male in the PA group said:

"after about three years, my wife and I joined the different clubs and, ..would have been a bit of friction before that, because we were home most of the time together."

iii) Respite from intellectual under-stimulation:

It was common for participants in both the PA and social groups to describe programs as adding mental stimulation to their lives. This appeared to occur in two main ways*:* 1)

stimulation through sharing ideas with others and 2) the activity itself is stimulating (such as dancing, or learning a new skill). For example one man said

"Gives you something to focus on … if you've got a project, you go home, you think about how you're gonna put it together and, think of all the options that we might take in doing it, and, involving other people with it that, .. you come in. You say, "Oh, I think I'll try this," and they say, "Oh, no, here's a better idea and so.. .. you're learning from, uh, cross education."

iv) Respite from loneliness

Many participants in both the social and PA groups, felt that the programs allow them to spend time with other people rather than being alone or only with their spouse. This was especially relevant after a major life event such as retiring, moving house or loved ones becoming unwell. One male in the PA group said:

*"I just saw work as a collection of, um, colleagues as opposed to friends. I had a few good friends there. Most were simply colleagues or acquaintances. But what I did miss was the interaction with other people. It had simply gone. That intervening period was, oh, a couple of months. That was a bit tough. But in that time the people in LAC and the people in U3A …group just drew me into more things. Got to know more people. So once again, yeah, reasonable group of acquaintances."(*M, 62)

Autonomy

This theme captured how the participants were appreciative when they had choice relating to program activities. Discussions relating to autonomy in these groups of older adults centred around two subthemes: i) Activity of interest and ii) Attend of own volition.

i) Activity of interest

This subtheme refers to the activity itself being enjoyable and therefore participants look forward to attending. The activity may be something that they continued to do from when they were younger, or it could be a new activity that they are trying. in both social and PA groups participants were either doing the activity because they were interested in the activity itself, or they were using the activity to meet other people. Once the activity was initiated, the social aspect of the activities was one of the primary reasons why people would continue going. For example, one woman said:

"the motivation was to get back, but in the meantime my partner had the Alzheimer's and he'd had a knee replacement and cancer, and so I was sort of looking after him ….. So that was all about me …getting back ..and not being a burden to my kids. …, ., I just needed to look out for me. that was all the motivation I needed, so I went, went to gym and I did weights … within my limitations–. … … and, ., once I got back dancing there was no stopping me."

ii) Attend of own volition:

This subtheme reflects the benefits of being free to determine when to attend activities and select from multiple activity options. The PA and social groups discussed this subtheme differently.

There was discussion, with much agreement in one of the PA focus groups around perceived health benefits of the activity motivating attendance at the programs:

"Oh, it's health (F1) (Agreement) "Yeah. -you know, if you haven't, been to the gym for a while .. been away doing something else, you just feel, ….."(F2) "Sluggish or–.(F3) "Sluggish. .. you roll up tired and you think, ooh, yuh, how many squats do I have to do here, but as soon as you leave you feel … You feel alive. You feel awake, and you feel better able to, you know, just face whatever the day brings"(F2).

In the social groups this theme was discussed differently. The participants appreciated flexibility in the type of activities that were offered, such as the availability of sessions where they could try new things. The men's shed group especially appreciated being able to come and go as they please with no pressure to commit to anything, seen in this example:

"But all that's generally great points about this organization, you come and you go as you please. [much agreement amongst the group]. There's no pressure on anybody to perform in any particular area. If you feel like doing something, you do. If you don't, you don't."(M)

Mastery

Mastery experiences included activities that challenged individuals and provided learning opportunities and were discussed in all the focus groups. This mechanism was demonstrated in two ways: i) Challenge and ii) Learn new things.

i) Challenge:

Many participants described that the activity itself provided some sense of participatory challenge, but descriptions differed between PA and social groups.

PA groups discussed that the programs challenged them to stay healthy or that the activity was mentally or physically challenging. This included remembering dancing steps, or the group atmosphere encouraging members to push themselves harder physically. For example, one male in the PA group said:

"*the activity that I'm doing, you know, is, can be quite strenuous, and that is Thursdays is two or three hours so I've got that length of exercise which I probably wouldn't do if I was doing it by myself."*

Some social programs developed existing or new skills and potentially offered the challenge of teaching one another activities such as knitting, sewing, craft, woodworking, playing music, book groups. For example

"recently joined the xxx here which is giving me a, learning curve really because the boys here are so skilled that I find it, it's fantastic for me and gives me a great interest" (M, social)

ii) Learn new things

Both social and PA focus groups discussed how their activity programs provide opportunity to learn or try new things. This included discussion of the importance of broadening knowledge through diversity of social contact, and the ability to try new activities that develop new or existing skills.

"when you're retired, you can easily think, "Oh, well, great, I don't have to do that anymore. I don't have to keep learning," but it's a sort of stultifying part if you don't do that, and if you keep learning new things, new experiences, then you feel vibrant and alive."(F, PA)

Meaning

There were many ways that the PA and social programs could be meaningful to older adults, and it was the most richly discussed of the themes, with five subthemes. These were i) Ability to contribute to society, ii) Broadening horizons, iii) Diversify interests, iv) Value physical or health benefits and v) Sense of purpose related to skills. There was

discussion amongst members in all the focus groups around meaning gained from their program in one or more of the above subthemes.

i) Ability to contribute to society.

The older adults discussed the importance of their leisure activities somehow enabling them to contribute to society or helping people in some way, but there were some differences between the PA and social groups, with it being more prominent in social group discussions.

This subtheme not widely discussed in the PA group, with only one mention. One female participant had an administrative duty for her club. Rather than being directly related to PA activities, it was related to the opportunities of being a member of a volunteer-run club in general. She said:

"I prepare the calendar of events for the club. And because of that I go on the internet to see what's going on in the area and just have one page to talk about other things.., just that sharing information and then occasionally we get a, "Oh, I went to that, xxx I wouldn't have gone to it if you hadn't put it in the newsletter."

The Men's Shed focus group discussed that they valued being able to contribute to society through the programs. For example, making woodworking projects for the local community. For example:

"the fact that we get an awful lot of raw materials come through the door, the vast majority of that stuff ends up back out in the community. And there's something really quite gratifying in that…When you take a bunch of stuff to, uh, a kindergarten and all the kids are lined up and… And it's just magical. .. So the, there's, there's a real good feeling about that."(M1).

ii) Broadening horizons

This subtheme relates to how program activities or the social aspect of the programs can provide a way to help broaden participants outlook on life or perspectives.

Both types of groups reflected that being a member allowed them to diversify their social network and meet people they may not normally meet. Some felt that this broadens their concepts of life, including making them feel lucky for what they have compared to others. For example;

"I generally just meet people from different walks of life, and you realize, how lucky you are to have what you've got. Compared to what other people have got .. not just monetary-wise but health-wise, um, sometimes you hear about their different life and you think, "Well, I thought my life was pretty bad, but I think their's might have been worse."(F, social)

iii) Diversify interests

Participants valued how the clubs provided them with a broader range of interests than they would have considered before, and this mainly centered around them having another interest and therefore, having more to talk about in their personal relationships. Discussion around this emerged predominantly in the social groups (see figure 1), especially in the men's social group amongst men who joined the club shortly after retirement. For example;

"So, you know, your sons know that they've got something to talk about, "What are you doing at the xxxx," …You've got something (to talk about) … it's expanding your…… Social conversation (group agreement)."(M, social).

Diversifying interests was also mentioned by one female in the social group, who identified that different activities became available through the vibrant social club she was part of, so she diversified her interests this way.

iv) Value physical or health benefits

This subtheme reflects how participants recognise that health benefits gained through partaking in their activity contribute to improving their lives. Most of the health benefits described as being valued were related to doing PA in the PA programs.

For example, *"It's good mental health as well as physical (F1). [General group agreement] "And the motivator's health, continuing good health as long as you can."(F2) [General group agreement]*.

Interestingly, even though the Men's Shed group was a social program, many of the participants valued the health benefits gained from doing an activity that involved standing and doing a manual task(woodwork), because they said they would otherwise be sitting at home.

"I suspect that, you know, we all know subliminally that, keeping, keeping this active is, very good for us, … and the, simply the fact that we are moving round, not necessarily doing anything rabidly strenuous. Occasionally, you know, loading a truck, but, but by and large it's just, just a movement and just the activity. And that is, is probably far, far more beneficial to us than we like to, to acknowledge"(M, social) [general group agreement]

v) Sense of purpose related to skills.

This subtheme refers to participants appreciating being able to use existing skills from their prior/working life or develop new skills to contribute to something useful or valuable giving them a sense of purpose and feeling valued in their retirement. This was discussed differently between the PA and social groups.

There was most discussion of a sense of purpose being important within the Men's social focus group. These men especially valued being able to continue using and developing skills because it helped them transition from work to retirement. For example one man said;

"I feel that I haven't retired. This is good for me. I love it, 'cos, um, I just felt like I continued, not in a professional way anymore, because …I don't get paid, no. But, uh, there's good benefits like the, the fantastic businesses there. But I feel, I just feel like I haven't stopped...I'm continuing what I was always loved to do."

Within the PA groups there was some dissonance around whether the activity and the program made them feel valued or if it was value was something they needed to feel intrinsically. For example:

"I feel reasonably valued (by the group)."(F1) "Yeah, you don't see it as value."(F2) "You know, but I, I do, but it's, it's sort of more the connection part. I don't really know. It's a tricky thing; it's a many layered thing."(F1) "Yeah, because to an extent you really have to put your own value on yourself rather than being at the mercy of outsiders."(F1) "Oh, absolutely."(F1)[group agreement]"

Affiliation

This theme was the most discussed mechanism within the focus groups. There was general agreement that affiliation gained from joining the programs was highly

beneficial to them. Their improved wellbeing through affiliation related to meaningful social relationships/contact and social connections subthemes coded as *i) social support and ii) social connection(connecting with other people).*

i) Social support

Participants in each of the focus groups valued either task-based or general support they received from the other program group members.

a) **Task based support:** Within the PA group, other members provided support for participation in more PA and/or regular attendance. In the social groups, other participants or the group itself provided comradery to help and teach one another different tasks and support for trying new projects. For example:

"I enjoy our craft afternoons which is twice, um, minimum twice a month. It's every fortnight at xxx's house, because we learn from each other. If someone's got a problem with a particular craft, … someone'll say, "Does anyone know how to do this?" and we learn from each other. We have lots of fun, …, and we can learn some more crafts. So, yeah, it's, it's really good."(F)

b) **General support:** General support was less frequently mentioned in the focus groups but one of the comments was from a female in the PA group who had made very close friends and she felt she was able to call on them in times of need. Another was discussion in the men's social group where the group fostered an informal culture to give and receive support.

"Yeah, I think that's another important aspect that you've raised…Men, uh, historically have not been very open in discussing their….male conditions."(M1) "And health problems, and in this environment being primarily male environment, and you sit and you have morning tea or whatever, different things are raised, whether it be prostate, whatever, and it takes away some of the fear of the unknown."(M1) "And can open up, a couple of people realised that they had a problem and could then address it, whereas you wouldn't normally"(M1) (group agreement) "Uh, in a work environment sit and discuss these things."(M1) "Because...you haven't got the time or..."(M2) "Yeah, and, and it's a different environment."(M1) "It relates to the environment."(M2)

ii) Social connection

This relates to the importance of having people to connect to for wellbeing and also how connections lead to opportunity. It was the most discussed subtheme and was discussed in a similar way between the types of groups. For example

"I'm in a coffee group with a breakfast group and the dancing group and... I've, I've recently moved to xxxxx so I decided then I was going to get a new lot of friends and… My partner went into care with Alzheimer's and Parkinson's and he's (in care) so…That was the end of my dance partner so I decided I was going to get out and start again… So, yes. Yeah. LAC just opened it up for me."(F, social)

Discussion

The aim of this study was to explore the subjective experiences of older adults taking part in leisure programs, making use of the DRAMMA model for determining the mechanisms the program utilises to improve SWB. The DRAMMA model proved to be a good analytical fit for the data because it incorporated relevant theories relating to leisure and subjective well-being and many were specific to older adults (Newman et al., 2014). The results revealed multiple themes within each of the five DRAMMA mechanisms, which were specific to the way that each was present in older adults participating in leisure activities and some were different between the PA and social groups. Specifically, the PA groups offered physical challenge and physical benefits that translated to better SWB, whereas the social groups often offered activities that allowed participants to feel they were doing something of value in their retirement.

DRAMMA Mechanisms Present in Older Adult Programs (Aim 1)

Detachment-recovery

Even though most of the study participants were retired, detachment was still relevant to older adults' SWB. The mediating factors derived from this study differ slightly to the traditional mechanisms for detachment seen in studies in younger populations. It appears community social and PA programs can provide older retired adults both intellectual and social respite from the potential monotony and boredom of retirement by giving them varied interests and different, or more social, interaction. This was especially emphasized by male participants, in line with a study by Ryser and Wernli (2017), who found that higher work satisfaction at the time of retirement was linked to

reduced positive affect following retirement, but that satisfaction with leisure activities could improve positive affect in men.

Autonomy

The mechanism of autonomy was discussed by the older adults in this study and related to choosing activities of interest and the value of being able to attend activities of their own volition. In these programs, the volition to choose an activity of interest was often what initiated participation, but it was the group cohesion/and social connections that maintained their participation. Additionally, most of the identified participation benefit was gained not from autonomy but the resulting social connection. The observed link between the two mechanisms of autonomy and affiliation in relation to participation behaviour in this study is supported by the Self-Determination Theory of human wellbeing (Deci & Ryan, 1985). Higher leisure relatedness (measured as social support provided or received) and leisure self-determination have both been found to be associated with lower stress in a cross-sectional study of older adults (Chang, 2017).

Mastery

Participants felt that there were several ways that activity programs could provide opportunities for mastery. This included, participating in challenging activities and learning new things through opportunities such as teaching others, remembering skills or undertaking mentally challenging activity such as mah-jong. Mentioned alongside most of the discussion around mastery were aspects of socialization. Often the social situation encouraged participants to challenge themselves as social situation itself provided some challenge or learning opportunity. In line with this finding, a longitudinal study of older adults in the UK found a significant positive impact of informal learning opportunities including music/arts/evening classes, sports club and exercise classes on SWB (quality of life) but not formal learning courses (Jenkins & Mostafa, 2015). Similarly, this leisure-based link between the mechanisms of affiliation, and mastery has been noted in a qualitative study of female older adults, who valued art and craft activities felt the art of making and doing was closely linked to their wellbeing because it made them feel enabled(gained mastery) (Liddle et al., 2013) The meaning in the activity came from the making and also from the social contact received in the groups(affiliation). This study demonstrates the interconnectedness of the different factors. Like our study, this supports the importance of a combination of socialization

and learning for older adults. This is supported by the Socioemotional Selectivity Theory (SST), which suggests that people's motivations change as they age (Carstensen et al., 1999). While younger adults are motivated to gain knowledge and information for their future, older adults instead prioritise emotion and meaning. It helps to explain why simply learning about others may be viewed as meaningful for these older adults and that learning alone does not necessarily improve SWB but a combination of the two may be more beneficial.

Meaning

Meaning was the most widely discussed and richly described psychological SWB mechanism in this study, and this theme was discussed in greater depth in the social groups compared to the PA groups. Of the five 'meaning' subthemes, three were primarily raised by the social groups. For example, the ability to contribute to society was reported by participants as an important mechanism through which meaning could be gained from group activities and was particularly evident in the men's social group discussions. Perceptions of regularly feeling useful to friends and family has been shown in a longitudinal study of older men and women to be significantly associated with better disability and mortality outcomes seven years later compared to perceptions of being of little or no or use to others (Gruenewald et al., 2007). Meaning was also reportedly gained from the physical or health benefits achieved from PA activity. The opportunity to broaden social horizons was a mechanism for gaining meaning from both types of programs. This strong connection between socialization and meaning, characterized by a large volume of participant discussions of meaning gained through programs being derived from socialization aligns with older adult perceptions of the importance of both meaning and affiliation/social support in one's life to age successfully (Reichstadt et al., 2010). There also seemed to be a connection between meaning and detachment/recovery in these programs, where discussions of meaning turned to meaning gained from learning new things from others or as a result of doing the activity. This, reportedly, made their lives more interesting, improved home relationships, and even helped them adapt to changes such as retirement or loved ones becoming unwell. This is a new finding, to our knowledge not observed before in other literature relating to older adults.

Affiliation

Affiliation was the most mentioned psychological SWB mechanism discussed in the focus groups. Receiving social support was mentioned in the focus group discussions as being an important benefit of group participation. Most of this related to receiving task-specific support. There was a suggestion that more generalised support can develop in these programs, but it takes some time. Creating social connections through activities was the most mentioned subtheme of the affiliation mechanism for improving SWB in both types of programs and between men and women. The participants agreed it was one of the main ways they gained benefits from their leisure program participation. Newman et al.(2014) proposed that affiliation may be the most important mechanism for older adults. He and his colleagues found that there was greatest support for leisure-based affiliation as a contributor to SWB amongst the ageing-specific literature (Newman et al., 2014). There is evidence that increased social contact and greater social support is associated with higher SWB amongst older adults (Swift et al. 2014; Diener and Chan, 2011) and a recent systematic review has found that feelings of connectedness to others, especially in a reciprocal social situation is important in meeting the social needs of older adults and contributes to wellbeing (Bruggencate et al., 2017). A qualitative study of older adults (Dattilo et al., 2018) suggested that maintaining relationships is a key factor in allowing them to compensate for shrinking social networks with age. It appears from our study that in older adults, both simple engagement and engagement for the development of rewarding relationships are relevant and important to older adults.

The results indicate that being a member of community group for older adults clearly contributes to SWB and the DRAMMA model is a very suitable tool for planning and evaluating community programs for older adults because it considers five pillars relating to mechanisms that are clearly relevant for SWB in older adults. Whilst not found in specific gerontological wellbeing theories summarized by Newman et al. (2014), there are examples of mastery gained through leisure being beneficial wellbeing in older adults in this study. This study provides particular evidence that detachment recovery is also important for SWB in older adults and can be provided through community programs. In addition to these general-population mechanisms being relevant for older adults, the findings suggested that in older adults, affiliation is

particularly relevant to SWB and should be encouraged in leisure and was a common theme linking the mechanisms together.

Differences Between Physical Activity and Social Programs (Aim 2)

The results highlighted that each of the DRAMMA mechanisms could be provided by both PA and social activity programs for older adults. This is important because it suggests that both PA and social programs can both provide the important mechanisms for SWB. Differences in individual needs for lifestyle change have been seen in people nearing retirement (Smeaton, Barnes & Vegeris, 2017) and preferences for the type of activities that provide fulfillment for older adults (Adamson & Parker, 2006); so it is important to offer a variety of types of activity.

Some subthemes were more apparent in one program than the other. For example, PA programs offered physical benefits, which encouraged intrinsic motivation(autonomy) and gave meaning to PA program participation. The PA programs also provided physical challenge(mastery). This is to be expected, because it is known that PA provides many physical benefits such as improved cardiovascular fitness, muscle strength, flexibility and health benefits such as improved glucose tolerance, better balance, reduced risk of cardiovascular disease (Reiner et al., 2013; Nunan et al., 2013). Interestingly, the woodworking group participants, a social program, also reported several physical benefits. This is an important finding because it suggests that older adults who are not inclined to do traditional PA type exercise can benefit from physical craft/making type activities that are typically standing and moving around. This is supported by the strong field of sedentary behaviour literature that emphases the importance of reducing sitting time for improvement of health in addition to increasing levels of traditional PA (Panten et al., 2017; Seguin et al., 2014; Rezende et al., 2014). It has been found that reducing sitting time can lower mortality risk in older adults (León-Muñoz et al., 2013) and that even replacing sitting time with light-intensity PA like a standing craft activity can improve health in older adults (Buman et al., 2010). Protective effects on health (e.g. cognition) have also been shown to be associated with higher levels of incidental PA (Sanchez-Lopez et al., 2018). Given that one of the major reasons some older adults do not undertake leisure PA is that they do not find it enjoyable or interesting (Crombie et al., 2004), social activities incorporating incidental PA may be a novel way to increase exercise levels in these people.

There were also some subthemes mentioned more often in the social focus groups. They came from two of the themes detachment/recovery (DR) and meaning. The social groups provided respite from home lives (DR) and meaning through i)ability to contribute to society ii)diversify interests and iii)sense of purpose related to skills. . It is logical that the social groups provided respite from home lives because it is likely that the participants joined this kind of social activity with an aim of socialising with others, which may not necessarily be a specific aim of PA program participation. The three subthemes relating to meaning mentioned above i) and iii) would be difficult to achieve through PA programs of this nature because their primary aim is to increase PA. Diversification of interests is possible through PA and lack of mention of this subtheme may have just been that the conversation did not follow that line of discussion.

Sex differences

Whilst the differential gender experiences of community group involvement and SWB was not an initial aim of the current study, there were some differences in meaning attributed to groups after retirement. The older men deeply valued several of the benefits that the programs offered them to give them something meaningful to do, whereas women valued the groups more for social reasons. A specific example was in the detachment theme, where women used socialisation in the groups to cope with stress in their lives and men felt the programs offered respite from boredom and time away from their spouse (DR). Men also discussed meaning as being important for SWB to a greater degree than women. For example, diversification of interests and being able to do something of value were both highly valued by the men in the study. This finding is similar to previous studies, where older men in particular find that meaningful leisure activities can improve positive affect following retirement (Ryser & Wernli, 2017). Purposeful innovation (e.g learning or gaining skills or improving body) is particularly beneficial for men to prevent boredom in retirement (Liechty & Genoe, 2013). Furthermore, men in the study particularly discussed how appreciative they were of the supportive nature of the organisation that they were members of. The organisational focus of the group was to ensure that encouragement of a supportive environment was a key to their aims. Although the activities that the men took part in were not focused on talking (e.g. woodworking, computers, cars) there was much agreement that in that male-only environment they were inclined to talk about their emotions, issues and health and they felt they would not otherwise do this outside the group.

The comparison of group differences highlighted that each of the DRAMMA mechanisms could be provided by both PA and social activity programs for older adults and that some mechanisms were more readily provided by one type of program than another. Social programs especially provided activities that added meaning relating to purpose relating to skills and contribution to society and PA programs provided physical and health–related benefits. Gender differences also became apparent in the analysis and showed that men gained particular benefit from male-only opportunities with a focus on safe supportive environments. It is therefore relevant to offer gender separate activities. When considering program specifics associated with SWB in men, meaningful leisure was particularly relevant. For women, socially-focused leisure was particularly relevant. Overall, the analysis shows that there is variation between people in their perceptions of important factors for wellbeing through leisure and it is important to offer a wide variety of programs.

Strengths and limitations

A considerable strength of this study was that it was the first to utilise the DRAMMA model, developed to outline key mechanisms relating leisure to SWB in the general population, to evaluate community leisure programs for older adults.

This study also incorporated small sample sizes, typical to qualitative research. Whilst this means that it is difficult to generalise our findings to a larger population group (Creswell & Plano-Clark, 2011), qualitative research aims to delve more deeply into a topic or comparing differences between cases through exploration of convergence and divergence of opinions, to develop a better understanding of a phenomenon and this was the purpose of the study (Patton, 2015). This study was conducted in Melbourne, Australia and it maybe therefore not be relevant to programs in other countries. All participants were healthy, and the results may not apply to people with significant health issues.

Conclusion and recommendations

The results indicate that being a member of community group for older adults clearly contributes to SWB and the DRAMMA model is a very suitable tool for planning and evaluating community programs for older adults because it considers five pillars relating to mechanisms that are clearly relevant for SWB in older adults. The results of

our study also demonstrate that some of the five mechanisms are connected in older adults, which would not be apparent if only examining one theory or mechanism at a time. There was an overarching emphasis on the importance of social opportunities and social connectedness in all types of leisure activities for older adults. There was evidence that detachment through leisure is also relevant to older adults as a way of escaping monotony and boredom in retired life. There were some differences in mechanisms for SWB provided by PA and social programs, with PA programs providing physical challenge and meaning through physical health benefits, and social programs proving opportunities to gain meaning by developing, maintaining or diversifying skills or interests in their new retired lives. The study highlighted the importance of considering offering gender separate programs. Factors relating specifically to SWB from leisure in men were incorporating meaningful or leisure options such contributing to society or developing a skill. Ability to connect with others socially was particularly important for women. When planning programs for older adults it would beneficial to especially considering these factors. It is therefore recommended that programs for older adults make social engagement a key priority irrespective of the type of group activity and try to provide a wide range of options to satisfy the diversity of interests in older adults. Based on these findings, it would be useful to use the model to develop and evaluate wellbeing programs for older adults in other contexts such as in different countries, cultural backgrounds, and people with specific chronic illnesses or disabilities. Given that there is very little evidence in support of the importance of detachment/recovery for SWB in older adults, it would also be useful to undertake larger quantitative studies investigating if this association is supported in a more generalisable cohort.

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Appendix 1. General and gerontological wellbeing theories relating to DRAMMA Model.

Mechanism	Gerontology theories	General population theories
Detachment/ Recovery		• Conservation of Resources Theory (Hobfoll and Stokes 1988) • Effort-Recovery Model (Meijman and Mulder 1998) • Attention-Restoration Theory (Kaplan 1995) • Compensation Theory (Chick and Hood 1996)
Autonomy	• Continuity Theory (Atchley 1976) • Innovation Theory (Nimrod 2008)	• Self-Determination Theory (SDT) (Ryan and Deci 2000) • Hierarchy of Needs (Maslow 1954) Compensation Theory (Chick and Hood 1996) • Leisure and Well-Being Model (Carruthers and Hood 2007)
Mastery		• Flow (Csikszentmihalyi 1990) • SDT (Ryan and Deci 2000) • Serious Leisure (Stebbins 2006) • Hierarchy of Needs (Maslow 1954)
Meaning	• Activity Theory (Havighurst 1961) • Selection Optimization and Compensation Theory (Baltes and Baltes 1990) • Socioemotional Selectivity Theory (SST) (Carstensen 1992)	• Serious Leisure (Stebbins 2006) • Hierarchy of Needs (Maslow 1954)
Affiliation	• Activity Theory (Havighurst 1961) • Disengagement Theory (Cumming and Henry 1961) Selection Optimization And Compensation Theory (Baltes and Baltes 1990) • SST(Carstensen 1992)	• SDT (Ryan and Deci 2000) • Hierarchy of Needs (Maslow 1954) • Need Theory (Diener and Lucas 2000) • Leisure and Well-Being Model (Carruthers and Hood 2007)

Adapted from (Newman et al. 2014)

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Chapter 8 : Discussion, Strengths and Limitations, Conclusions, and Implications

The final Chapter of this thesis synthesises the findings of the studies conducted as part of this program of research and how they relate to the PhD research questions. Specifically, the results will be discussed in relation to the contribution to knowledge that this research makes in the field of Active Ageing in general; and physical activity (PA), health and wellbeing through socially oriented groups for older adults in particular. The overall question for of this program of research was *What is the role of community activity groups for older adults for Active Ageing, with a specific focus on PA, health and wellbeing.*

The results of the program of research will be discussed individually for each of the two specific PhD research sub-questions, followed by a description of how the key research findings link to the overall research question above. This will be followed by a discussion of the strengths and limitations of the research, practical implications and directions for future research. The Chapter concludes with a statement regarding the contribution that this PhD program of research has made to the knowledge relating to the role that community activity groups for older adults play in the Active Ageing process.

The research questions addressed in this program of research were based on a thorough review of the literature relating to Active Ageing, with a focus on social relationships, physical activity, health and wellbeing for older adults. The focus of the research was community activity groups for older adults, because they offer the potential for development of social relationships, which prior research had suggested were particularly relevant in relation to PA, health and wellbeing. A mixed-methods case study was used for one section of the PhD research and participants of multiple community groups were included in the final exploratory qualitative study focusing on subjective wellbeing (SWB) through such groups.

Research Sub-Question One: What is the relationship between social support and physical activity in older people?

Research sub-question one was explored using a combination of a systematic review and a rapid review, summarising more recent research. The findings suggest that, for

older adults, general social support does not have a clear impact on PA levels. However, the definition of social support as a construct is highly variable and probably contributes to this lack of evidence for a relationship between social support and PA. Social support for physical activity (SSPA) as a construct is more clearly defined and the studies suggest that SSPA provided by friends and family is likely to be positively associated with PA, but in some cases it may have a negative influence on PA levels. Various factors relating to social integration appear to be positively associated with PA. Loneliness appears to have an indeterminate association with PA levels in older adults. The two aspects of social relationships which appear to be associated with PA, SSPA and social integration will be discussed below in the context of previous research.

The mixed findings surrounding the association between PA and SSPA from friends and family suggests that older adults are likely to have varying individual needs and preferences for support for PA. This is supported by a recent systematic review of the evidence around the social needs and preferences of older adults (Bruggencate et al., 2017). In addition to individual differences in social preferences, context and type of support have been shown to influence whether social support from others is perceived negatively or positively by the receiver (Newsom et al., 2018; Stephens, Alpass, Towers, & Stevenson, 2011; Stephens et al., 2014). For example, encouragement for PA has actually been associated with lower levels of PA in older adults (Fisher et al., 2018) and corrective support for health behaviours from a spouse have also been associated with negative health behaviours (Franks et al., 2006). It may be that direct encouragement to do PA by close friends and family can sometimes be perceived to be controlling and lead to reactive negative behaviour (Lox et al., 2003).

The synthesis of the evidence in the two systematic reviews conducted in this program of research also suggest that a variety of factors relating to social integration are likely to be associated with PA in older adults. In particular, the review update found that satisfaction with friendship networks, having a greater proportion of friends in one's social network, attending formal groups or having a larger social network were positively associated with PA (Clarke et al., 2017; Hakola et al., 2015; Ho et al., 2018). However, greater satisfaction with family relationships or purely having greater frequency of social contact with friends or family were not associated with PA in the studies included in the review (Clarke et al., 2017; Doubova et al., 2016). The importance of social integration factors for PA participation was also raised in the

mixed methods study in this program of research (see Chapter 5). The results of that study suggested that social interaction in a group PA setting was a key factor motivating adherence to PA because it added enjoyment to the exercise. This is similar to the findings of the five quantitative interventions undertaken between 2000 and 2012 measuring factors relating to adherence in group PA programs run for older adults, which were reviewed in a recent systematic review (Farrance, Tsofliou, & Clark, 2016). Like the current study, the mean adherence rate over one year was high, being approximately 70%. Four of the studies were specific exercise programs (offering aerobic, strengthening and coordination or balance exercises) and one was a volleyball program. In contrast. the current study included a wide variety of types of PA options (e.g. walking groups, table tennis, dancing). Typically, the programs were offered as group exercise run one or two times per week. The key attribute linking program adherence in these studies was attributed to social connectedness gained through the programs. Other factors perceived to assist adherence were instructor, program design (e.g. location, affordability, adaptable content) and participant perceived benefits of the program. The one study in the systematic review that measured whether the program had an energising and empowering effect had the greatest adherence of approximately 90% (Fox et al, 2007). It suggested that a feeling of empowerment leads to a sense of purpose and greater intrinsic motivation. This was also demonstrated in this program of research, where programs that were meaningful appeared to be particularly important for offering health and wellbeing benefits to participants. This has finding been echoed in a number of other qualitative studies and particularly in older adults who do not enjoy PA (Franco et al., 2015; Mobily et al., 2017; Nielsen et al., 2014). Because the majority of studies in the review were cross-sectional and enquired about social integration in general life rather than associated with social PA groups, it is not possible to determine causality. Although it cannot be concluded that the findings above explain the results of the review conclusively, it seems likely that social integration developed through participation in a group PA setting does contribute to enjoyment of PA, and thus PA levels in older adults.

In addition, the Social Convoy Model of Health (Kahn & Antonucci, 1980) states that social connectivity is a predecessor to social support. Thus, having more good quality social interactions, especially with friends or acquaintances, offers a greater opportunity for the development of relationships that can provide social support for healthy

behaviours such as PA (Berkman & Glass, 2006; McLaughlin, Adams, Vagenas, & Dobson, 2010). However, it has been noted that this explanation is generally only valid when people are currently trying to engage in some form of exercise (Sallis et al., 1987). Thus, this mechanism may be associated with maintenance of PA, but it is less likely to influence the initiation of PA.

There are some other potential mechanisms explaining the association between social integration and PA. These include social engagement and social influence.

Social engagement: Engaging socially with others provides an important opportunity for companionship, or connection with others, which in turn gives meaning to one's life through the ability to give and receive support, and feel attached to the community around them (Berkman et al., 2000). The act of engaging with others also helps to reinforce social roles, and leads to a sense of value, belonging and attachment (S.Haslam et al., 2018). It may be that the importance of connecting with others is particularly pertinent for PA behaviour in older adults. For example, connecting with others in an exercise environment (such as a group) can enhance enjoyment of the activity and maintain motivation to adhere (Nielsen et al., 2014). This suggestion was supported by the majority of the qualitative studies in the rapid review (Chapter 3), where older adults felt that the social aspect of PA in groups is enjoyable and motivates adherence to the activity (Choi et al., 2018; Hawley-Hague et al., 2016; Killingback et al., 2017; Kosteli et al., 2016; Mobily et al., 2017; Sims-Gould et al., 2018; South et al., 2017). Additionally, connecting socially with others, especially people whom one identifies with, can increase life meaning and perceived personal control and lead to better self-esteem (C. Haslam, Cruwys, Milne, et al., 2016; C. Haslam et al., 2018; Jetten et al., 2015). This, in turn, is likely to enable older adults undertake healthy behaviours such as PA (Carlson et al., 2012; Fernández et al., 2014; Orsega-Smith et al., 2007).

Social influence: Social influence is the tendency for people to base their behaviours on the behaviours of others around them (C. Haslam, Cruwys, Milne, et al., 2016; C. Haslam et al., 2018). Having a larger network, especially when it is made up of a majority of friends, who are chosen and likely to be identified with, may increase the likelihood of one's behaviour being influenced by those around them (S. Haslam et al.,

2018). Therefore, it is possible that the greater network of friends positively influences PA levels if the behaviours of those friends is also positive.

In conclusion, both direct SSPA received from family and friends and having a more socially connected life, especially through contact with friends or social groups seem to be positively associated with PA levels in older adults. It is also important to consider individual needs and preferences of older adults in relation to social relationships because this is likely to influence the association also.

Research Sub-Question Two. What is the potential role of community groups for older adults offering a socially supportive environment in improving physical activity, health and wellbeing?

The results from all the studies in this program of research have been synthesised to address this research question. The key findings are presented in Figure 8 1 and in the following text.

Impact of participation in community activity groups for older adults on social relationships

A thorough review of the evidence relating to Active Ageing, PA and social relationships informed the wording of the second research sub-question linking the social environment of community groups to the potential PA, health and wellbeing outcomes from membership (see Chapter 1 for details of the evidence). However, it was also important to confirm whether membership of community activity groups impacted social relationships in the context of this program of research. Findings from this PhD research confirmed that members of community activity groups felt that group membership positively affected their social relationships. Social connections increased, loneliness decreased and social support somewhat increased. These findings are in line with previous evidence suggesting membership of activity groups may be associated with reduced feelings of loneliness, increased social integration or social connectivity in older adults (Alidoust et al., 2019; Broughton et al., 2017; Cohen et al., 2006; Earl, Gerrans, & Halim, 2015; Golding, 2011).

It was not entirely clear from the survey data whether group membership had a significant impact on social support, but there was a trend towards a positive association over time ($p=0.056$). The focus group study suggested that the supportive social

environment in the community group programs may eventually lead to greater social support but that this is likely to take more than one year. A similar lag in development of friendships in community PA programs was observed in another qualitative study (Killingback et al., 2017). Additionally, a lag between development of social connections and actual friendships has been observed in a longitudinal study of retiring older adults in France (Sabbath, Lubben, Goldberg, Zins, & Berkman, 2015). The findings from the two reviews relating to social relationships and PA (Chapters 3 and 4) also suggested that the relationship between general social support and PA in older adults is equivocal This suggests that whilst the functional social support scale utilised in this PhD research had adequate validity and reliability for measuring social support in older adults, it may have been more appropriate to include a measure of social cohesion within the group. Perhaps social support had not yet changed, but the associations described in the focus group studies are likely to have been associated with the socially cohesive nature of the group (Christensen et al., 2006; Estabrooks & Carron, 1999). Additionally, the small sample size of the survey study may have contributed to the lack of significant observed change over time in general social support scores of the participants (VanVoorhis & Morgan, 2007).

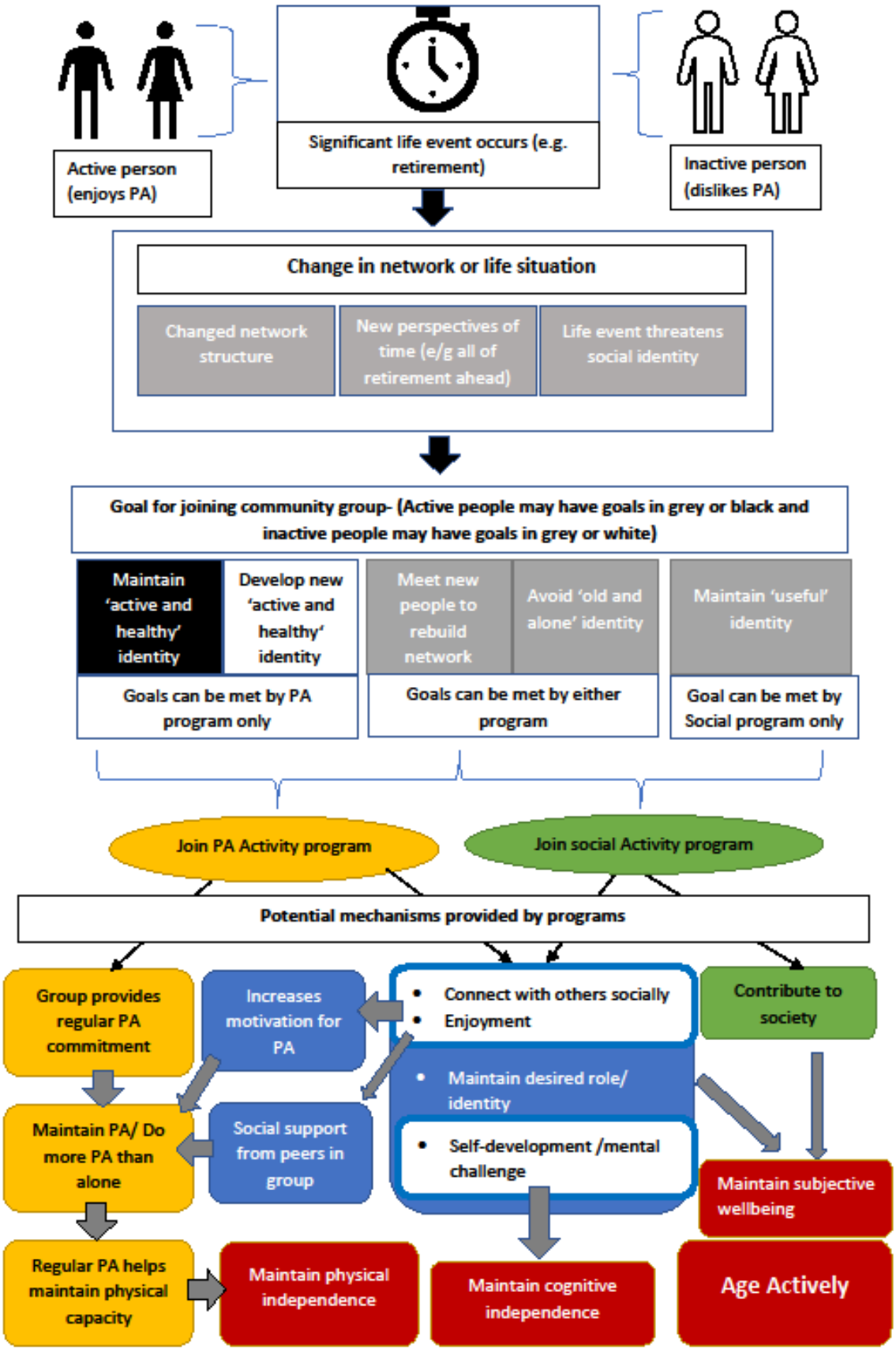

Figure 8-1. Proposed role of community activity groups for older adults in Active Ageing process.

Key: This figure gives an example of a significant life event as a trigger for joining such groups. Black represents linkages for people who enjoy PA. White represents linkages for people who dislike PA and grey are linkages relevant to all. Yellow indicates benefits related to PA programs only, Blue indicates mechanisms for both types of program, green indicates mechanisms related to social programs only. Red boxes relate directly to Active Ageing

Community activity groups as a means of coping with social change in the lives of older adults.

Older adults can experience a wide variety of significant life events such as retirement, personal illness, death or illness of a family member or friend (Hardy, Concato, & Gill, 2002). The findings from this program of research suggest that membership of community activity groups for older adults can be particularly beneficial for social relationships around times of these significant life events, where social circumstances change. Most of the participants in the focus group study joined an activity group soon after retirement, moving house or their partners becoming unwell or dying, as they felt their social network decrease. A sudden reduction in social network immediately after retirement has been documented elsewhere (Van Tilburg, 2003). If network losses are not replaced in older age, it can have negative consequences for health (Cornwell & Laumann, 2015; Steffens, Jetten, Haslam, Cruwys, & Haslam, 2016; Windsor et al., 2016). Conversely, gaining more new network members following retirement appears to be beneficial, compared to not adding any new network members (Cornwell & Laumann, 2015). For example, the addition of two new confidants has been found to be associated with a 24 percent increase in the odds of reporting better health at all levels, and the addition of four confidants associated with a 62 percent increase (Cornwell & Laumann, 2015).

The activities chosen by participants in this PhD research were either social or physical in nature. The qualitative research demonstrated that all the participants felt that their activity of choice provided them with an opportunity to socialise with people they identified with, or who had similar interests. Therefore, the network change is likely to have motivated the older adults in this study to try to regain new relationships by taking part in activities that were congruent with their social identity (as in the Social Identity Theory of Health (S. Haslam et al., 2009) as well as their prior history and interests (as in the Continuity Theory (Atchley, 1971)). Past literature suggests that there is a crucial

and optimal time for promoting activity group participation to older adults for greatest health and wellbeing impact. This appear to be approximately one to four years post retirement (Sabbath et al., 2015). Therefore, not only is it important to consider significant life events as being and important time for promotion of activities to assist in replacement of social network members and promote health, it is particularly important to reach people fewer than four years after retirement for the greatest likelihood of having long-term adherence to programs.

There is evidence that social networks tend to become more restricted with advancing age (Litwin, 2001). The Socio-Emotional Selectivity Theory (SST) suggests that this network reduction is a preference for fewer high-quality relationships supplying emotional reward, rather than novel relationships offering the opportunity to learn (Carstensen, 1992). It would seem that the findings from the research in this thesis are incongruent with this theory because they show a preference for renewing lost connections after retirement or moving house. However, there is an additional aspect of the SST theory that was observed in later work by Laura Carstensen and Colleagues (2003). In circumstances where the perception of time is altered, social preferences for novel or emotional social relationships also change (Carstensen, Fung, & Charles, 2003). For example, when young people find out that they are dying, they demonstrate an increased preference for close emotional relationships. Conversely, if people are asked to imagine that a drug had been invented to increase their life span, they show an increased preference for novel relationships (Carstensen et al., 2003). Therefore, it is possible that the significant life events described in the results of this PhD research may have lengthened the perceived time available in the participants lives and increased their preference for new social partners. This evidence emphasises the importance of considering predictable life events as important times for development and promotion of programs incorporating the opportunity for increasing social connections.

Overall, the PhD research suggests that membership of community activity groups provides an opportunity for greater and more diverse social contact, which is especially important at times of social change (e.g. retirement). This greater social connectivity may lead to friendships, social support and reduced perceptions of loneliness amongst members.

Community activity groups for maintaining social identities

The results from this program of research suggest that the social or PA programs all acted as a *common interest* to connect older adults to others in the activity group. The activities themselves may have a means of continuing their *social identity* (Haslam et al., 2009; Tajfel, 1974), which would otherwise be compromised after a significant life event. Maintaining social group membership that is congruent with one's social identity assists with adjustment to life change (Iyer, Jetten, Tsivrikos, Postmes, & Haslam, 2009). Some social identity examples from this program of research and past literature that seem to be supported by community activity group participation are the *'active healthy'* identity (from PA program participation) (Bennett, Hurd Clarke, Kowalski, & Crocker, 2017; Doubova et al., 2016; Gebhardt, Lottman, van Rossum, Bekedam, & Crone, 2015), and *'useful'* identity (programs where people could contribute to society) (Aw et al., 2017; Burrow, Sumner, & Ong, 2014). Joining certain groups also appears to be a way of warding off an '*old and useless'* or *'old and frail'* identity by keeping physically, mentally and socially active (Armenta, Stroebe, Scheibe, Postmes, & Van Yperen, 2017; Bennett et al., 2017; Warmoth et al., 2015) (see Chapter 7 and Figure 8 1).

It important to note, however, that the need for maintaining one's identity at times of social change may also be a barrier to joining groups and should be seriously considered when designing programs for older adults. For example, some older adults feel that joining groups for older adults means that they would lose their '*youthful'* identity (Goll, Charlesworth, Scior, & Stott, 2015). Wide-spread age discrimination in today's society may discourage young older adults from joining groups to be perceived as being 'for old people' and needs to be considered. In addition, there is evidence that some people who reach retirement feel that there is a lack of appropriate exercise options available; that they are either too old for generalist programs or too young for older adult programs (Hawley-Hague et al., 2016; Van Dyck, Mertens, Cardon, Cocker, & De Bourdeaudhuij, 2017). Inappropriate group identity has also been given as a reason for not participating in other types of health promotion programs (Wright & Hyner, 2009). Given that it is likely that many older adults will seek a form of social program to enable them to maintain their social identity around retirement, it is vital that a sufficient number of programs exist that are deemed appropriate for recently retired

people. Specifically, there is a need for community activity groups for older adults to be developed to tailor more for these *'youthful*' older adults and appropriately marketed.

Community activity group program participation and physical activity in older adults

The results of this program of research suggest that participation in PA programs and sometimes social programs within community activity groups for older adults can impact PA levels in positive ways. Only PA maintenance effects were seen in the survey study, but this is likely to have been because participants were already active to start with and unlikely to experience further gains in PA (i.e. a ceiling effect) (Foreman et al., 2012; Wilcox et al., 2009). Ideally, future studies would examine the effects of community group membership in inactive individuals. The studies in this program of research highlighted a number of social factors that appear to be particularly pertinent for understanding the above benefit of PA in a group setting. These are shown in Figure 1 and detailed below.

Mechanisms for impact of participation in community activity groups on PA: Social integration

The results from this program of research suggest that the primary mechanisms acting in PA programs at community groups to assist in maintaining PA levels relate to social integration. Specifically, the majority of PA benefits were derived from being surrounded by others when doing PA. The results indicated that several aspects of PA participation in a social group environment motivated regular PA including regular commitment, enjoyment, being a member of a supportive group and increased social connectivity.

Regular commitment of a group activity and enjoyment of social situations were discussed by participants as being primary factors motivating them to attend the programs regularly, thus enabling them to maintain their PA levels.

The social context provides enjoyment, which may not naturally be gained through PA for some people (Nelson et al., 2007). The social enjoyment then motivates adherence to PA (Earl et al., 2015; Franco et al., 2015; Hawley-Hague et al., 2016; Killingback et al., 2017; Kosteli et al., 2016; Sims-Gould et al., 2018). Socialising in a group sporting situation has also been found to create social connectedness and has been identified as a

reason for continued participation in sporting activities among older adults (Jenkin et al., 2018; Wikman et al., 2017). The regular commitment of exercising with others has also been recognised previously as being a motivator to 'stick with' exercise for people who are not naturally inclined to like PA (Mobily et al., 2017).

The results of the program of research also suggested that *being a member of a supportive group* to undertake PA may help motivate greater PA than when exercising alone. This finding is congruent with theories of social integration (Berkman et al., 2000) and Social Identity for Health (C. Haslam et al., 2017). These theories suggest that having strong social networks, which people identify with, can influence health by encouraging receptivity to the influences of the other people in the network (Berkman et al., 2000). Therefore, being amongst a supportive group of others who participate in a healthy behaviour (PA) is likely to encourage older adults to do the same, especially when there is a positive group dynamic present (Christensen et al., 2006; McNeill et al., 2006; Wikman et al., 2017).

Community groups for older adults also provide a means of *connecting socially* with others. The findings from this program of research suggested that social connections gained in PA programs may impact participants in various ways, depending on whether people are naturally inclined to do PA (see Figure 8-1). For example, people who do not enjoy exercise used enjoyment group social environments in the PA program to motivate them to do regular PA (see *Regular commitment* of a group above). Additionally, people who do like PA may use the PA programs as a common interest to meet other similar people, especially at times of life change. This finding was discussed earlier in the section on *community activity groups as a means of coping with social change in the lives of older adults.*

PA programs are likely to provide the greatest benefit to PA levels but this program of research utilised a multi-activity community group, which also offered a variety of social programs. The findings suggested that these social programs may also offer some PA benefits to participants. This is congruent with previous research, which reported that, when compared to older adults with restricted social networks, those with friend centred or diverse networks have higher rates of PA (Howard Litwin, 2003; Shiovitz-Ezra & Litwin, 2012). There was suggestion that part of the benefit was derived from spending greater time away from home. Some participants in the social programs felt

that taking part in activities at their groups prevented them from ‘sitting around at home’ because they gave them something to do. In support of this another study has reported that compared to people who never leave their homes, people who leave home once in a day adds an additional 40 minutes of PA to their day (Rapp, Mikolaizak, Rothenbacher, Denkinger, & Klenk, 2018). Additionally, there was some support from the findings in the program of research that *positive social connections* made in social activity programs could also possibly encourage initiation of new PA in people who were previously inactive. This occurred because new friends were promoting the enjoyment they experienced in other physical activities that they participated in (see Chapter 6). The Social Identity Approach to Health (C. Haslam et al., 2017; S.. Haslam et al., 2009) suggests that social connections can positively influence health behaviours when people identify strongly with the others in the group. As previously mentioned, many participants in the groups joined at significant times in their lives and chose an activity that was of interest to them to assist in connecting with others, thereby facilitating identification with the group. Therefore, social programs that strongly encourage friendships and being set in multi-activity community activity groups, may potentially encourage people who dislike PA to try PA programs in the same organisation. To our knowledge this is the first study to report this finding.

Community activity group program participation and health

This program of research, found that health, measured as physical HR QoL, did not change in the PA program participants, and declined in some of the social program participants. This was in contrast to what was expected, which was that participation in the PA programs would lead to an increase in physical HRQoL, reflective of gains in physical health known to be related to regular PA (Kendig, Browning, Thomas, & Wells, 2014; Nash, 2012; Paterson & Warburton, 2010; Reiner et al., 2013). In contrast to the findings in the PhD research, other studies have found a significant protective effect of participating in PA programs, on the onset of disability and against declines in self-rated physical health in older adults when assessed longitudinally (Ashida, Kondo, & Kondo, 2016) and a significant positive association between PA program participation and functional health when measured cross-sectionally (Everard, Lach, Fisher, & Baum, 2000). In support of previous research and in apparent contrast to the quantitative findings in this program of research, the focus groups suggested that PA program participants did perceive that they gained physical health benefits such as

improved physical capacity and general physical health. The physical benefits of group membership were also cited by focus group participants as motivation for continued attendance at programs. The lack of observable changes in the PA programs in the survey study may have been due a number of factors. Firstly, there may have been a ceiling effect of the program, as physical HRQoL scores were quite high to start with. Additionally, a small sample size will have reduced the power of the study (VanVoorhis & Morgan, 2007). Finally, the PA programs offered in the groups were not a focused fitness intervention, reducing the likelihood that physical health benefits would be as large as is observed in some specific PA interventions (Hughes et al., 2009; McKay et al., 2018; McKay, Sims-Gould, Nettlefold, Hoy, & Bauman, 2017; Stathokostas et al., 2017; Wikman et al., 2017; Wilcox et al., 2009; Wilcox et al., 2006).

Community activity group program participation and wellbeing

The results from this research program suggest that participation in either PA or social activity programs in community activity groups for older adults has potential to be beneficial for wellbeing in older adults. However, the survey study failed to find any positive associations between membership and mental wellbeing, as assessed with the Short Form 12 – Mental Component Score (MCS). Rather, participants in the social and PA groups maintained the same MCS scores over the one year of the study. This finding appears to be disparate when compared to previous research, which has typically found a positive association between social group participation and mental wellbeing or quality of life (Broughton et al., 2017; Choi et al., 2016; Earl et al., 2015). However, qualitative data derived from the studies in this PhD research suggested that participants did perceive that they gained mental health benefits from participation in both program types. Therefore, the results, rather than implying a lack of impact, may actually have reflected a protective effect of participation in both program types and that there was a ceiling effect of the scale, with high initial score. Another possible explanation is that the mental HR QoL of participants may have otherwise declined, as is the general trend with increasing age (Gana, Saada, & Amieva, 2015; Steptoe, Deaton, & Stone, 2015). For example, approximately one in ten older adults experience subthreshold depression (presence of depressive symptoms but not able to be diagnosed as major depressive disorder), which is a higher rate than younger adults (World Health Organisation, 2015b). It is not however possible to know for certain if this was true because there was no control group that were not involved in any groups in this study.

Mechanisms for the impact of community activity groups on wellbeing

Throughout this program of research, mechanisms relating to wellbeing benefits of membership of community activity groups for older adults were explored. All participants of the focus groups, independent of whether or not they participated in PA or social programs, agreed that group membership offered some wellbeing benefits through a variety of mechanisms. All the DRAMMA mechanisms for wellbeing through leisure were available in the programs within the community groups evaluated in this PhD research (Chapter 7) (Newman et al., 2014). Of particular importance to wellbeing in the participants of these programs was affiliation through the groups, which could lead to social connectedness and social support and has already been discussed in length in the previous sections of this discussion. Social and PA groups appeared to differ with regards to 'Meaning' gained from programs. Both types of program seemed to offer meaning, but in different ways. Participants of PA programs perceived that the activities offered meaning through physical health benefits from regular PA participation. This is regularly cited as being a key motivating factor for PA adherence (Beck, Weeks, Montelpare, & MacDonald, 2016; Bunn, Dickinson, Barnett-Page, McInnes, & Horton, 2008; Franco et al., 2015). Additionally, PA programs may provide an opportunity for out of home PA; which has been shown in previous studies to be a mediator between social integration with friends and depression in older adults (Herbolsheimer et al., 2018). In contrast, in social programs, meaning was primarily derived from using or developing skills or diversifying interests (Iwasaki, 2008; Iwasaki, Messina, & Hopper, 2018; Liddle, Parkinson, & Sibbritt, 2013). Also, some social programs allowed participants to contribute to society (e.g. wood-working projects for community) and this was also described by the participants as being meaningful, in line with past literature (Adams, Leibbrandt, & Moon, 2011; McMunn, Nazroo, Wahrendorf, Breeze, & Zaninotto, 2009). Interestingly, the two aspects of affiliation; which related to feelings of social connectedness or social support as well as and meaning which could be derived through community group participation are also both key factors relating group participation and wellbeing as defined by of the Social Identity Approach to Health (C.Haslam et. al., 2018). This theory suggests that the additional factor of needing to identify with the groups values (as mentioned in previous sections of this discussion) is valuable and is what was found in this program of research. In summary, the primary mechanism impacting wellbeing or mental HRQoL through community

activity groups for older adults appears to be related to the ability for groups that people identify with to assist in development of important relationships for older adults and it is also important that activities that are offered can add meaning to the lives of older adults.

Bringing it together: - Community Activity groups for Active Ageing.

As discussed above, the results of this PhD program of research demonstrated that community groups for older adults have the potential to improve social relationships, reduce loneliness and maintain PA levels, health and maintain or improve wellbeing. Mechanisms for these changes particularly relate to social connection opportunities, as well as program aspects offering valued opportunities. The overarching aim of this PhD research was to examine the role of community groups for Active Ageing, which was assessed by addressing the two research sub-questions of the PhD described earlier. This final section will briefly touch on how the research contributes to this overarching aim.

Promoting Active Ageing is achieved by offering older adults opportunities to maintain and improve their functional ability; which is the ability to do things that they value in their lives (World Health Organisation, 2015b). The aspects of life that are particularly valued include *"a role or identity, relationships, possibility of enjoyment, autonomy, security and potential for personal growth"* (World Health Organisation, 2015b, p28). The results from this PhD research clearly indicate that community groups for older adults have the potential to contribute to an older adult's ability to achieve a number of these key aspects of life. Of the six mentioned above, five appeared in the results of this research to be benefits that can be obtained from participating in community activity groups for older adults. The only aspect not mentioned in the research was security. Participating in either social or PA programs could provide benefits related to each of these values, with PA programs being particularly pertinent for maintaining the physical independence aspect of autonomy. Some of these benefits have been described in detail earlier in this discussion. Specifically, m*aintain a role or identity* and *develop relationships* have been discussed in thorough detail and *provide opportunities for enjoyment* has been described throughout the discussion in some detail. More detail about how community activity groups for older adults provide opportunities for

enjoyment, maintain autonomy and enable personal growth in relation to this research will be described below.

Provide opportunities for enjoyment: As discussed earlier, socialising in the groups was enjoyable for the members, as was participating in activities of interest. The fun and accepting social environment was particularly appreciated as a means of detachment from daily life. It provided means of escape from mental under-stimulation experienced in retirement or reprieve from daily stressors that occur with older age, such as illness (Chapter 7). This benefit has been previously associated with leisure for detachment from work (Korpela and Kinnunen 2010; Sonnentag and Niessen 2008; Sonnentag and Zijlstra 2006). This has rarely been documented in studies with older adults, but one qualitative study found that community provide programs provide a means of 'escape' from their daily lives (Killingback et al., 2017). The enjoyment derived from program participation and socialising was also particularly important for maintaining SWB (see Chapter 7) (Newman et al., 2014).

Maintain autonomy (maintaining physical and cognitive independence) The definition of autonomy used by the WHO in relation to Active Ageing relates to the opportunity to maintain independence (physical and social) and an ability to make decisions (cognitive independence) (World Health Organisation, 2015). Three aspects of the group membership were beneficial to autonomy as defined by the WHO, namely, maintenance of physical activity in the PA groups, cognitive challenge and development of strong friendships.

As described earlier, *maintenance of physical activity* in the PA groups led to perceived physical capacity benefits (e.g strength and 'feeling better' in every-day life) as well as physical health benefits (e.g. management of chronic illness (diabetes) that are in line with known benefits of regular PA (Kendig et al., 2014; Nash, 2012; Paterson & Warburton, 2010; Reiner et al., 2013).

Cognitive challenge was provided by a range of the activities, such as socialising with new people, dancing, mah-jong, and were perceived to be beneficial to cognitive health by participants in the focus groups. This is in line with evidence that group social activity participation has the potential to slow cognitive decline in older adults (Glei et al., 2005; C. Haslam et al., 2014). Research has found that it in particular, socialising in

groups plays a particularly important part in the cognitive benefits provided by group activity participation (Litwin & Stoeckel, 2016).

Some of the participants in the focus groups felt that community group membership may lead to the *development of strong friendships* that could be relied on in times of need, reducing a reliance of family support and contributing to an individual's autonomy. This was highly valued by the participants who experienced it. It is likely that this social support may take longer than one year to develop, so many participants felt they hadn't had the opportunity to develop these kinds of relationships yet.

Potential for personal growth: Activity groups appeared to be very important for personal growth and development. Social groups can provide an opportunity to develop new skills or share existing skills and knowledge with others (Adams et al., 2011; Iwasaki, 2008; Iwasaki et al., 2018; Liddle et al., 2013). Physical activities can offer personal growth through improvement of physical capacity and health (Beck et al., 2016; Bunn et al., 2008; Franco et al., 2015) (See also Chapter 7). The social atmosphere in both PA and social programs also provides an opportunity to develop social skills through association with a large and potentially diverse range of other people (Feeney & Collins, 2015; C. Haslam, Cruwys, Haslam, et al., 2016)(See Chapters 5 and 7).

Strengths and limitations of this PhD research

There are several strengths and limitations of this PhD research. Strengths relate to the design (mixed methods longitudinal study), setting (real life) and analysis methods (linear mixed models). Limitations relate to the small sample size, the lack of a true control group, and some design limitations relating to the use of self-report surveys and case studies.

Strengths

Design

Mixed methods

The use of mixed –methodologies, combining longitudinal survey study analysed quantitatively, with a qualitative exploration through focus group discussions and thematic analysis, was a strength of the current study. It allowed the researchers to not

only examine the association between becoming a member of a community group and social support and loneliness over an extended period, but also obtain a deeper understanding of the underlying mechanisms behind any associations. Given the variability of social support definitions in research (Williams et al., 2004) and the broad area of social wellbeing, it allowed for open exploration of the topic, to understand associations that may have otherwise been missed in a purely quantitative study.

Study duration

The duration of the study (one year) is another strength, especially compared to previous randomised controlled studies that are typically only six to sixteen weeks in length. Drop-out rate in the current study was also very low and probably attributable to the benefits of working with long-standing organisations.

Setting - Existing community activity group

Embedding the research in an existing community organisation was a strength because there had been very little previous literature investigating community activity groups and PA directly. The one study that was identified was a cross sectional study (Millard, 2017). Experimental PA interventions commonly published have poor transferability to the real world (Bauman, Merom, Bull, Buchner, & Fiatarone Singh, 2016). Utilising existing community resources for research has the benefit that any results are likely to be transferable outside of the research study, because the resource already exists. Whilst subject self-selection may be seen as a risk for bias in observational studies, it can also be viewed as a strength. The research conducted in this thesis demonstrates that there is individual variety of social need and also for activity preferences in older adults. Allowing them to choose their preferred activity would potentially lead to a result that is more relevant to a real-world setting (Black, 1996).

Limitations

Small sample size - survey study

Whilst utilisation of an existing community organisation had benefits in relation to transferability of findings to real world settings, this method also had limitations. The primary issue was related to recruitment for the survey study. Life Activities has a structure where each club is independent but loosely overseen by Life Activities Clubs

Victoria, where high-level governance and strategy occurs. The board members of the organisation and some of the clubs were supportive of the study. However, not all the clubs were interested in being involved. This meant that the pool of potential participants was smaller than initially anticipated. Following on from this, in order to observe the greatest possible 'treatment effects' of membership it was necessary to make new membership an inclusion criteria for the study. Recruiting new members of an organisation turned out to be innately challenging because they were not yet committed to the club. For example, some people did not want to commit to a year-long study if they were not sure how long they would be a member of the club. These two factors combined led to a smaller sample size than anticipated and, as a result, the study had less power to detect statistically significant changes in the main outcome measures over time (VanVoorhis & Morgan, 2007). In addition, statistical methods such as linear regression were not appropriate. Linear mixed models were chosen as the most appropriate statistical method as it makes optimal use of the sample by allowing people with missing data to be included in the analysis and thereby optimizing the study sample. Despite this limitation, the lack of existing evidence in the field meant that a small feasibility-type case study was a good sounding board for future larger scale research relating to community group participation and Active Ageing.

Lack of a 'true' control group

The mixed-methods study in this PhD research did not incorporate a true control group because a case study design was employed. In the second part of the mixed methods study, relating to the impact of community group involvement on PA, health and wellbeing over one-year, social program participants were used as a control group for comparison to the PA program participants but no non-intervention or waitlist control group was included (See Chapter 6). This means that the findings from the survey study may have possibly been reflective of changes that would have occurred in any older adult and not particularly demonstrative of effects of joining a LAC. The focus groups findings suggested otherwise and did support the findings of the survey. However, caution needs to be given to assuming any causation in the results observed.

Small number of focus groups

There were only two focus groups conducted from LAC and two from other organisations. Initially it was planned that six focus groups would be conducted utilising

survey study participants alone, but the small sample size precluded this. A further cohort from LACVI was recruited when it was realised that there were not enough participants to represent the survey study participants.

To increase the sample size of the focus group study, and also broaden the scope of the findings, it was decided to include participants from other community activity groups. Many organisations were approached but only a small number were willing to take part in the study. Ideally more focus groups would have been conducted overall, with an aim of achieving saturation. However, time and resource constraints limited the possibility of gaining many additional focus groups.

Design limitations

Self-report surveys

The use of a self-reported surveys will have added some error into the quantitative results. It is well-known that self-report surveys may suffer from recall bias due to a reliance on memory and subjective nature of interpretation of the questions. This has been documented previously to be particularly problematic with self-reported scales measuring PA in older adults and children (Sylvia, Bernstein, Hubbard, Keating, & Anderson, 2014). Objective measurement of PA using accelerometers has higher accuracy than self-report measures (Fjeldsoe, Winkler, Marshall, Eakin, & Reeves, 2013). Given the small sample size of the study conducted in this PhD research, it is possible that the self-report PA scale was not sensitive enough for the small numbers in this sample or the likely small changes that would have occurred due to the fact that participants had already high PA levels when they became a member. It would have been ideal if an objective measure of PA was used but this was not feasible for financial and practical reasons. Despite this limitation, the chosen self-report scale the Active Australia has been shown to be valid and reliable as a self-report survey in older adults (Heesch et al., 2011; Heesch, van Uffelen, & Brown, 2014) and responsive to change in interventions (Reeves, Marshall, Owen, Winkler, & Eakin, 2010).

Case study

Owing to the particularistic nature of case studies, it can be difficult to generalise to other types of organisations or groups, unless there is a great deal of similarity between

them (Yin, 1994). There are however, other types of community organisations in existence that have a similar structure to LACVI (Seniors centres (Bøen, 2012; Hutchinson & Gallant, 2016), Men's Sheds (Golding, 2011), University of the Third Age (C. Haslam, Cruwys, Milne, et al., 2016; Merriam & Kee, 2014), Japanese salons (Hikichi, Kondo, Takeda, & Kawachi, 2017; Hikichi et al., 2015) and it may be that the results from this study are transferable to these also. In addition, the additional focus groups added to the qualitative study gave some insight into the transferability of some of the findings to other types of community activity groups. A key limitation of the use of the case study in this program of research however is the inability to generalise findings to the general population. This is because the self-selecting nature of the study meant that only people who would normally join these types of organisations were included in the study and thus the findings can only generalise to club-seekers of similar organisations (Yin, 1994). Further work would be needed to explore whether these types of organisations have a similar impact on people who would not naturally join these clubs.

Implications

This PhD research suggests that community activity groups for older adults have the potential to benefit health and wellbeing of older adults; which appears to derive primarily from enjoyment of socialisation with others and the developing new and diverse networks as people age. Significant life events, especially retirement, may be an important time to focus on promotion of these groups to older adults. This is because these life events are a natural point of social flux and older adults may look for ways to re-invigorate their social relationships during these times specifically. It is known that older adults are more likely to have restricted networks than younger older adults (Fiori et al., 2007) and more adults join social activity groups after retirement than had been members prior to retirement (Cherry et al., 2016). This suggests a window of opportunity around the time of early retirement for promotions and tailoring of social and PA programs that appeal to younger old adults. It appears from this research that young older adults are most likely to engage with such programs, but it appears that programs for older adults do not currently appeal to them and instead are often viewed as being for 'old people'. The research shows that appropriate programs would target people who are aiming to maintain 'active healthy' identities. This is important because it suggests that at present there are people who may be missing out on the benefits of

being involved in groups for ‘older adults’ because of ways that they are promoted and perceived in the community. The work on the social identity and health (Haslam et al, 2018) sheds some light on some methods that may be able to change this. The first is that the negative stereotyping of older people as unwell or useless makes people try to prevent themselves as being seen as older for as long as possible. A long term strategy which is needed to prevent this and is currently occurring to some extent is a global reduction of ageism and age-discrimination. This obviously takes a very long time and many resources. One strategy is the World Health Organisaton “#YearsAhead” campaign, which encourages people to take photos of their older adult counterparts and post them on Instagram under the hashtag to demonstrate all the amazing things that older adults are achieving in the world (World Health Organisation, 2016). Alternatively and more achievable for community organisations in the short term is finding ways to promote programs as preventing age-related decline may encourage membership of these groups because it may allow the older adults to feel that they do not have to self-categorise as being ‘older’ and that group participation may actually help this.

Alternatively, the homogenisation of the ‘older adult’ categorization to approximate nothing more than being 60 years and over (Blytheway, 2005) is not particularly helpful for promoting programs, as we can see from the findings of this research. Therefore, using other categories that are more narrow (e.g. the young-old (65-74), middle -old (75-84) and old-old (85+) (Atchley, 1987, p15) may enable programs to target more specific groups. However, I would theorise from the findings of this study that people do not identify groups based on their age but their ability to offer something of value and interest to them. Blytheway (2005) also suggests the potential of focusing on transitions for definitions (e.g. post retirement), and potentially this may be a beneficial strategy in this case as the research suggested that transitions were indeed a key factor for membership.

In conclusion, the use of strategies to promote the programs emphasising the ‘Active Ageing’ benefits of the programs and targeting valuable activities at times of transition may be the most beneficial strategy in this case.

This PhD research also suggests that the availability of varied activities, both social and physical is valuable to encourage the diverse needs and interests of older adults who

may wish to be a part of such organisations. The activities themselves appear to provide a common interest for development of social connections with others whom they socially identify with.

Furthermore, the research indicates that social connections developed through socially focused PA and social programs lead to the health behaviours of the participants being influenced by their peers in the groups. This may encourage members of PA programs to maintain PA or social program participants may be encouraged by their peers to try physical activities that they had not previously have considered. This is further evidence for the importance of offering a variety of programs within the same organisation, which increases choice and the potential for cross-over from social to PA programs. If variety is not possible within one organisation, community partnerships between community groups may be an alternative to enable a greater variety of programs.

When designing these programs for older adults, it would be useful to consider the factors Detachment/Recovery, Autonomy, Mastery, Meaning and especially, Affiliation (i.e. the DRAMMA model). For example, consider allowing flexibility of attendance, flexibility or variety of programs offered, opportunities for learning or mastery or escape from stress or boredom, as well as social opportunities. These were demonstrated to be valued program aspects for enhancing the wellbeing of members of community groups for older adults in this PhD research.

The caveat to the above findings is that it is not possible to state that community activity groups for older adults can offer Active Ageing benefits to all older adults. Some older adults prefer to participate in solitary activities rather than social ones (Bruggencate et al., 2017). Such groups may also only be appealing to older adults in certain contexts or situations. For example, they may search for such groups at different life-stages or have different social identities and thus, their needs for groups will differ. Therefore, the availability of programs that fit with their circumstance or social identity will motivate or inhibit them from trying a group. It is thus important to offer a variety of types of programs to meet the needs of both young and older old adults, congruent with a range of social identities.

Conclusion

Participation in community activity groups for older adults can offer a variety of benefits, which are likely to improve the functional capacity of the participants and thereby promote 'Active Ageing'. These benefits are derived from both program factors, as well as social opportunities offered through the group nature. This may enable older adults who are interested in group-based activities to build new connections and relationships at times of life change, such as retirement or illness of a loved one. The relationships they develop in these groups can enable positive mental and physical health and wellbeing and a positive motivation for PA. The availability of a variety of programs, especially targeting people who are newly retired, would be a positive addition to the lives of older adults who desire additional social interaction. Furthermore, people who are not intrinsically motivated to do PA may be able to use positive group activities to enhance motivation to maintain adherence. In addition, people who enjoy PA may use PA groups to meet new people, especially at times where their social network changes (e.g. retirement). Furthermore, when cohesive relationships have developed in groups people may be open to trying new activities that their new friends suggest. This is a substantial benefit of multi activity groups where a variety of activities are offered.

Recommendations for Future Research

During the course of this PhD research a number of areas were uncovered that have potential for investigation in future research. These were: investigating the change in PA in inactive participants of community activity programs, larger studies utilising similar natural settings with a true control group, use of a group cohesiveness scale, explore whether utilisation of a greater number of DRAMMA model mechanisms in activity programs has a greater impact on wellbeing and investigate the factors that facilitate or inhibit older adults from joining community activity groups.

The participants in the study were initially active and this may have led to a ceiling effect in the study, where no further PA benefits were gained from participation in the PA programs. It would therefore be useful to include people who are not active in future studies, but this is typically very difficult to achieve. In line with this recommendation,

the interesting potential of social programs to encourage inactive older adults to try physical activities has intervention potential. Possibly PA could be built into social programs or offer PA try sessions where a number of participants from a social program participate together in some other physical activities offered at the same organisation.

The small sample size and lack of true control groups were limitations of this PhD research. Therefore, future studies would benefit from the using similar natural settings with existing community activity groups but with the inclusion of a wait-list control and a greater sample size to increase the statistical power and likelihood of observing statistically significant results.

Social support showed a tendency to increase in the survey study in this PhD research but there was suggestion in the focus groups that this was not the key factor that should be measured relating to social relationships in community activity groups for older adults. Rather, it would be useful to measure whether the social cohesion or social connectedness between individuals in the group changes over time and if this is related to PA levels.

There has been suggestion by the creators of the DRAMMA model, that potentially programs that incorporate a greater number of the mechanisms in the DRAMMA model have a greater impact on subjective wellbeing (Newman et al., 2014). It would be worth exploring this in future studies with older adults.

Finally, given the great potential for community groups for older adults to encourage Active Ageing, it is important to explore barriers and facilitators for joining such groups and strategies to engaged older adults in these groups. This research should incorporate people who are members and those who decline to be members or such groups.

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Appendices

Appendix 1:Participant information sheet

VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

INFORMATION TO PARTICIPANTS INVOLVED IN RESEARCH

You are invited to participate in a research project entitled:

Active and healthy ageing in the community: evaluation of the effect of a community based activity program on physical activity, health and wellbeing

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This project is being conducted by Gabrielle Lindsay Smith (Institute of Sport, Exercise and Active Living at Victoria University: ISEAL), Dr Jannique van Uffelen (ISEAL), Dr Lauren Banting (ISEAL), Dr Ineke Vergeer (ISEAL), Dr Jason Bennie (ISEAL) and Associate Professor Rochelle Eime (ISEAL)

Project explanation

This research project aims to evaluate the effects of membership in a community based activity program (Life Activities Clubs) on physical activity, health and wellbeing of new Life Activities Clubs members. This information sheet is related to the research study only. If you choose to take part in this research study, your participation will not change your involvement in your Life Activities Club in any way. Participation in this study will comprise of completing three surveys, and possibly attend focus groups (if you choose to) and allow the results of these measures to be used for research purposes, for example journal publications, research reports or conference presentations. All data will be de-identified in any research output, so the only risk involved in participation is related to the knowledge that your data are being collected for research purposes.

What will I be asked to do?

To participate in the research study, we will invite you to complete a survey at 3 time points, when you become a member, after 6 months and after 12 months, and possibly attend a focus group interview if you agree to be contacted for this. You can choose to complete the survey online, or we can send you a pen and paper survey to complete. There are no additional procedures involved in the research study. If you decide to participate in the research study, any information collected during your participation will

be accessible to the ISEAL research team for research purposes only. Only de-indentified group level results will be shared with Life Activities Clubs organisers, participants and the research community.

It will take around 30 minutes to complete the survey and will contain questions about:

- you, such as gender and age
- your health and wellbeing
- your lifestyle
- Some questions about your reasons for joining Life Activities Clubs, your attendance at activities and your expectations of the activities.

What will I gain from participating?

This study will help in the further understanding of the effects of a program like Life Activities Clubs on people's physical activity, health and wellbeing, but there is no tangible benefit for you personally to participate in the research project. Upon completion of the study you will be provided with the aggregated (summary) results. As a contribution towards your time invested in completing the survey, all participants who complete the survey receive a $10 coles/myer gift voucher and will go in into a draw to win a pair of gold cinema tickets at each time you complete a survey (at the beginning, after 6 and 12 months).

How will the information I give be used?

Your information will be used in scientific publications, research reports and conference presentations. All data will be de-identified and summarised in these presentations and individuals outside of the research team will not have access to your personal results.

What are the potential risks of participating in this project?

The surveys contain a number of questions about how you are feeling and you may feel some level of discomfort answering some of these questions, or you may feel pressured by Life Activities Clubs to participate in this study. It is important to remember that while the questions are useful to us, if you feel unable to answer a particular question you can leave it blank. If you feel distressed as a result of your participation in this research project, you are free to drop out of the project, with no repercussions and no explanation needed. If you do feel any amount of distress related to the research project, you can contact a university psychologist by calling Dr Glen Hoskin on: (03) 9919 2266.

How will this project be conducted?

You will have an opportunity to discuss the research study with members of the research team prior to making your decision to participate. You are most welcome to contact the researchers for more information after reading this information or notify them if you are interested in participating. If you are interested in participating, the researchers will take some personal details (your name, gender and contact details and the way you prefer to complete the surveys). The researchers will then send you your first survey and a study ID number and they will keep your personal details secure in a secure database. If you choose a pen and paper survey you will also receive a reply paid envelope. If you choose to participate, once you have received your survey we would like you to complete and return it **within 7 days**. You will receive a reminder if we have not heard from you **within 2 weeks**. Upon receiving your first completed survey the researchers will assume you would like to participate in the study.

The next 2 surveys will be sent to you after 6 months and 12 months of Life Activities Clubs membership. The surveys will be sent to you via post or email, depending on your initial preferences.

If you decide at any time that you would no longer like to be involved in the research study, please inform Gabby Lindsay Smith at gabrielle.lindsaysmith@live.vu.edu.au or tel (03) 9919 4329 or any of the investigators listed below. You can discontinue your participation in the evaluation study at any time without any penalty or prejudice. Your discontinuation in the study will in no way affect your membership, your participation or how you are treated by Life Activities Clubs. If you decide to cease your membership with Life Activities Clubs during the study period we will continue to contact you and invite you to complete the surveys at the allotted time points. If you would prefer not to, it would be very helpful to the research team if you would complete 3 short questions about your reasons for ceasing your membership of Life Activities Clubs.

Who is conducting the study?

Student Investigators

Gabby Lindsay Smith (PhD student)

Phone: (03) 9919 4329

Email: gabrielle.lindsaysmith@live.vu.edu.au

Chief Investigators

Dr Jannique van Uffelen

Email: jannique.vanuffelen@vu.edu.au

Dr Lauren Banting

Associate Investigators

Dr Ineke Vergeer

Dr Jason Bennie

Associate Professor Rochelle Eime

Any queries about your participation in this project may be directed to the Chief Investigators listed above.

If you have any queries or complaints about the way you have been treated, you may contact the Ethics Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University, PO Box 14428, Melbourne, VIC, 8001, email researchethics@vu.edu.au or phone (03) 9919 4781 or (03) 9919 4461.

Appendix 2: Participant consent form

VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

ACTIVE AND HEALTHY AGEING STUDY
CONSENT FORM FOR PARTICIPANTS

Thank you for your interest in this study. This study is a research study, so in order to proceed with the questionnaire, we would like to ensure you understand and are comfortable with your responses being used for research.

INFORMATION TO PARTICIPANTS

The research project aims to assess the impact on health and wellbeing of participating in Life Activities Clubs. Your participation in the research project will not influence your experience with your particular Life Activities Club or Life Activities Clubs Victoria. The research project asks you to allow your data collected in the survey to be used for research purposes for example journal publications, research reports, conference presentations. All data will be de-identified in any research output (publications etc).

CERTIFICATION BY SUBJECT

I certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the study: 'Active and healthy ageing in the community: evaluation of the effect of a community based activity program' being conducted at Victoria University by: Ms Gabby Lindsay Smith, Dr Jannique van Uffelen, Dr Lauren Banting, Dr Rochelle Eime and Dr Jason Bennie.

I certify that the objectives of the study, together with any risks and safeguards associated with the procedures listed below to be carried out in the research, have been fully explained to me and that I freely consent to participation involving the below mentioned procedures:

- Complete a survey 3 times (at the start, at 6 months and after 12 months)
- I agree to the research team to use the answers I give in the Active and Healthy Ageing survey for research purposes.

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time and that this withdrawal will not jeopardise my membership, participation, or how I am treated in any way. I also understand that I can leave blank any questions I feel unable to answer in the survey.

Any queries about your participation in this project may be directed to the researcher Gabby Lindsay Smith on (03) 9919 4329 or gabrielle.lindsaysmith@live.vu.edu.au

If you have any queries or complaints about the way you have been treated, you may contact the Ethics Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University, PO Box 14428, Melbourne, VIC, 8001, email researchethics@vu.edu.au or phone (03) 9919 4781 or (03) 9919 4461.

By returning your completed survey, you are indicating consent to participate in the research study.

Appendix 3: Baseline survey

VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

ISEAL
INSTITUTE OF SPORT,
EXERCISE AND ACTIVE LIVING

Active and healthy ageing in the community

Thank you for completing this survey. It should take 30-45 minutes to complete.	Only the **Research Team** staff will see your answers, and your information will be kept confidential and anonymous.
This questionnaire is about your health and wellbeing, your lifestyle, and your background. This information will be used to investigate the impact of being a member of Life Activities Clubs on your health and wellbeing over the next year.	Please read each question carefully and try to answer all the questions as accurately as you can. If you feel unable to answer a question you can leave it blank. If you are unsure how to answer any of the questions, please contact Gabby Ansems. It is important to be as honest as you can when answering the following questions, there are no right or wrong answers.

VICTORIA UNIVERSITY MELBOURNE AUSTRALIA | ISEAL INSTITUTE OF SPORT, EXERCISE AND ACTIVE LIVING **Baseline Survey** Life Activities Clubs™

Section 1

1.	What is your study ID number? (You can find this in the invitation letter you received from the research team)			
2.	Is English your first language?	Yes ☐ →	Continue to question 4	
		No ☐ →	Continue to next question	
3.	All questions in this survey are in English. Knowing this, do you feel able to complete them?	Yes ☐ →	Continue to next question	
		No ☐ →	Thank you very much for your interest in the study and taking the time to complete these questions. You do not have to continue with the survey. **Please send your survey back to the researchers in the prepaid envelope provided** We hope you enjoy being a member of Life Activities Clubs.	
4.	Are you a new member to Life Activities Clubs Victoria?	Yes ☐ →	Continue to question 6	
		No ☐ →	Continue to next question	
5.	Have you been a member of a Life Activities Club in the last 1 year?	Yes ☐ →	Thank you very much for your interest in the study and taking the time to complete these questions. Only new members who have not been a member in the past 1 year are eligible for this study. Unfortunately you do not meet the inclusion criteria for this research study so this is the end of the survey for you. This will not affect your ability to continue your membership of Life Activities Clubs. **Please send your survey back to the researchers in the prepaid envelope provided** We hope you enjoy being a member of Life Activities Clubs.	
		No ☐ →	Continue to next question	

VICTORIA UNIVERSITY MELBOURNE AUSTRALIA | ISEAL INSTITUTE OF SPORT, EXERCISE AND ACTIVE LIVING **Baseline Survey** Life Activities Clubs™

The following 3 questions aim to gain some understanding about your involvement in Life Activities Clubs

6. What is your home club?

Bacchus Marsh	☐	Darebin	☐	Port Phillip	☐
Ballarat	☐	Echuca	☐	Sandringham	☐
Balwyn	☐	Frankston	☐	Shepparton	☐
Benalla	☐	Hobsons Bay	☐	Surfcoast	☐
Bendigo	☐	Inner Melbourne	☐	Trentham	☐
Bentleigh	☐	Knox	☐	Wangaratta	☐
Boroondara	☐	Manningham	☐	Waverley	☐
Brighton Bayside	☐	Moonee Valley	☐	Whitehorse	☐
Casey/Cardinia	☐	Mornington	☐	Wodonga	☐
Croydon	☐	Pakenham/ Warragul	☐	Yarraville	☐
Other (specify)	☐				

7. What do you hope to get out of being a member of Life Activities Clubs? *(tick all that apply)*

Make new friends	☐	
Try something new	☐	
Do more physical activity	☐	
Do more craft activities	☐	
Do more cultural activities	☐	
Enjoy food and wine	☐	
Other *(please enter)*	☐	_____

8. What kinds of activities do you plan to take part in at your new club? (tick all that apply)

Physical activity	☐
Craft activities	☐
Art and literature activities	☐
Food and wine	☐
Entertainment	☐
Other *(please enter)*	☐ _____

Questions about your health and wellbeing

The following questions ask about your health, quality of life, whether you are currently experiencing and symptoms of depression, your life satisfaction, and a little about your social networks and friendships. If you would like to discuss any questions with the researchers please do not hesitate to contact us.

9. What is your :

Height (in cm/feet & inches. Without shoes)	_____	Please circle units you used below cm / feet & inches
Weight (in kilograms)	_____	Kg

10. Have you had a fall in the past 12 months?

Yes	☐
No	☐

11. Can you rate your fear of falling on a scale from 1-5 with 1 no fear at all and 5 strong fear of falling? *(tick one only)*

No Fear	1	2	3	4	5	Strong fear
	☐	☐	☐	☐	☐	

12. Please indicate whether a medical or health professional has diagnosed you with or treated you for any of the following conditions in the last 5 years, and if so, whether you have been prescribed medication to treat or manage that condition *(Please tick one response for each line).*

	Yes	Yes, and taking medication	No
Heart problems (including angina)	☐	☐	☐
High blood pressure	☐	☐	☐
High cholesterol	☐	☐	☐
Arthritis (including osteoarthritis, rheumatoid arthritis, other arthritis)	☐	☐	☐
Musculo-skeletal injuries	☐	☐	☐
Type 1 Diabetes	☐	☐	☐
Type 2 Diabetes	☐	☐	☐
Depression, Anxiety or other mental health condition	☐	☐	☐
Cancer (excluding skin cancer)	☐	☐	☐
Skin cancer	☐	☐	☐
Asthma	☐	☐	☐
Osteoporosis	☐	☐	☐
Other (please specify below if relevant):	☐	☐	☐

_____

13. In general, would you say your health is: *(tick one answer only)*

Excellent	Very good	Good	Fair	Poor
☐	☐	☐	☐	☐

14. The following questions are about activities you might do during a typical day. Does **your health now limit you** in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	☐	☐	☐
Climbing **several** flights of stairs:	☐	☐	☐

15. During the **past 4 weeks**, how much of the time have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Accomplished less than you would like	☐	☐	☐	☐	☐
Were limited in the **kind** of work or other activities	☐	☐	☐	☐	☐

16. During the **past 4 weeks**, how much of the time have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Accomplished less than you would like	☐	☐	☐	☐	☐
Did work or other activities **less carefully than usual**	☐	☐	☐	☐	☐

17. During the **past 4 weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?

Not At All	A Little Bit	Moderately	Quite A Bit	Extremely
☐	☐	☐	☐	☐

18. These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the **past 4 weeks**...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Have you felt calm and peaceful?	☐	☐	☐	☐	☐
Did you have a lot of energy?	☐	☐	☐	☐	☐
Have you felt downhearted and depressed?	☐	☐	☐	☐	☐

19. During the **past 4 weeks**, how much of the time has your **physical health or emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
☐	☐	☐	☐	☐

20. During a typical day, does your health **now limit you** in being able to walk **100m**? If so how much?

Yes limited a lot	Yes, limited a little	No, not limited at all
☐	☐	☐

21. Do you use any aids for getting around? (Mark all that apply)

Motorised scooter	☐
Wheelchair (motorised or not)	☐
Walking or wheeled frame	☐
Walking or quad stick	☐
I do not use any aids for getting around	☐

22. Please read each statement and indicate a number 0, 1, 2 or 3 that indicates how much the statement applied to you **over the past week**. There are no right or wrong answers. Do not spend too much time on any statement.

	0 Never	1 Sometimes	2 Often	3 Almost always
I couldn't seem to experience any positive feeling at all	☐	☐	☐	☐
I found it difficult to work up the initiative to do things	☐	☐	☐	☐
I felt that I had nothing to look forward to	☐	☐	☐	☐
I felt down-hearted and blue	☐	☐	☐	☐
I was unable to become enthusiastic about anything	☐	☐	☐	☐
I felt I wasn't worth much as a person	☐	☐	☐	☐
I felt that life was meaningless	☐	☐	☐	☐
I felt terrific!	☐	☐	☐	☐

23. Thinking about your own life and personal circumstances, how satisfied are you with your life as a whole? *0= least satisfied, 10= most satisfied. (tick one number only)*

Completely unsatisfied — *Neutral* — *Completely satisfied*

0	1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

The next questions are about your social support and friendships.

24. Here is a list of some things that other people do for us or give us that may be helpful or supportive. Please read each statement carefully and place a mark in the column that is closest to your situation. Give only 1 answer per row.

	As much as I would like	Almost as much as I would like	Some, but would like more	Less than I would like	Much less than I would like
I have people who care what happens to me	☐	☐	☐	☐	☐
I get love and affection	☐	☐	☐	☐	☐
I get chances to talk to someone about problems at work or with my housework	☐	☐	☐	☐	☐
I get chances to talk to someone I trust about my personal or family problems	☐	☐	☐	☐	☐
I get chances to talk about money matters	☐	☐	☐	☐	☐
I get invitations to go out and do things with other people	☐	☐	☐	☐	☐
I get useful advice about important things in life	☐	☐	☐	☐	☐
I get help when I am sick in bed	☐	☐	☐	☐	☐

25. Please indicate for each of the 11 statements below, the extent to which they apply to your situation, the way you feel **now**. Please, tick the appropriate answer.

	Yes!	Yes	More or less	No	No!
There is always someone I can talk to about my day-to-day problems	☐	☐	☐	☐	☐
I miss having a really close friend	☐	☐	☐	☐	☐
I experience a general sense of emptiness	☐	☐	☐	☐	☐
There are plenty of people I can lean on when I have problems	☐	☐	☐	☐	☐
I miss the pleasure of the company of others	☐	☐	☐	☐	☐
I find my circle of friends and acquaintances too limited	☐	☐	☐	☐	☐
There are many people I can trust completely	☐	☐	☐	☐	☐
There are enough people I feel close to	☐	☐	☐	☐	☐
I miss having people around me	☐	☐	☐	☐	☐
I often feel rejected	☐	☐	☐	☐	☐
I can call on my friends whenever I need them	☐	☐	☐	☐	☐

26. The next questions are about how you feel about different aspects of your life. For each one, tell us how often you feel that way.

	Hardly Ever	Some of the Time	Often
How often do you feel that you lack companionship?	☐	☐	☐
How often do you feel left out?	☐	☐	☐
How often do you feel isolated from others?	☐	☐	☐

VICTORIA UNIVERSITY MELBOURNE AUSTRALIA | ISEAL INSTITUTE OF SPORT, EXERCISE AND ACTIVE LIVING **Baseline Survey** Life Activities Clubs™

Please consider the following statements related to friendships and social interactions.

27. For each of the following statements, please indicate your agreement, using the following scale: *(please tick one response per line)*

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly agree
I believe making friends could be beneficial to me	☐	☐	☐	☐	☐	☐	☐
I think making friends is enjoyable or fun	☐	☐	☐	☐	☐	☐	☐
People who are important to me think it is a good decision for me to keep making friends	☐	☐	☐	☐	☐	☐	☐
Most people who are important to me have good friendships with others	☐	☐	☐	☐	☐	☐	☐
I believe that I am able to make new friends	☐	☐	☐	☐	☐	☐	☐
I think that social interactions are important for my overall health	☐	☐	☐	☐	☐	☐	☐

You have now completed the questions about health and wellbeing, is there anything else that you would like to share with us about this?

VICTORIA UNIVERSITY MELBOURNE AUSTRALIA | ISEAL INSTITUTE OF SPORT, EXERCISE AND ACTIVE LIVING

Baseline Survey

Life Activities Clubs™

Questions about your lifestyle

The following section contains questions about your physical activity levels, and other aspects of your lifestyle including smoking, alcohol intake and diet.

The next questions are about any physical activities that you may have done in the last week			
28.	In the last week, how many times have you walked continuously, for at least 10 minutes, for recreation, exercise or to get to or from places?	_____	Times
	What do you estimate was the total time that you spent walking in this way in the last week?	_____	Hours
	In hours and/or minutes	_____	Minutes
29.	In the last week, how many times did you do any vigorous gardening or heavy work around the yard, which made you breathe harder or puff and pant?	_____	Times
	What do you estimate was the total time that you spent doing vigorous gardening or heavy work around the yard in the last week?	_____	Hours
	In hours and/or minutes	_____	Minutes
The next questions exclude household chores, gardening or yardwork:			
30.	In the last week, how many times did you do any vigorous physical activity which made you breathe harder or puff and pant? (e.g. jogging, cycling, aerobics, competitive tennis)	_____	Times
	What do you estimate was the total time that you spent doing this vigorous physical activity in the last week?	_____	Hours
	In hours and/or minutes	_____	Minutes
31.	In the last week, how many times did you do any other more moderate physical activities that you have not already mentioned? (e.g. gentle swimming, social tennis, golf	_____	Times
	What do you estimate was the total time that you spent doing these activities in the last week?	_____	Hours
	In hours and/or minutes	_____	Minutes

VICTORIA UNIVERSITY MELBOURNE AUSTRALIA | ISEAL INSTITUTE OF SPORT, EXERCISE AND ACTIVE LIVING

Baseline Survey

Life Activities Clubs™

The next questions are about your strength or toning activity participation

32.	Did you undertake any strength or toning activity in the last week? e.g. circuit training, machine weights.	☐ Yes ☐ No
33.	In the last week, how many times did you do strength or toning activities?	_____ times
	What do you estimate was the total time that you spent doing strength or toning activities in the last week? *In hours and/or minutes*	_____ hours _____ minutes

34. I believe that I am doing enough exercise/physical activity to achieve health benefits

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
☐	☐	☐	☐	☐

35. Please estimate how much time you spend **sitting** each day in the following situations

	Week day Hours	Week day Minutes	Weekend day Hours	Weekend day Minutes
While traveling to and from places	_____	_____	_____	_____
While at work	_____	_____	_____	_____
While watching television	_____	_____	_____	_____
While using a computer at home	_____	_____	_____	_____
In your leisure time, NOT including television (e.g., visiting friends, movies, dining out, etc.)	_____	_____	_____	_____

36. For each of the following statements, please indicate your agreement, using the following scale:

	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
I believe doing physical activity is beneficial for me	☐	☐	☐	☐	☐	☐	☐
I think doing physical activity is enjoyable or fun	☐	☐	☐	☐	☐	☐	☐
People who are important to me think it is good for me to do more physical activity	☐	☐	☐	☐	☐	☐	☐
Most people who are important to me regularly participate in physical activity	☐	☐	☐	☐	☐	☐	☐
I believe that I am able to do regular physical activity	☐	☐	☐	☐	☐	☐	☐
I feel I have the skills and knowledge to participate in physical activity	☐	☐	☐	☐	☐	☐	☐

The following questions are about alcohol intake and smoking

37. How often do you drink alcohol?

I have never drunk alcohol in my life	☐	On 1 or 2 days a week	☐
I never drink alcohol, but I have in the past	☐	On 3 or 4 days a week	☐
I drink rarely	☐	On 5 or 6 days a week	☐
Less than once a week	☐	Every day	☐

38. On a day when you drink alcohol, how many drinks do you usually have? (see refer to standard drink estimates below

1 or 2 drinks per day	☐	5 to 8 drinks per day	☐
3 or 4 drinks per day	☐	9 or more drinks per day	☐

The following question is about your smoking history

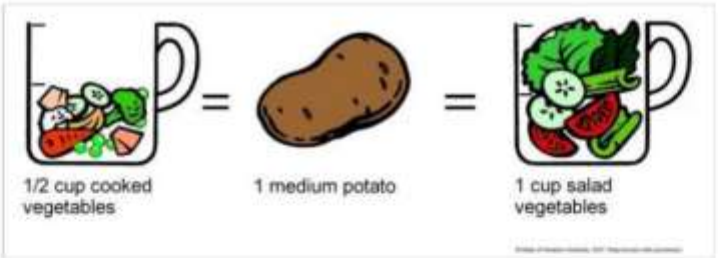
39. Are you a:

Smoker	☐
Ex-Smoker	☐
Non-smoker	☐

The following question is about your intake of fruit and vegetables

40. How many serves of fruit and vegetables do you usually eat each day**? Please select the most appropriate response relating to vegetables.** Please refer to the standard sizes for a serve of vegetables below.

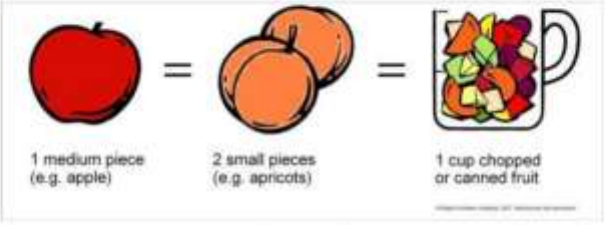
One serve of vegetables



I don't eat vegetables ☐	less than one serve ☐	1 serve ☐	2 serves ☐
3 serves ☐	4 serves ☐	5 serves ☐	6 serves or more ☐

41. How many serves of fruit and vegetables do you usually eat each day? **Please select the most appropriate response relating to fruit.** Please refer to the standard sizes for a serve of fruit below.

One serve of fruit



I don't eat fruit ☐	less than one serve ☐	1 serve ☐	2 serves ☐
3 serves ☐	4 serves ☐	5 serves ☐	6 serves or more ☐

Questions about you

42. What is your residential postcode? _____

43. What is your date of birth? Day _____ Month _____ Year _____

44. Are you male or female? Male ☐ Female ☐

45. What is your highest level of education? (Please tick the appropriate response).

Never attended school ☐	Completed high school (i.e. Year 12, Form 6, HSC) ☐
Some primary school ☐	TAFE or Trade Certificate or Diploma ☐
Completed primary school ☐	University, CAE or some other Tertiary Institute degree, including post university (i.e. postgraduate diploma, Master's degree, PhD) ☐
Some high school (i.e. Year 7 to Year 11, Form 1 to Form 5) ☐	Other (Specify) ☐

46. Which of the following best describes your main current employment situation ? (tick one only)

Full time employment	☐	Retired	☐
Part time employment	☐	Unemployed	☐
Casual	☐		

47. How do you manage on the income you have available? (Tick one only)

It is impossible	It is difficult all the time	It is difficult some of the time	It is not too bad	It is easy
☐	☐	☐	☐	☐

48. In regard to the work you have done for most of your life, what has been your **MAIN** occupation? (Please tick one response only)

Manager/Administrator	☐	Intermediate clerical, sales or service	☐
Professional	☐	Intermediate production and transport	☐
Associate professional	☐	Elementary clerical, sales or service	☐
Trades persons	☐	Labourers & related workers	☐
Advanced clerical or service	☐	Other (Specify) _____	☐

49. In which country were you born?

Australia (includes External Territories)	☐	China	☐
United Kingdom (incl. England, Scotland, Wales, Northern Ireland)	☐	Vietnam	☐
New Zealand	☐	Lebanon	☐
Italy	☐	Other (Specify) _____	☐
Greece	☐	Don't know	☐

50. What is your present marital status? *Tick one only*

Never married	☐	Divorced	☐
Married/defacto	☐	Widowed	☐
Separated	☐		

51. You had a choice between receiving a pen and paper survey and an online survey. Please indicate to what extent each of the factors below influenced your choice.

	Not at all	A Little Bit	Moderately	Quite A Bit	Extremely
More convenient	☐	☐	☐	☐	☐
Ease of completing	☐	☐	☐	☐	☐
Data security	☐	☐	☐	☐	☐
Other (please indicate below)	☐	☐	☐	☐	☐

52. After completing this questionnaire, would you make the same choice for future surveys?

Yes ☐		
No ☐	→	Please indicate why you would prefer the other method in the space below.

Is there anything else you would like to share with us?

Thank you very much for taking the time to complete this survey.

Please tick the box below if it would be possible for us to contact you again during the study to possibly take part in some focus groups around your experiences of being involved in Life Activities Clubs.

☐ yes, I would be happy for you to contact me about the focus groups

Appendix 4: Six-month survey: (Six and twelve month surveys are the same so only six month version shown here)

VICTORIA UNIVERSITY
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Active and healthy ageing in the community

Thank you for completing this survey. It should take 30-45 minutes to complete.	Only the **Research Team** staff will see your answers, and your information will be kept confidential and anonymous.
This questionnaire is about your health and wellbeing, your lifestyle, and your background. This information will be used to investigate the impact of being a member of Life Activities Clubs on your health and wellbeing.	Please read each question carefully and try to answer all the questions as accurately as you can. If you feel unable to answer a question you can leave it blank. If you are unsure how to answer any of the questions, please contact Gabby Lindsay Smith. It is important to be as honest as you can when answering the following questions, there are no right or wrong answers.
Even if you are no longer a member of a Life Activities Club, we are still very interested in your responses to this survey. If you are no longer a member, you will be asked some questions about your health as well as some questions about why you are no longer a member.	

VICTORIA UNIVERSITY MELBOURNE AUSTRALIA | ISEAL INSTITUTE OF SPORT, EXERCISE AND ACTIVE LIVING

6 month survey

Life Activities Clubs™

Section 1

1.	What is your study ID number? (On the study invitation letter you received)	

The following 3 questions aim to gain some understanding about your involvement in Life Activities Clubs in the past 6 months

2. Please rate your agreement with the following statements about your involvement so far with your Life Activities Club

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I have made new friends	☐	☐	☐	☐	☐
I have tried something new	☐	☐	☐	☐	☐
I have increased my physical activity levels	☐	☐	☐	☐	☐
I have increased my craft activities	☐	☐	☐	☐	☐
I have participated in more cultural activities	☐	☐	☐	☐	☐
I have participated in more food and wine events	☐	☐	☐	☐	☐
I have learned a new skill	☐	☐	☐	☐	☐
I have enhanced an existing skill	☐	☐	☐	☐	☐
I have participated in more social occasions	☐	☐	☐	☐	☐

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6 month survey

Life Activities Clubs™

3. In the last month please consider the activities you have taken part in at your Life Activities Club and tell us how many times you have done each of the following:

Physical activity sessions (e.g. walking, table tennis, cycling)	_____	times
Craft activity sessions	_____	times
Art and literature activities	_____	times
Food and drink sessions	_____	times
Entertainment sessions	_____	times
Other (please specify) _____	_____	times

4. In an average week how many times would you attend a physical activity session at your Life Activities Club? *(tick one only)*

Never	☐	**Go to question 7**
Less than 1x per week	☐	
1-2x per week	☐	
2-3x per week	☐	
3-4 x per week	☐	

5. What is the most common physical activity you do at your Life Activities Club? *(tick one only)*

Walking	☐	Bowls	☐
Table Tennis	☐	Golf	☐
Dancing	☐	Cycling	☐
Exercise Class	☐	Other (please specify below)	☐
		_____	

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6 month survey

Life Activities Clubs™

6. Thinking about the physical activity you indicated in question 5, can you rate the intensity of the last time you did it?

Low	Moderate	Vigorous
(Easy, didn't make your heart beat faster and you didn't feel out of breath)	(Required a moderate amount of effort and made your heart beat and breathing a little faster and made you feel slightly warm but you can still hold a conversation)	(Required a large amount of effort, made your heart beat much faster and made you feel out of breath, hot or sweaty and talking was difficult)
☐	☐	☐

7. Have you discontinued your involvement with your Life Activities Club?

Yes	☐	→ **Complete questions 8-10 below.**
No	☐	→ **Skip to question number 11**

8. Please select your reasons for discontinuing membership of Life Activities Clubs from the list below (select all that apply)

Lack of time	☐
It wasn't what I expected	☐
I didn't enjoy it	☐
Moved out of the area	☐
Other (please specify)	☐ _____

9. Would you consider joining Life Activities Clubs again in the future?

Yes	☐
No	☐
Unsure	☐

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6 month survey

Life Activities Clubs™

10.	Do you have any suggestions for improvements to Life Activities Clubs? (please enter them in the free text box below)	

Thank you for answering these questions about your reasons for ceasing membership of Life Activities Clubs. If you would like to complete the remainder of the questions it would be valuable to us. If not, simply stop now and return the survey in the reply paid envelope provided.

Questions about your health and wellbeing

The following questions ask about your health, quality of life, whether you are currently experiencing and symptoms of depression, your life satisfaction, and a little about your social networks and friendships. If you would like to discuss any questions with the researchers please do not hesitate to contact us.

11. What is your : Weight (in kilograms without shoes) _____ Kg

12. Have you had a fall in the past 6 months?

Yes	☐
No	☐

13. Can you rate your fear of falling on a scale from 1-5 with 1 no fear at all and 5 strong fear of falling? *(tick one only)*

No Fear	1	2	3	4	5	Strong fear
	☐	☐	☐	☐	☐	

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6 month survey

Life Activities Clubs™

14. Please indicate whether a medical or health professional has diagnosed you with or treated you for any of the following conditions in the last 6 months, and if so, whether you have been prescribed medication to treat or manage that condition *(Please tick one response for each line).*

	Yes	Yes, and taking medication	No
Heart problems (including angina)	☐	☐	☐
High blood pressure	☐	☐	☐
High cholesterol	☐	☐	☐
Arthritis (including osteoarthritis, rheumatoid arthritis, other arthritis)	☐	☐	☐
Musculo-skeletal injuries	☐	☐	☐
Type 1 Diabetes	☐	☐	☐
Type 2 Diabetes	☐	☐	☐
Depression, Anxiety or other mental health condition	☐	☐	☐
Cancer (excluding skin cancer)	☐	☐	☐
Skin cancer	☐	☐	☐
Asthma	☐	☐	☐
Osteoporosis	☐	☐	☐
Other (please specify below if relevant):	☐	☐	☐

_____

15. In general, would you say your health is: *(tick one answer only)*

Excellent	Very good	Good	Fair	Poor
☐	☐	☐	☐	☐

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6 month survey

Life Activities Clubs™

16. The following questions are about activities you might do during a typical day. Does **your health now limit you** in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	☐	☐	☐
Climbing **several** flights of stairs:	☐	☐	☐

17. During the **past 4 weeks**, how much of the time have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Accomplished less than you would like	☐	☐	☐	☐	☐
Were limited in the **kind** of work or other activities	☐	☐	☐	☐	☐

18. During the **past 4 weeks**, how much of the time have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Accomplished less than you would like	☐	☐	☐	☐	☐
Did work or other activities **less carefully than usual**	☐	☐	☐	☐	☐

19. During the **past 4 weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?

Not At All	A Little Bit	Moderately	Quite A Bit	Extremely
☐	☐	☐	☐	☐

20. These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the **past 4 weeks**...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Have you felt calm and peaceful?	☐	☐	☐	☐	☐
Did you have a lot of energy?	☐	☐	☐	☐	☐
Have you felt downhearted and depressed?	☐	☐	☐	☐	☐

21. During the **past 4 weeks**, how much of the time has your **physical health or emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
☐	☐	☐	☐	☐

22. During a typical day, does your health **now limit you** in being able to walk **100m**? If so how much?

Yes limited a lot	Yes, limited a little	No, not limited at all
☐	☐	☐

23. Do you use any aids for getting around? (Mark all that apply)

Motorised scooter	☐
Wheelchair (motorised or not)	☐
Walking or wheeled frame	☐
Walking or quad stick	☐
I do not use any aids for getting around	☐

24. Please read each statement and indicate a number 0, 1, 2 or 3 that indicates how much the statement applied to you **over the past week**. There are no right or wrong answers. Do not spend too much time on any statement.

	0 Never	1 Sometimes	2 Often	3 Almost always
I couldn't seem to experience any positive feeling at all	☐	☐	☐	☐
I found it difficult to work up the initiative to do things	☐	☐	☐	☐
I felt that I had nothing to look forward to	☐	☐	☐	☐
I felt down-hearted and blue	☐	☐	☐	☐
I was unable to become enthusiastic about anything	☐	☐	☐	☐
I felt I wasn't worth much as a person	☐	☐	☐	☐
I felt that life was meaningless	☐	☐	☐	☐
I felt terrific!	☐	☐	☐	☐

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6 month survey

Life Activities Clubs™

25. Thinking about your own life and personal circumstances, how satisfied are you with your life as a whole? *0= least satisfied, 10= most satisfied. (tick one number only)*

Completely unsatisfied — *Neutral* — *Completely satisfied*

0	1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

The next questions are about your social support and friendships.

26. Here is a list of some things that other people do for us or give us that may be helpful or supportive. Please read each statement carefully and place a mark in the column that is closest to your situation. Give only 1 answer per row.

	As much as I would like	Almost as much as I would like	Some, but would like more	Less than I would like	Much less than I would like
I have people who care what happens to me	☐	☐	☐	☐	☐
I get love and affection	☐	☐	☐	☐	☐
I get chances to talk to someone about problems at work or with my housework	☐	☐	☐	☐	☐
I get chances to talk to someone I trust about my personal or family problems	☐	☐	☐	☐	☐
I get chances to talk about money matters	☐	☐	☐	☐	☐
I get invitations to go out and do things with other people	☐	☐	☐	☐	☐
I get useful advice about important things in life	☐	☐	☐	☐	☐
I get help when I am sick in bed	☐	☐	☐	☐	☐

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6 month survey

Life Activities Clubs™

27. Please indicate for each of the 11 statements below, the extent to which they apply to your situation, the way you feel **now**. Please, tick the appropriate answer.

	Yes!	Yes	More or less	No	No!
There is always someone I can talk to about my day-to-day problems	☐	☐	☐	☐	☐
I miss having a really close friend	☐	☐	☐	☐	☐
I experience a general sense of emptiness	☐	☐	☐	☐	☐
There are plenty of people I can lean on when I have problems	☐	☐	☐	☐	☐
I miss the pleasure of the company of others	☐	☐	☐	☐	☐
I find my circle of friends and acquaintances too limited	☐	☐	☐	☐	☐
There are many people I can trust completely	☐	☐	☐	☐	☐
There are enough people I feel close to	☐	☐	☐	☐	☐
I miss having people around me	☐	☐	☐	☐	☐
I often feel rejected	☐	☐	☐	☐	☐
I can call on my friends whenever I need them	☐	☐	☐	☐	☐

28. The next questions are about how you feel about different aspects of your life. For each one, tell us how often you feel that way.

	Hardly Ever	Some of the Time	Often
How often do you feel that you lack companionship?	☐	☐	☐
How often do you feel left out?	☐	☐	☐
How often do you feel isolated from others?	☐	☐	☐

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6 month survey

Life Activities Clubs™

Please consider the following statements related to friendships and social interactions.

29. For each of the following statements, please indicate your agreement, using the following scale: *(please tick one response per line)*

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly agree
I believe making friends could be beneficial to me	☐	☐	☐	☐	☐	☐	☐
I think making friends is enjoyable or fun	☐	☐	☐	☐	☐	☐	☐
People who are important to me think it is a good decision for me to keep making friends	☐	☐	☐	☐	☐	☐	☐
Most people who are important to me have good friendships with others	☐	☐	☐	☐	☐	☐	☐
I believe that I am able to make new friends	☐	☐	☐	☐	☐	☐	☐
I think that social interactions are important for my overall health	☐	☐	☐	☐	☐	☐	☐

You have now completed the questions about health and wellbeing, is there anything else that you would like to share with us about this?

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6 month survey

Life Activities Clubs™

Questions about your lifestyle

The following section contains questions about your physical activity levels, and other aspects of your lifestyle including smoking, alcohol intake and diet.

The next questions are about any physical activities that you may have done in the last week			
30.	In the last week, how many times have you walked continuously, for at least 10 minutes, for recreation, exercise or to get to or from places?	_____	Times
	What do you estimate was the total time that you spent walking in this way in the last week?	_____	Hours
	In hours and/or minutes	_____	Minutes
31.	In the last week, how many times did you do any vigorous gardening or heavy work around the yard, which made you breathe harder or puff and pant?	_____	Times
	What do you estimate was the total time that you spent doing vigorous gardening or heavy work around the yard in the last week?	_____	Hours
	In hours and/or minutes	_____	Minutes
The next questions exclude household chores, gardening or yardwork:			
32.	In the last week, how many times did you do any vigorous physical activity which made you breathe harder or puff and pant? (e.g. jogging, cycling, aerobics, competitive tennis)	_____	Times
	What do you estimate was the total time that you spent doing this vigorous physical activity in the last week?	_____	Hours
	In hours and/or minutes	_____	Minutes
33.	In the last week, how many times did you do any other more moderate physical activities that you have not already mentioned? (e.g. gentle swimming, social tennis, golf	_____	Times
	What do you estimate was the total time that you spent doing these activities in the last week?	_____	Hours
	In hours and/or minutes	_____	Minutes

VICTORIA UNIVERSITY MELBOURNE AUSTRALIA | ISEAL INSTITUTE OF SPORT, EXERCISE AND ACTIVE LIVING

6 month survey

Life Activities Clubs™

The next questions are about your strength or toning activity participation

34.	Did you undertake any strength or toning activity in the last week? e.g. circuit training, machine weights.	☐ Yes ☐ No
35.	In the last week, how many times did you do strength or toning activities?	_____ times
	What do you estimate was the total time that you spent doing strength or toning activities in the last week? *In hours and/or minutes*	_____ hours _____ minutes

36. I believe that I am doing enough exercise/physical activity to achieve health benefits

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
☐	☐	☐	☐	☐

37. Please estimate how much time you spend **sitting** each day in the following situations

	Week day Hours	Week day Minutes	Weekend day Hours	Weekend day Minutes
While traveling to and from places	_____	_____	_____	_____
While at work	_____	_____	_____	_____
While watching television	_____	_____	_____	_____
While using a computer at home	_____	_____	_____	_____
In your leisure time, NOT including television (e.g., visiting friends, movies, dining out, etc.)	_____	_____	_____	_____

38. For each of the following statements, please indicate your agreement, using the following scale:

	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
I believe doing physical activity is beneficial for me	☐	☐	☐	☐	☐	☐	☐
I think doing physical activity is enjoyable or fun	☐	☐	☐	☐	☐	☐	☐
People who are important to me think it is good for me to do more physical activity	☐	☐	☐	☐	☐	☐	☐
Most people who are important to me regularly participate in physical activity	☐	☐	☐	☐	☐	☐	☐
I believe that I am able to do regular physical activity	☐	☐	☐	☐	☐	☐	☐
I feel I have the skills and knowledge to participate in physical activity	☐	☐	☐	☐	☐	☐	☐

Please turn over

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6 month survey

Life Activities Clubs™

Questions about you

39. What is your date of birth? **Day** **Month** **Year**

40. Which of the following best describes your main current employment situation ? (tick one only)

Full time employment	☐	Retired	☐
Part time employment	☐	Unemployed	☐
Casual	☐		

41. How do you manage on the income you have available? (Tick one only)

It is impossible	It is difficult all the time	It is difficult some of the time	It is not too bad	It is easy
☐	☐	☐	☐	☐

42. What is your present marital status? *Tick one only*

Never married	☐	Divorced	☐
Married/defacto	☐	Widowed	☐
Separated	☐		

Thank you very much for taking the time to complete this survey and taking part in this important study.

If you have any other comments please write them below:

_____

_____

_____

Appendix 5: Focus group information form

INFORMATION TO PARTICIPANTS INVOLVED IN RESEARCH

You are invited to participate in a research project entitled

Active and healthy ageing in the community: The relationship between social support, physical activity behaviour and health in community organisations.

This project is being conducted by
Gabrielle Ansems (Institute of Sport, Exercise and Active Living at Victoria University: ISEAL), Dr Rochelle Eime (ISEAL), Dr Jannique van Uffelen (ISEAL), Dr Lauren Banting (ISEAL), Dr Grant O'Sullivan (ISEAL).

Project explanation

This project aims to gain a deeper understanding of the life experiences of older adults who do and don't take part in community organisations (such as Life Activities Clubs Victoria). The researchers hope to gain a better understanding of the factors which may impact physical activity and wellbeing in older people. It also aims to investigate how these factors differ in members and non-members of community organisations. This information sheet is related to this focus group study only. Participation in the research project is completely voluntary. Participation in this study will involve participation in one focus group and results of the discussion to be used for research purposes, for example journal publications, research reports or conference presentations. When we report the results of the study, primarily the themes of each focus group will be used. However in any direct quotes that are used for the research reports your personal details will not be included and an alias will be given to the quote (e.g. 'participant number x'). During the focus groups the researchers will ask all participants to keep any information discussed confidential. However, you may know someone at the focus group so we cannot guarantee that you will be anonymous.

What will I be asked to do?

To participate in the research project, we will invite you to take part in one focus group lasting 70-90 minutes in a location that is central to the people involved in the focus group (either at a local Life Activities Club meeting room or a meeting room at the Council of the Aged in central Melbourne). When you first arrive you will also complete a very short demographic survey asking about your age, background and education. If you decide to participate in the research project, any information collected during your participation will be accessible to the ISEAL research team for research purposes only. Only de-identified group level results will be shared with Life Activities Clubs Board members, other study participants, and the research community.
The focus group will be guided by a semi-structured interview guide and the topics will be factors which assist or prevent you taking part in physical activity or becoming a member of a community group. We will also be asking about your opinion of community activity organisations (like Life Activities Clubs or Probus) to give us information which may assist in improving similar organisations in future.

What will I gain from participating?

This study will help in the further understanding of the effects of a program like Life Activities Clubs and other community organisations on older people's physical activity, health and wellbeing, but there is no tangible benefit for you personally to participate. Upon completion of the study you will be provided with a summary of the results. As a contribution towards your time invested in completing the focus group and travel to and from the venue, all participants who complete the focus groups will receive a $20 shopping voucher.

How will the information I give be used?

Your information will be used in scientific and public health related publications, research reports and conference presentations. All data will be de-identified and summarised in these presentations and individuals outside of the research team will not have access to your personal results.

What are the potential risks of participating in this project?

There is no risk involved in completing the surveys. We don't plan to discuss any distressing topics during the focus groups but they are designed to encourage free discussion so we cannot guarantee that discussion will not naturally flow to a topic that may be distressing to you. The researchers will guide the conversation as best as possible to ensure this risk is minimised. Please also be aware that we will ask for all members to maintain confidentiality around what is discussed in the focus groups but we cannot guarantee that all participants will maintain this confidentiality. You only need to discuss things you feel comfortable discussing with the group. If you feel stressed or upset as a result of your participation in the focus group, you are free leave the discussion, with no repercussions and no explanation needed. If you do feel any amount of distress related to the research project, you can contact a university psychologist by calling Dr Glen Hosking on: (03) 9919 2266.

How will this project be conducted?

You will have an opportunity to discuss the research project with members of the research team prior to making your decision to participate. You are most welcome to contact the researchers for more information after reading this information or notify them if you are interested in participating. If you are interested in participating, the researchers will take some personal details (your name, gender and contact details). Once recruitment closes the researchers will randomly select a number of people to take part in the focus groups and you will be notified if this is you. The researchers will then arrange the focus group in a location and time most convenient to the participants.

When you first attend the focus group you will be asked to complete a short (9 questions) demographic survey (e.g. age, postcode, gender, education, employment). Each focus group we conduct will contain 6-8 people and will be recorded (audio only) and then transcribed by an independent person who has signed a confidentiality agreement regarding the contents. Only the researchers will have access to the transcripts and when the transcripts are analysed they will be coded so your personal details are removed. They will keep your personal details in a secure database.

If you decide at any time that you would no longer like to be involved in the research project, please inform Gabby Lindsay Smith at gabrielle.lindsaysmith@vu.edu.au or tel: 9919 4329 or any of the investigators listed below. You can discontinue your participation at any time without any penalty or prejudice.

Who is conducting the study?

Institute of Sport, Exercise and Active Living (ISEAL), Victoria University

Student Investigators
Gabby Lindsay Smith (PhD student)
Phone 9919 4329
Email: gabrielle.ansems@vu.edu.au

Chief Investigators
Associate Prof. Rochelle Eime
Phone: 03 53279687
Email: r.eime@federation.edu.au

Other Investigators
Dr Jannique van Uffelen
Dr Lauren Banting
Dr Grant O'Sullivan

Any queries about your participation in this project may be directed to the Chief Investigators listed above.
If you have any queries or complaints about the way you have been treated, you may contact the Ethics Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University, PO Box 14428, Melbourne, VIC, 8001, email researchethics@vu.edu.au or phone (03) 9919 4781 or 4461.

Appendix 6: Focus group demographic information survey form

Active and healthy ageing in the community

Demographic survey

1.	Are you a member of Life Activities Clubs Victoria?	Yes ☐ →	Continue to question 2
		No ☐ →	Jump to question 3

2. What is your Life Activities club?

Bacchus Marsh	☐	Darebin	☐	Port Phillip	☐
Ballarat	☐	Echuca	☐	Sandringham	☐
Balwyn	☐	Frankston	☐	Shepparton	☐
Benalla	☐	Hobsons Bay	☐	Surfcoast	☐
Bendigo	☐	Inner Melbourne	☐	Trentham	☐
Bentleigh	☐	Knox	☐	Wangaratta	☐
Boroondara	☐	Manningham	☐	Waverley	☐
Brighton Bayside	☐	Moonee Valley	☐	Whitehorse	☐
Casey/Cardinia	☐	Mornington	☐	Wodonga	☐
Croydon	☐	Pakenham/ Warragul	☐	Yarraville	☐
Other (specify)	☐				

3.	Are you a member of any community group (e.g. can be formal like U3A or church group or informal like a walking group with friends or book group)?	☐ Yes ☐ No If yes, please say which group/s you are a member of _____ _____ _____
4.	What is your residential postcode?	_____
5.	What is your age?	_____
6.	Are you male or female?	Male ☐ Female ☐

7. What is your highest level of education? (Please tick the appropriate response).

Never attended school	☐	Completed high school (i.e. Year 12, Form 6, HSC)	☐
Some primary school	☐	TAFE or Trade Certificate or Diploma	☐
Completed primary school	☐	University, CAE or some other Tertiary Institute degree, including post university (i.e. postgraduate diploma, Master's degree, PhD)	☐
Some high school (i.e. Year 7 to Year 11, Form 1 to Form 5)	☐	Other (Specify)	☐

8. Which of the following best describes your main current employment situation ? (tick one only)

Full time employment	☐	Retired	☐
Part time employment	☐	Unemployed	☐
Casual	☐		

9. How do you manage on the income you have available? (Tick one only)

It is impossible	It is difficult all the time	It is difficult some of the time	It is not too bad	It is easy
☐	☐	☐	☐	☐

10. In regard to the work you have done for most of your life, what has been your **MAIN** occupation? (Please tick one response only)

Manager/Administrator	☐	Intermediate clerical, sales or service	☐
Professional	☐	Intermediate production and transport	☐
Associate professional	☐	Elementary clerical, sales or service	☐
Trades persons	☐	Labourers & related workers	☐
Advanced clerical or service	☐	Other (Specify) _____ _____ _____	☐

11. How would you describe your ethnicity?

Australian	☐	German	☐
English	☐	Greek	☐
Scottish	☐	Dutch	☐
Irish	☐	Chinese	☐
Italian	☐	Vietnamese	☐
Lebanese	☐	Don't Know	☐
Other (please specify)			

12. What is your present marital status? *Tick one only*

Never married	☐	Divorced	☐
Married/defacto	☐	Widowed	☐
Separated	☐		

13. I believe that I am doing enough exercise/physical activity to achieve health benefits

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
☐	☐	☐	☐	☐

Appendix 7: Focus groups question guides

"You have all been invited to attend this focus group today because you take part in physical activity as part of a community group or organisation. By this I mean either an organisation you join or even just doing physical activity with a group of friends regularly such as a walking group. We are interested in learning more about these groups and about you."

1. Can we start off by talking about what kinds of activities you enjoy most in your spare time?
    i. This doesn't have to be in a group situation.
    ii. Physical activity?

2. Can you tell me about the ways you have been physically active throughout your lives? If at all.
    i. what we mean by PA – organised sport, regular activity, gardening, walking etc)
    ii. Has the type of PA you do changed as you got **older**? Why?
    iii. Some of you mentioned activities that sound like **individual sports** – alone or with people?
    iv. Some mentioned **team sports** – what is it you like about these?

3. **Starting physical activity** -What things do you feel have helped you start doing physical activity in the past?
    i. Individual
    ii. /interpersonal or
    iii. organisational
    iv. environmental things).

4. **Continuing to be physically active:** What things do you feel help you continue doing physical activity and not want to give up?
    i. Individual
    ii. /interpersonal or
    iii. organisational
    iv. environmental things).

v. Are these different to things that help you start?
vi.

5. What things make it **difficult to do physical activity or make you stop** once you have started
    i. Individual
    ii. /interpersonal or
    iii. organisational
    iv. environmental

You are members of groups that do/do not do physical activity:

6. Can you tell us what **motivated you to join** the group/groups you belong to?
    i. Age a factor?
    ii. If social is mentioned – say many of you have mentioned social factors of the groups, would you ever consider joining social groups rather than PA groups?
7. How has being a member of your club/group **impact your health**? If at all
8. How has being a member of your club/group **impact your physical activity levels**? If at all.
    i. both direct impact through the group itself or
    ii. indirect impact through other factors especially with the non-PA group.
9. How does being a member of your club impact you socially
10. Are there other ways that the group has had an **impact on your life** that you haven't already mentioned?

Is there anything else you'd like to tell us?

Appendix 8: Ethics approval survey study

Quest Ethics Notification - Application Process Finalised - Application Approved

quest.noreply@vu.edu.au

Tue 13/05/2014 9:59 AM

To: Jannique.VanUffelen@vu.edu.au <Jannique.VanUffelen@vu.edu.au>; Jason.Bennie@vu.edu.au <Jason.Bennie@vu.edu.au>; Lauren.Banting@vu.edu.au <Lauren.Banting@vu.edu.au>; Rochelle.Eime@vu.edu.au <Rochelle.Eime@vu.edu.au>;

Cc: gabrielle.ansems@live.vu.edu.au <gabrielle.ansems@live.vu.edu.au>;

Dear DR JANNIQUE VAN UFFELEN,

Your ethics application has been formally reviewed and finalised.

» Application ID: HRE14-071
» Chief Investigator: DR JANNIQUE VAN UFFELEN
» Other Investigators: MISS LAUREN BANTING, DR JASON BENNIE, DR ROCHELLE EIME, MS Gabrielle (Gabby) Ansems
» Application Title: Active and healthy ageing in the community: evaluation of the effect of a community based activity program on physical activity, health and wellbeing.
» Form Version: 13-07

The application has been accepted and deemed to meet the requirements of the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007)' by the Victoria University Human Research Ethics Committee. Approval has been granted for two (2) years from the approval date; 13/05/2014.

Continued approval of this research project by the Victoria University Human Research Ethics Committee (VUHREC) is conditional upon the provision of a report within 12 months of the above approval date or upon the completion of the project (if earlier). A report proforma may be downloaded from the Office for Research website at: http://research.vu.edu.au/hrec.php.

Please note that the Human Research Ethics Committee must be informed of the following: any changes to the approved research protocol, project timelines, any serious events or adverse and/or unforeseen events that may affect continued ethical acceptability of the project. In these unlikely events, researchers must immediately cease all data collection until the Committee has approved the changes. Researchers are also reminded of the need to notify the approving HREC of changes to personnel in research projects via a request for a minor amendment. It should also be noted that it is the Chief Investigators' responsibility to ensure the research project is conducted in line with the recommendations outlined in the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007).'

On behalf of the Committee, I wish you all the best for the conduct of the project.

Secretary, Human Research Ethics Committee
Phone: 9919 4781 or 9919 4461
Email: researchethics@vu.edu.au

This is an automated email from an unattended email address. Do not reply to this address.

Appendix 9:Ethics approval focus group study

Quest Ethics Notification - Application Process Finalised - Application Approved

quest.noreply@vu.edu.au

Wed 9/12/2015 2:00 PM

To: Grant.OSullivan@vu.edu.au <Grant.OSullivan@vu.edu.au>; Jannique.VanUffelen@vu.edu.au <Jannique.VanUffelen@vu.edu.au>; Lauren.Banting@vu.edu.au <Lauren.Banting@vu.edu.au>; Rochelle.Eime@vu.edu.au <Rochelle.Eime@vu.edu.au>;

Cc: Gabrielle Lindsay Smith <gabrielle.lindsaysmith@live.vu.edu.au>;

Dear ASPR ROCHELLE EIME,

Your ethics application has been formally reviewed and finalised.

» Application ID: HRE15-291
» Chief Investigator: ASPR ROCHELLE EIME
» Other Investigators: MS Gabrielle (Gabby) Lindsay Smith, DR GRANT O'SULLIVAN, DR JANNIQUE VAN UFFELEN, MISS LAUREN BANTING
» Application Title: Active and healthy ageing in the community: The relationship between social support, physical activity behaviour and health in community organisations.
» Form Version: 13-07

The application has been accepted and deemed to meet the requirements of the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007)' by the Victoria University Human Research Ethics Committee. Approval has been granted for two (2) years from the approval date; 09/12/2015.

Continued approval of this research project by the Victoria University Human Research Ethics Committee (VUHREC) is conditional upon the provision of a report within 12 months of the above approval date or upon the completion of the project (if earlier). A report proforma may be downloaded from the Office for Research website at: http://research.vu.edu.au/hrec.php.

Please note that the Human Research Ethics Committee must be informed of the following: any changes to the approved research protocol, project timelines, any serious events or adverse and/or unforeseen events that may affect continued ethical acceptability of the project. In these unlikely events, researchers must immediately cease all data collection until the Committee has approved the changes. Researchers are also reminded of the need to notify the approving HREC of changes to personnel in research projects via a request for a minor amendment. It should also be noted that it is the Chief Investigators' responsibility to ensure the research project is conducted in line with the recommendations outlined in the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007).'

On behalf of the Committee, I wish you all the best for the conduct of the project.

Secretary, Human Research Ethics Committee
Phone: 9919 4781 or 9919 4461

Appendix 10: Report prepared for LACVI

Life Activities Clubs through the eyes of members. Process and Outcome Evaluation

Report prepared by Gabrielle Lindsay Smith from the Institute of Sport, Exercise and Active Living (ISEAL). Victoria University

Contents

Acknowledgements

This report has been written by the Active Living and Public Health research team, at the Institute of Sport, Exercise and Active Living, Victoria University. The research has been conducted by Gabrielle Lindsay Smith as part of her PhD research, with support from Associate Professor Jannique van Uffelen, Associate Professor Rochelle Eime, Dr Grant O'Sullivan, Dr Toni Hilland and Dr Jack Harvey.

We acknowledge the vital input received from key LACVI board members who assisted in the planning and logistics of the study, especially Lindsay Doig, Heather Wheat, Edith Martin and Rebecca Luxford. We also acknowledge the hard work of the clubs in assisting with connecting with participants to take part in the study.

Summary

1. Membership expectations and aims of LAC clubs seemed to be well aligned. Two major goals of LAC are to assist people around retirement in developing friendships and maintaining active lifestyles. These two objectives were met in the vast majority of participants who wanted to do so.
2. Activities are low cost. The participants of the focus group discussions agreed that LAC activities were good value and cheaper than other similar organisations.
3. Members feel they develop friendships, improve social connection and support and avoid loneliness, especially when joining soon after retirement or other significant life event (such as moving house). The survey study also found that social support improved and loneliness declined in people who joined an LAC to take part in physical activity but not necessarily only social activity.
4. The majority of members who did physical activities at their LAC club felt that membership of the club assisted in increasing or maintaining their physical activity (PA) levels. Some members who only did social activities also gained PA benefits from their LAC by learning about PA activities at their club. The survey found a small reduction in PA levels of members over one year, but this may have been due to the difficulty many people have in estimating their PA levels.
5. Members felt they gained mental and physical benefits from their LAC clubs. Physical benefits were mostly experienced in those who did physical activities. In addition, the survey found that people who take part in physical activities at their LAC club improved their mental quality of life over one year.
6. There was strong agreement that LAC activities were fun and enjoyable through the activities themselves as well as the social interaction that occurs in the groups.

Introduction and aims

This research study commenced in 2014 and the purpose was to conduct a process and outcome evaluation of Life Activities Clubs focusing on the views of the members. The LACVI board was interested in finding out whether Life Activities Clubs were managing to achieve their objectives (outcome evaluation) and what aspects of the planning and delivery of LACs impacted this (process evaluation). Another aim of this research was to investigate whether people who join an LAC increase their physical activity levels.

The broad objectives of LAC's:

> *Life Activities Clubs aim to **improve the wellbeing of Victorians** in or approaching retirement by providing a **range of opportunities** to **enjoy healthy and satisfying social and recreational activities in the company of good friends**. We want to 'keep people young': **avoiding social isolation**, enjoying **an active lifestyle** and having **fun**.*

To investigate whether the clubs achieved their objectives we conducted two studies. The first was a survey study to find out whether people (club members) experience the benefits listed above when they join a LAC. New members who had not been a member before were invited to complete three surveys over one year: at the time of becoming a member and after 6 and 12 months. To ensure the valuable breadth of experience in LAC members was not missed, we also conducted a number of focus groups. Focus groups provide an additional depth of information, and first-person accounts, which are not obtained in surveys.

In this report, the results are presented, addressing the following LACVI key aims, as stated in the elevator statement above and several other LACVI key documents.

Process evaluation

1. Clubs meet the expectations of members (survey)
2. Provide activities at a low cost to participants (FG)
3. Offer a range of healthy and satisfying activities (FG)

Outcome evaluation:

4. Create friendships, improve social connection and support and avoid social isolation (reduce loneliness) (both survey and FG)
5. Maintain an active lifestyle (both survey and FG)
6. Improve wellbeing (cognitive health, mental health, physical health) (both survey and FG)
7. Have fun / enjoyment (FG)

Results

Survey study background

Participants

Eighteen LAC clubs agreed to participate in the study and the participants who volunteered came from 15 clubs. Participants needed to be new members of an LAC or not been members of an LAC club in the last two years.

38 new LAC members (29 Female and 9 Male) completed the first survey, 35 (27 Females, 8 Males) carried on in the study to complete the second survey after 6-months. Of these people, 28 (21 Females, 7 Males) continued on to complete the final survey at 12-months Three quarters of the participants in our study were women and they had an average age of 67 years. These demographics are comparable to the those of whole LACVI membership, with the average age of participants in the study being slightly younger. This is not surprising because only new members were surveyed, who are primarily recent retirees.

Focus group background

Participants

There were 2 focus groups conducted with LAC members. The physical activity (PA) focus group had 6 members, 4 women and 2 men who all did physical activities through their LAC. The other focus group contained 5 women who took part in activities in their LAC not considered to be physical activity (e.g. craft dine- outs, book group). Within both focus groups, retirement or moving house was the primary reasons for joining a LAC, to help making new friends.

Process evaluation

Meeting expectations of members (Objective 1)

Survey study

An important aspect of the process evaluation was to find out why people joined a LAC and if they felt they were successful in achieving their goals. Table 1 below shows the percentage of participants in the survey study who achieved the goals they had when they became a member. Only the reported percentages for the people who indicated in the first survey that this was a goal for them. In relation to the key objective of making friends through LACs are presented; the vast majority of the participants who hoped to make new friends felt that they had done so by 6 months and this had increased by 12 months. Another primary objective of the clubs is to maintain an active lifestyle and around 70% of the participants who intended to become physically active when they joined an LAC felt they had done so after six and 12 months.

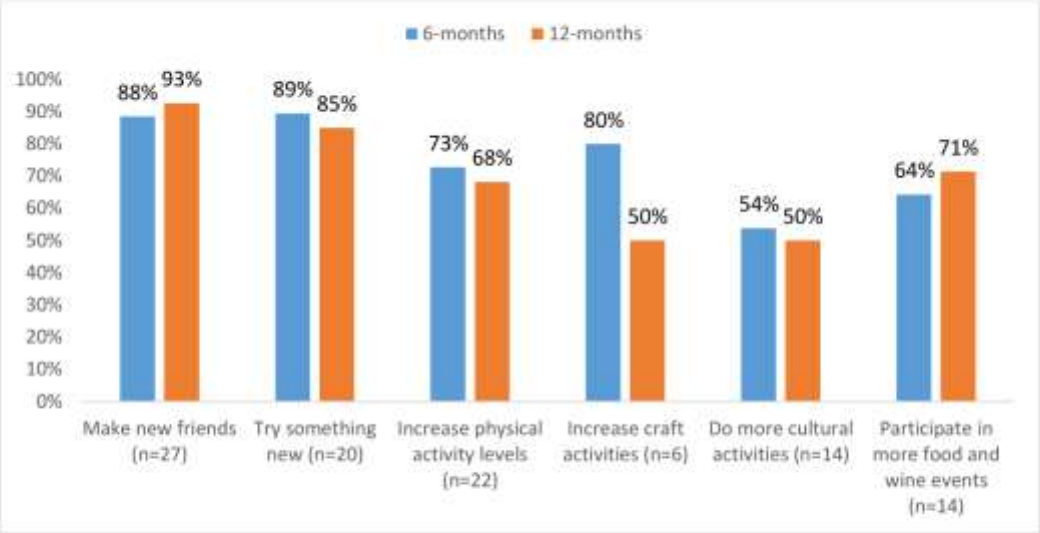

Figure 1. Percentage of participants agreeing that their goals for joining a LAC were met

Reasons for ceasing LAC membership

Five people ceased membership of their LAC throughout the course of the study. 1 ceased after 6 months and 4 after 12 months. The reasons for stopping membership are listed in the table below. In the survey, more than one reason could be given for ceasing membership

Table 1. Reasons for discontinuing membership

	6 months (n=1)	12 months (n=4)
Lack of time	1	1
It wasn't what I expected		1
I didn't enjoy it		1
Started other kind of group		1
Times of relevant session didn't suit me		1
Would consider re-joining LAC in future	1x unsure	2x yes 2x no

Offer a range of healthy and satisfying activities (Objective 2)

Focus groups

The focus group discussions were used to gauge whether participants felt a range of activities were available through their LAC, whether activities had healthy benefits and were satisfying or seen to be valuable to the members. There was discussion about a variety of activities being offered at clubs (examples were dine-out events, mah-jong, table tennis, craft, cycling, and dancing) and many participants took part in more than one activity.

'It's good that there's something each month different to look forward to, so it's got something different for everybody, which is, which is good.'

An additional interesting experience a number of participants found was that they tried activities that they hadn not considered as a result of being a member of their LAC.

Provide activities at a low cost to participants (Objective 3)

Focus groups

There was recognition and appreciation from a number of participants that activities were low cost and even some comparison to other similar community groups such as the University of the Third Age (U3A) and consensus within discussions that LAC clubs are good value.

'can I just mention, the other advantage or the, the good part about it.... I, as I see it with, uh, LAC groups.....Is the cost, you know?....(All participants agreed that cost is minimal or free)...to, such a minimum cost per year.....and so that's a great advantage really.'

Other notable process evaluation findings

Some other potentially useful feedback received in the focus groups were the following:

- The ability to try activities before joining is appreciated by new members
- Some members noted a little stagnation of activities in older LAC clubs which may potentially detract from new members joining or continuing memberships
- Seniors week advertising and the little booklet given out at that time was the most discussed means of advertising that triggered the new members to join an LAC and the main reason for not joining an LAC earlier was not knowing about the LAC.

Outcome evaluation

Create friendships, improve social connection and support and avoid social isolation (reduce loneliness) (Objective 4)

Survey study

Social Support

General social support was measured using an eight-item questionnaire [1]. A score of 1 indicates that people feel their social support is low and 5 indicates high social support. Figure 2 shows that social support was quite high to begin (around 3.8/5) and stayed roughly the same over the first year of membership. Interestingly, statistical testing showed that people who aimed to increase their PA levels (PA group; n=22) did improve their social support after 6 and 12 months of being an LAC member.

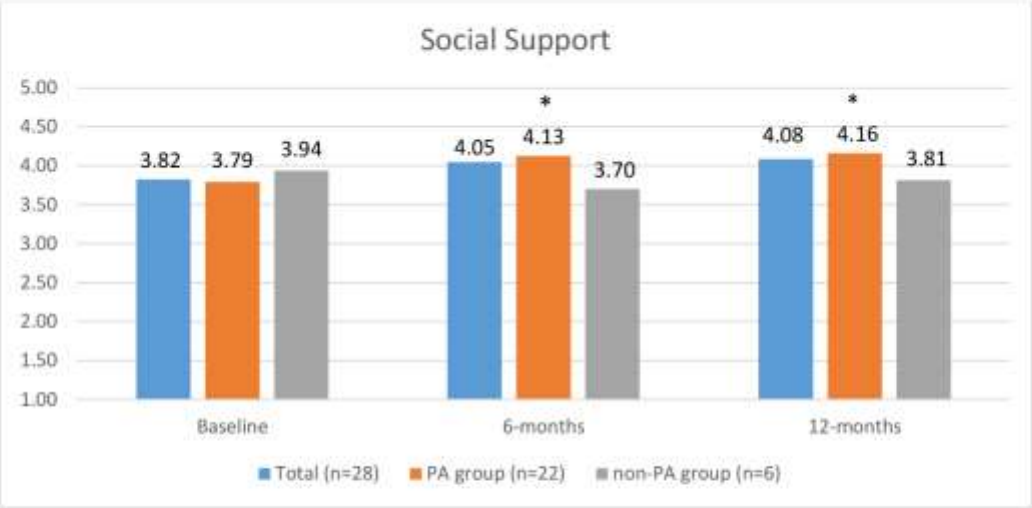

*Figure 2. Average social support score from questionnaire when first joining an LAC and after 6-months and 12-months (1=low SS; 5= high SS). * indicates significantly greater social support compared to baseline (from statistical testing).*

Loneliness

Loneliness was assessed using an 11-item questionnaire [2]. Scores range from 0 to 11 with 0 indicating least loneliness and 11 indicating greatest loneliness. The results are very similar to social support above. Figure 3 shows participants had average levels of loneliness to begin (around 5.2 out of 11) and scores did not change over time in the full group. However, people who aimed to increase their PA levels (PA group; n=22) had lower loneliness scores after 6 and 12 months of LAC membership, compared to when they first joined.

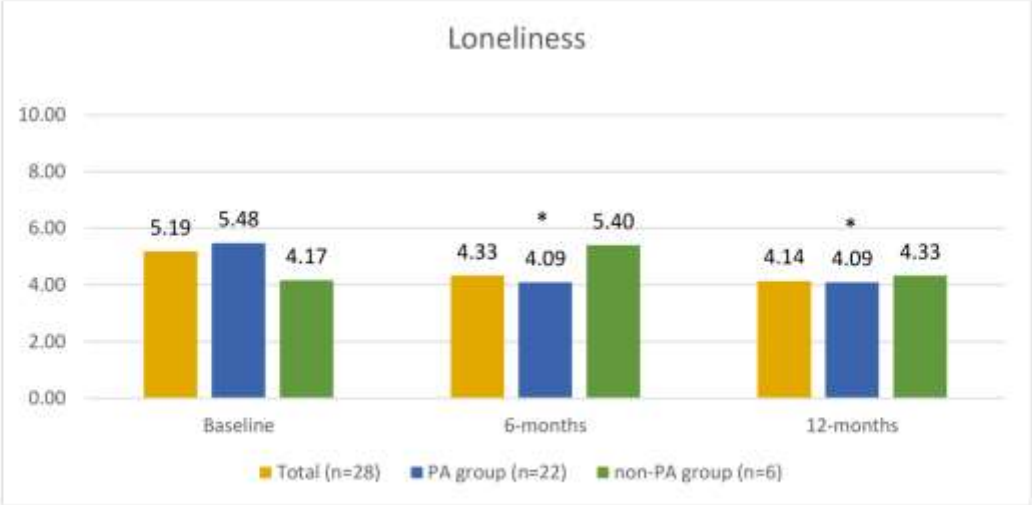

*Figure 3. Average loneliness score from questionnaire. (0 = least lonely. 11=very lonely.) * indicates significantly less loneliness compared to baseline (from statistical testing).*

Focus groups

A great deal of discussion in the focus groups centered around social benefits of joining LAC groups. The broad agreement across the two focus groups was that the clubs assisted them in developing friendships, diversifying their social connections, being supported by members in their clubs and socially inspiring them to try new things. Unlike the survey results, FG participants thought group activities focusing on physical activity as well as those which were more sedentary, such as craft or dine-outs were socially beneficial.

'that's made a big difference and from there I've gone into the other groups….And, uh, you know, they're just different, different groups of people all round…. So, uh, yep, a new life for me. '

'it's nice to be able to pick up the phone and share your problem with somebody else, and that's come about through LAC.'

Maintain an active lifestyle – physical activity (Objective 5)

Survey study

The participants in the study were a very active group of people indeed, with almost three-quarters of them doing more than enough physical activity to gain health benefits when they first started the study. It is not therefore surprising that there was not much change in levels of physical activity over the first year of membership. Statistical analysis did show a small overall decrease in total time doing physical activity from baseline to 12 months. However, this result should be interpreted with caution because people find it difficult to accurately report their physical activity levels in self-reported surveys and this may have affected the results. The only way to really know if physical activity levels change would be to assess PA levels using pedometers (step counters) or accelerometers (similar to pedometer but also measures speed of movement), but this was not feasible for this project.

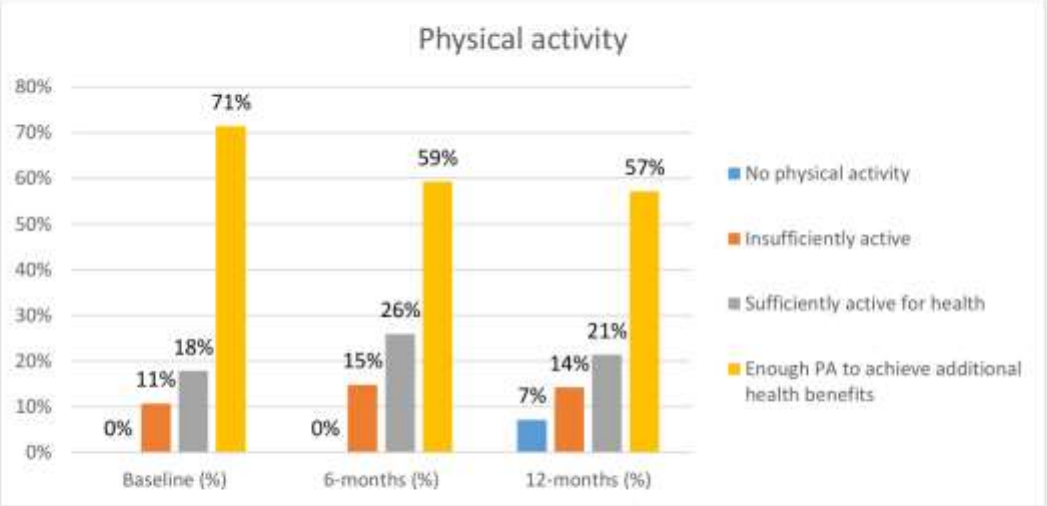

Figure 4. Percentage of participants who fall into the pre-defined categories of physical activity (n=28). (Insufficient PA = less than 150 mins moderate PA per week, sufficient PA = 150-299 minutes moderate PA per week, additional benefits = at least 300 mins moderate PA per week http://www.who.int/dietphysicalactivity/factsheet_olderadults/en/.)

Focus groups

One focus group contained members who took part in physical activities in their LAC, the other was people who were only part of a social LAC activity.

While there was no significant change in PA levels seen in the survey results, in the PA focus group discussion, people felt that their LAC club had assisted them to continue to do PA, and increase their levels of PA. This seemed to be related to the enjoyment that social engagement brought to the activity for most of the participants.

'I think from the, um, just another, uh, aspect that I thought about then was the, um, acta-, activity that I'm doing, you know, is, can be quite strenuous, and that is Thursdays is two or three hours so I've got that length of exercise which I probably wouldn't do if I was doing it by myself.'

'If it's shared. I think if it's shared with people you enjoy whose company you enjoy..... that's a greater, you know, incentive to keep going too,'

Even in the purely social activities there is some potential for increasing physical activity by learning about PA opportunities from others.

' Yeah, you always find someone who will suggest something....That you can try, like yoga I found out through one of the members.....so I wouldn't have found it unless, you know what we were saying before about networking through people and just talking to people.'

Improve wellbeing (cognitive health, mental and physical health) (Objective 6)

Survey study

Health related quality of life (QoL) was measured using a 12-item survey called the SF-12. The score is calculated and then compared to the average US population (average of 50 in Figure 5 below). A score of 50 means average QoL, above 50 is greater Qol than average, less is the opposite. Figure 5 shows that both physical and mental QoL of participants in the study were close to the average score of 50 points (the black line on the graph). Statistical testing indicated that QoL did not change over the first year of membership but interestingly, people who said they aimed to increase their physical activity levels (PA group, n=22) did significantly improve the mental component of quality of life in the first year of membership (see Figure 5b).

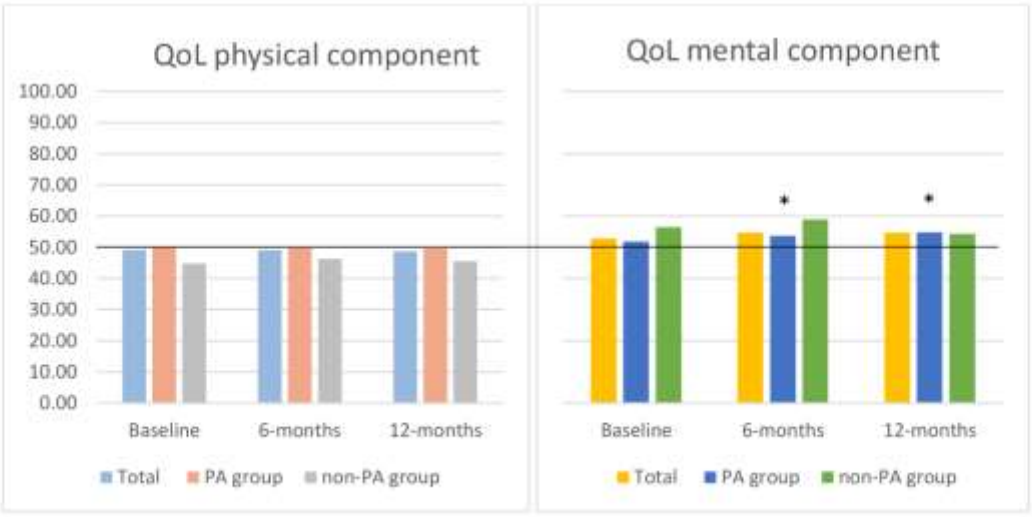

*Figure 5a and b. Self-rated quality of life (QOL). Physical (a) and mental components (b) of QOL at each time point of the study (the black line on the graph is the average score for the general population). * indicates significantly greater mental component of quality of life compared to baseline (from statistical testing).*

Focus groups

While only a mental health benefit was observed in the survey study for people who did PA activities, there was agreement of mental health benefits from both PA and non-PA focus groups including reduced stress and relaxing atmosphere as well as mental stimulation.

*'yes, less stressed and, and, yeah, just much more relaxed. I actually can relax.' (Agreement) 'And, um, definitely feel the benefit. Hugely.'...*F2 *'Something to look forward to makes you feel better as well. (Agreement)* F3 *'Yeah, it's a psychological benefit, isn't it? That's right.'*

The PA group members also noted physical benefits of being involved in physical activity such as maintaining general physical health as well as helping them maintain health post injury or illness.

'And my surgeons say...You must never give up your dancing. It's just the best thing.'

'And so I'm very, very active now and just do everything, that's so much easier, whether you're walking or...'

Have fun / enjoyment (Objective 7)

Focus group

Enjoyment is difficult to measure in a survey so this was only assessed level of enjoyment in the focus group discussion. Both groups discussed enjoyment derived from their LAC activities through the activities themselves as well as the social engagement experienced in the group.

Enjoyment from socialising in group: *'Not that, um, you know, you, you take your problem to a group, but, and, and you have lots of fun and laughter and that's what you're there for, to get out of your comfort zone, to be with other people. So I, I think it's a good thing because you join a group because you want to be there.'*

Enjoyment from activity itself: *'I, the one I'm really, really enjoying is mah-jong...I think that sort of helps try and keep the grey matter active as well... and, um, you know, hadn't... I'd never played it before. I didn't really know anything at all about it, and so it's, it's quite challenging.'*

Conclusions and Recommendations

Overall, each of the LACVI objectives evaluated were met fully or partially. The overwhelming strength of the clubs seem to be in **developing socially welcoming environments** to allow new members to make friends and feel connected with others. This was seen in both the survey study and the focus group study. The survey study results were difficult to assess because of the low numbers of people who eventually took part in the study (only 28). However, findings suggest that **physical activities performed in clubs appear to have additional benefits to members in helping further develop social support, reduce loneliness and improve mental quality of life**. The number of people who only did social activities in this study were smaller so it is difficult to make any conclusions about these types of activities. There was some discussion around stagnation of clubs deterring new members and this may be an area to address if an increase in membership numbers is a goal of the club. Given the benefits seen from the PA activities and the potential for social connection to inspire new activity amongst members it may be beneficial for discussion of PA activities to be promoted amongst members of non-PA groups.

References

1. Broadhead, W. et al., The Duke-UNC Functional Social Support Questionnaire: Measurement of social support in family medicine patients. Medical Care, 1988: p. 709-723.

2. de Jong Gierveld, J. and T. van Tilburg. Manual of the Loneliness Scale, 1999 Available from: http://home.fsw.vu.nl/tg.van.tilburg/manual_loneliness_scale_1999.html.