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PHYSICAL ACTIVITY AND DIMENSIONS OF SUBJECTIVE WELL-BEING IN ACTIVE OLDER ADULTS

By

Afroditi Stathi

A thesis submitted to the University of Bristol in accordance with the requirements of the degree of Doctor of Philosophy in the Faculty of Social Sciences

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ABSTRACT

The relationship between physical activity and subjective well-being during the later years of life was investigated in order to develop a well-being measure designed to capture changes initiated by participation in physical activities. Three separate but interrelated sequential phases are presented.

Phase I explored the dimensions of subjective well-being of active older adults using a qualitative approach. A sample of 28 community-dwelling retired adults (males=13, Females=15) with ages ranging from 62 to 81 years participated in one-to-one and group interviews. Using cross-case analysis, 5 main dimensions emerged: Developmental Well-Being, Financial Well-Being, Physical Well-Being, Mental Well-Being and Social Well-Being. The findings indicated that physical activity influences all dimensions of older adults' subjective well-being with the exception of Financial Well-being.

Phases II and III employed quantitative research methods for the development and preliminary validation of the five-factor Ageing-Well Profile. Participants were 777 older adults (males=214, females=563) with a mean age of 69.6 years (SD=7.7). Phase II formulated the subscales and the items of the new instrument. Phase III provided preliminary evidence for the factor structure, the internal consistency and reliability, and the convergent validity of the Ageing-Well Profile.

This thesis demonstrated that physical activity could contribute to older adults' well-being through maintenance of a busy and active life, mental alertness, positive attitude towards life and avoidance of stress, negative function and isolation. The Ageing-Well Profile appears to be a promising tool for the measurement of subjective well-being through 5 distinct dimensions reflecting physical well-being, independence, positive and negative aspects of mental well-being and social well-being. The evaluation of these dimensions could offer more accurate information regarding the contribution of physical activity to the subjective well-being of older adults and could lead in the development of more effective activity programmes for older people.

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I would like to thank all those 'young at heart' people who participated in this research and they offered me their thoughts and their positive attitude towards life, making me think a lot about my own life.

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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the Regulations of the University of Bristol. The work is original except where indicated by special reference in the text and no part of the dissertation has been submitted for any other degree. Any views expressed in the dissertation are those of the author and in no way represent those of the University of Bristol. The dissertation has not been presented to any other University for examination either in the United Kingdom or overseas.

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DATE:.....15/11/01.....

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CHAPTER 1

INTRODUCTION

1.1. Successful ageing and physical activity

The 20th century was marked by one of the most profound social revolutions of all times, the Age Revolution. The life expectancy rose by 30 years and the number of older people increased rapidly. These demographic changes have brought enormous challenges to the so-called "ageing" society. How we plan to address these challenges and seize the opportunities that arise will have fundamental implications for the members of our society today and for many generations to come.

When the Welfare State was established, post-retirement life expectancy was short and for every dependent there were several people in work to pay for them. The demographic changes have led to the increase of the retired people and the decrease of the workforce with negative consequences and significant pressure on the provision of social and health care services. At the social and political level the challenge is to ensure that older people remain integrated and contributing members of society for as long as possible with emphasis placed on the retirement to something (continuous involvement) rather than retirement from something (work). At a personal level, the challenge is to help older people to maintain an independent and active life. It is not the years in life but the life in years that makes all the difference.

It seems, however, that a lot must be done in order to address these challenges as recent evidence presents a rather inactive and unhealthy lifestyle for older adults. In the US, 88% of those over 65 have at least one chronic health condition, and 21% of people 65 and older have chronic disabilities (King, Rejeski, & Buchner, 1998). Moreover, 34% of the population age 50 and older are sedentary and the percentage is higher with increasing age. In the UK, 39% of men and 42% of women over the age of 50 are totally sedentary. By the age of 74 only 14% for both men and women participate in enough physical activity to benefit their health (Skelton, Young, Walker, & Hoinville, 1999). Furthermore, in the recent National Service Framework for Older People it was reported that the health and social services in UK have spent almost 50% of their budget to meet the needs of older adults (Department of Health, 2001).

Although this picture is rather discouraging, the increasing use of the term *successful ageing* stresses the change in perceptions regarding the later years of life and the increased belief that old age is a stage in the lifecourse that can be rewarding and positive. Physical activity appears to contribute positively towards successful ageing as it influences both the physical and psychosocial aspects of older adults' life (American College of Sports Medicine, 1998; World Health Organisation, 1997). However, defining the term success is not an easy task and the identification of the elements of successful ageing and the development of criteria of what should constitute 'success' in the later years of life is a complex endeavour.

Until recently, objective indices such as education, income, objective health ratings and family status were considered to be the most important criteria of successful ageing. However, the need to avoid the promotion of a socially-defined unauthentic self that older people should demonstrate has led to increased interest towards the subjective elements of successful ageing through the presentation of older people's quality in life based on their own words and using their own frames of reference.

Subjective well-being has been seen as an important element of successful ageing (Rowe & Kahn, 1987). However, it is a construct that almost everyone understands but almost no one can define. The lack of agreement as to what subjective well-being is leads to conflicting opinions as to how it should be measured. As a consequence, the choice of which measure of well-being to use seems to be almost arbitrary.

In the physical activity research, well-being is one of the few psychological terms that have been used both in everyday life and in scientific research. Furthermore, reference to well-being also features in formal policy documents of a range of organisations and institutions (Department of Health, 2001; The Robert Wood Johnson Foundation, 2001; World Health Organisation, 1997). The consequences of the lack of consensus regarding the definition and the measurement of subjective well-being are reflected also in the physical activity and ageing research. In some studies, well-being is presented as a general concept without information on the special characteristics that it might have for

the older persons. In other studies subjective well-being appears to be a multidimensional construct however there is no clear view of what are the most important dimensions in the later years of life. In addition, some authors argue that subjective well-being is a relatively transitory and easily influenced construct (Spirduso, 1995) and others stress that the constructs comprising subjective well-being are relatively global and therefore changes over time are typically rather small (McAuley, 2001).

The little consensus on the definition of subjective well-being, on the key constructs that should be used to assess well-being and on the most appropriate instruments for use in studies with older adults carry several implications such as:

- It is not clear what are the expected outcomes of physical activity promotion strategies and intervention programmes for the enhancement of older adults' well-being
- Measuring the effectiveness of these efforts is problematic as it is not clear what must be measured and what are the appropriate measurement tools to use
- It is also not clear whether what is measured is what is important for older adults' well-being

Careful examination of what constitutes subjective well-being could help in setting strategic directions towards the improvement of older adults' quality of life by targeting specific domains and establishing specific outcomes from participation in physical activities. Furthermore, it could help in the evaluation of the existing and the design of new and attractive activity programmes, tailored to the needs and characteristics of older people. Finally, it could lead to the selection or design of appropriate measurement tools that are needed in order to establish the value of physical activity and its potential to make a difference in older adults' life.

1.2. Overview of this research

The aim of this research is to explore the dimensions of subjective well-being of older adults and based on the identified elements relevant to the physical activity experience of older people, to develop a multidimensional subjective well-being profile specific to changes initiated by physical activity participation.

Chapter 2 addresses the current literature on subjective well-being and physical activity during the later years of life and explores the gaps and the research issues in the physical activity and ageing research.

Chapter 3 presents the exploration of the meaning of subjective well-being and the ways it is related with physical activity based on older adults' own frames of reference.

Chapter 4 and 5 present the development and initial validation of a measurement tool that could help in the evaluation of the contribution of physical activity to the maintenance or enhancement of well-being in later years of life.

Finally, chapter 6 presents a discussion of the results and the limitations of this research and concludes with the implications for future research and practice.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

Statistical reports reveal that over the past three decades the older adult population has been growing rapidly as a proportion of the total population. This has been due to the increasing life expectancy, decreasing fertility rates and advances in medical care (Arsenault & Anderson, 1998). It is predicted that in 2020 the percentage of the population aged 60+ will be 29.9% in Italy and 28.9% in Belgium (Walker, Maltby, & Bouget, 1997). At the turn of the twentieth century, approximately 4% of the US population were over age 65 (Rowe & Kahn, 1998). In the year 2000 13% of the population was 65+ and by 2030 approximately 20% of the population will be aged 65 years and over justifying therefore, the increasing use of the terms "greying" and "ageing" to describe the Western societies (National Institute on Aging, 1998).

Specifically in the United Kingdom, the number of people over 65 has doubled since the 1930s. Furthermore, between 1995 and 2025 the number of people over the age of 80 is set to increase by almost a half and the number of people over 90 will double (Department of Health, 2001). Older adults tend to have a much greater need for health and social services than the young, so the bulk of health and social care resources are directed at their needs. The National Health Service [NHS] spent around 40% of its budget (£10 billion) on people over the age of 65 in 1998/99. In the same year social services spent nearly 50% of their budget on the over 65s, an estimated £5.2 billion (Department of Health, 2001).

These cost figures explain why ageing has been typically viewed as a largely undesirable period of life during which a series of physical, cognitive, social, and emotional declines occur, and not as natural part of the life cycle, accompanied by advantages as well as losses (McGuire, Boyd, & Tedrick, 1999). This view is well illustrated in what Rowe and Kahn (1998) stress in their book 'Successful ageing,' "The progress of gerontology began to stall in the mid-1980s...There was a persistent preoccupation with disability, disease and chronological age rather than the positive aspects of ageing" (p.xi).

However, the growing social demands from the aged generations in many Western countries and the longitudinal research that have started to yield impressive results concerning life-span development have resulted in the increasing viewing of old age as a stage in the lifecourse that does not stand alone (Baltes & Baltes, 1990).

The Research Agenda on Ageing for the 21st Century proposes a global effort to meet the challenges of achieving a society for all ages (Andrews & Clark, 1999). All services are attempting to adopt a concept of old age that encompasses new ideas such as the third age, the grey pound and grandparent power. In recent years a new respect for older people has emerged, and older adults are seen as people with individual needs. According to the Department of Health (2001), "older people should no longer be seen as a burden on society. They are a vital resource of wisdom, experience and talent" (p.2).

2.2. Successful ageing

It was the Roman philosopher and statesman Cicero who in his essay De Senectute (Cicero, 44 B. C./ 1979) maintained that old age is not a phase of decline and loss but, if approached properly, offers many opportunities for positive change and productive functioning. He also introduced the distinction between *normal* and *sick* old age and he argued that old age should not be confused with illness, a condition that for some people is added on in later years of life.

The idea of *successful ageing* was initiated forty years ago (Havighurst, 1961), although only recently this has been promoted as a guiding theme in gerontological research. Baltes & Baltes (1990) discussed successful ageing as a process involving selection, optimisation, and compensation through which the individual prioritises, augments resources and adapts. Rowe and Kahn (1987, 1998) distinguished between "usual ageing"-what most people normally experience, and " successful ageing"- where the individual avoids functional loss or enhances functional abilities. Ryff (1989) identified six criteria for successful ageing, which included positive interaction with others, a

sense of purpose, autonomy, self-acceptance, personal growth and environmental fit.

Fisher (1992, 1995) has stressed the developmental aspect of successful ageing:

> People who are ageing successfully are still involved in addressing current problems of identity and development, and do so in light of anticipated future situations as implicated on the basis of past experience. Put another way, successful agers continue to grow and learn as they use past experience to cope with the present and set goals for future development (p.240)

Medics have also made the distinction between *normal*, *optimal* and *sick* ageing (Baltes & Baltes, 1990). *Normal* ageing refers to the absence of biological or mental pathology, *optimal* ageing exists when there is development and enhancement and *sick* ageing implies an ageing process determined by syndromes of illness. Successful ageing consists of optimising life expectancy while at the same time minimising physical, psychological and social morbidity, overwhelmingly concentrated in the final years of life (Fries, 1996). Thus, the period from onset of chronic infirmity to death may be shortened, with benefit, to both, individuals and society.

Baltes and Baltes (1990) presented a co-ordinated and focused strategy aimed at the achievement of successful ageing. According to that, a healthy lifestyle is necessary in order to reduce or to postpone any pathological ageing conditions and educational, motivational, social and health-related activities are needed to strengthen older adults' reserve capacities. They concluded that "the greater one's reserve capacities, be they physical, mental, or social reserves, the more likely successful ageing will take place" (p.20). Furthermore they stressed that the heterogeneity in the onset, direction and diversity of ageing, requires the avoidance of simple and aggregate solutions and the adoption of an individual approach that encourages individual and societal flexibility.

Defining the term success is not an easy task and searching for indicators of successful ageing is a complex endeavour. The existing research on successful ageing reflects a multicriteria approach, although a consensus on their interrelationship or relative importance has not been achieved. Furthermore, the issue of subjective versus objective indicators of successful ageing forms a "Gordian knot that no one is prepared to untie at the present moment" (Baltes & Baltes, 1990; p.7). Taking both approaches, subjective

and objective, various criteria of successful ageing appear in the literature (Baltes & Baltes, 1990; Rowe & Kahn, 1987):

- Length of life
- Biological health
- Mental health
- Behavioural competence
- Cognitive efficacy
- Social competence
- Personal control
- Life satisfaction

These criteria, as presented in Rowe & Kahn's model of successful ageing (Rowe & Kahn, 1997), could be summarised into two broad categories, the subjective and the objective approaches (Figure 2.1).

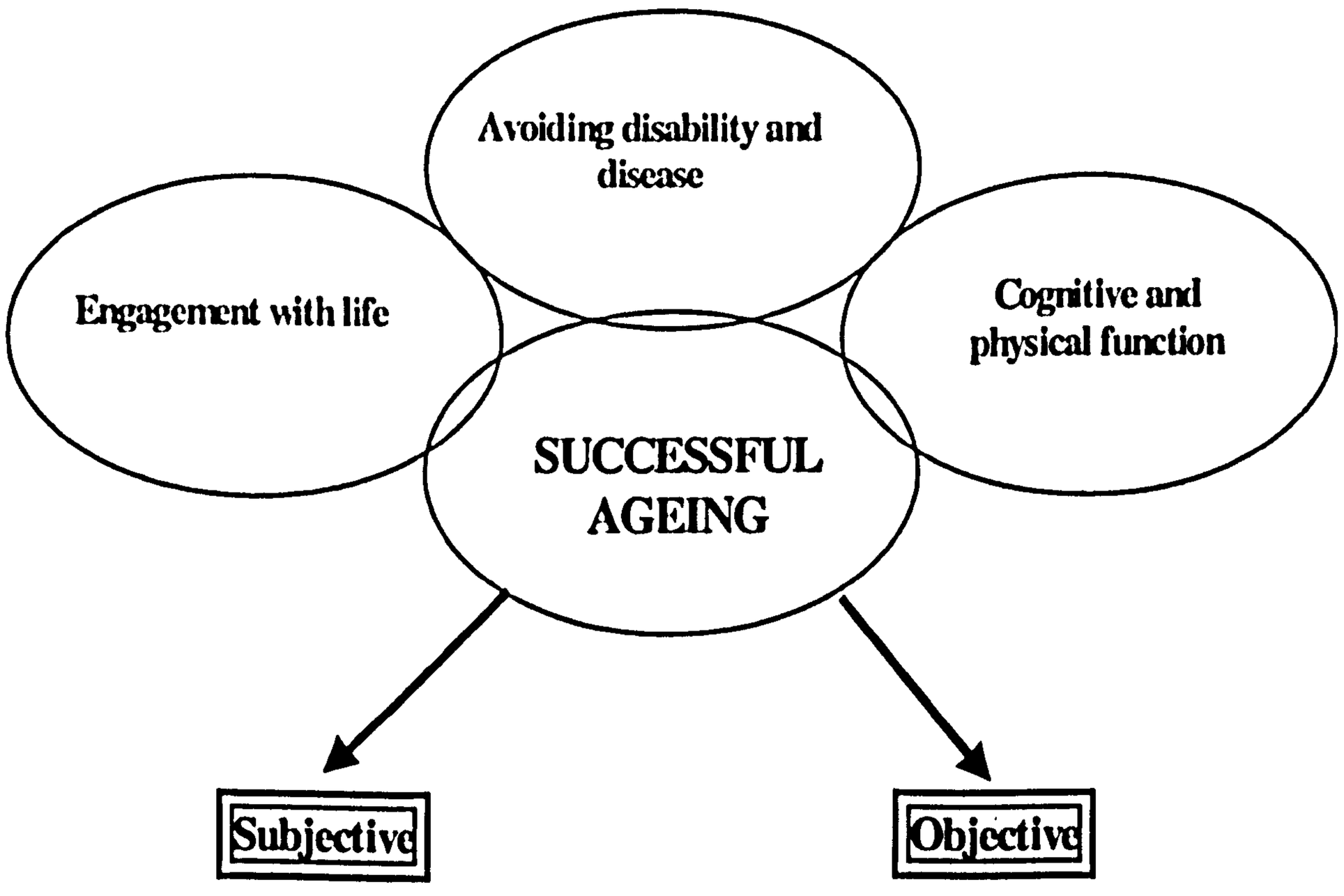

Figure 2.1. Model of successful ageing (adapted from Rowe & Kahn, 1997)

The objective elements of successful ageing have been researched quite extensively, especially the health/function and the socio-economic factors. Participation in health-related behaviours and maintenance of health and quality of life are affected by socio-economic factors over the life course (Carroll, Davey-Smith, & Bennett, 1996; Robert & House, 1994). The preventable health problems are increasingly concentrated among

persons of lower socio-economic status [SES] (House et al., 1994). Poor mental health is associated with being unemployed, living alone, living in rented accommodation, living in urban areas and being socially excluded (Grant, 2000). In a meta-analysis of 286 studies on the association of SES and well-being in later life, Pinquart and Sorensen (2000) found that older adults with higher SES (and especially higher income) and better social integration (especially higher quality of social ties) reported greater life satisfaction and happiness. House et al. (1994) stressed that eliminating extreme socio-economic deprivation and moderating socio-economic inequality may be necessary to reduce psychosocial risk factors. However, little work has been done to identify the subjective perceptions of individuals regarding the elements of well-being in later life and the meaning of ageing successfully.

2.3. Subjective well-being in later life

Subjective well-being has been seen as an important element of successful ageing (Rowe & Kahn, 1987). However, it is a construct that almost everyone understands but almost no one can define (Spirduso, 1995). Like self-esteem, well-being is one of the few psychological terms that has crossed the boundaries of scientific research and has been used extensively in everyday life. It appears in the cover page of magazines that promote a healthier way of life, in the health and lifestyle sections of newspapers, in the title of TV programmes, even in the names of TV channels.

Reference to well-being also features in formal policy documents of a range of organisations and institutions. The National Service Framework for Older People (Department of Health, 2001) includes well-being in one of the specific aims (Standard 8). There, it is clearly stated that "The health and well-being of older people is promoted through a co-ordinated programme of action led by the NHS with support from councils" (pp. 107) without however defining explicitly what is the meaning of well-being for the older persons.

The lack of consensus appears in both the definition and the measurement of subjective well-being. Spirduso (1995) argues that subjective well-being is an emotional feeling

and therefore it is personal, relatively transitory and can be influenced by temporary environmental occurrences. On the contrary, Veenhoven (in Diener, 1994) describes subjective well-being as the degree to which an individual judges the overall quality of her or his life as a whole in a favourable way stressing the cognitive component of subjective well-being. In a general definition, Andrews and Robinson (1991) define subjective well-being as "a psychological summing up of the quality of an individual's life in a society" (p.61). More specifically, Diener, Suh, Lucas, & Smith (1999), stress that "subjective well-being is a broad category of phenomena that includes people's emotional responses (pleasant-unpleasant affects), domain satisfactions, and global judgements of life satisfaction" (p.277). Therefore, subjective well-being appears to be a multidimensional construct including both emotional responses and cognitive judgements.

In ageing research, the definition of subjective well-being becomes more complicated as terms such as life satisfaction, happiness, morale, positive affect, negative affect, cognitive evaluations, sense of well-being, psychological well-being, perceived well-being and quality of life have been used interchangeably, even though not necessarily and not always synonymous (Andrews & Robinson, 1991).

In an attempt to clarify this issue, Kunzman, Little, and Smith (2000) defined older adults' subjective well-being as a "broad concept comprising a wide range of distinct dimensions such as life satisfaction, positive affect, happiness, personal growth, satisfying social relationships, and autonomy" (p. 511) stressing the multidimensionality of the construct. However, some researchers have equated well-being with self-esteem, some with the absence of depression, some with satisfaction and some with morale (Ranzijn & Luszcz, 2000).

The lack of agreement as to what subjective well-being is, leads to conflicting opinions as to how it should be measured. As a consequence, the choice of which measure of well-being to choose seems to be almost arbitrary. This is clearly illustrating in three recent reviews of health measurements. Bowling (1997) divides the well-being

instruments in two broad categories: 1. psychological well-being, 2. Life satisfaction and morale introducing the concept of morale as a way of categorizing well-being instruments. Interestingly, under the term psychological well-being there are mainly measures about anxiety and depression and a few mental status questionnaires confirming a common notion that well-being is merely the absence of negative affective states. On the contrary, McDowell and Newell (1996) divide the instruments in three distinct categories: 1. Psychological well-being which includes measures of well-being, life satisfaction, morale and affective scales; 2. Depression, and 3. General health status and quality of life measures, which include the health-related quality of life measures. Finally, Andrews and Robinson (1991) divides the measures of subjective well-being in single-item and multi-item scales representing the cognitive and affective aspects of well-being.

2.4. Subjective well-being and physical activity in later years of life

The consequences of the lack of consensus regarding the definition and the measurement of subjective well-being are reflected also in the physical activity and ageing research literature. Terms such as mood, affect (positive and negative), psychological benefits, and well-being are often used interchangeably when the effects of physical activity on the well-being of older adults' are being assessed (Arent, Landers, & Etnier, 2000).

There is little consensus among existing studies on the key constructs that should be used to assess well-being and on the most appropriate instruments for use in studies with older adults. The phrase psychological benefits often includes improvements in cognitive function or decreases in stress reactivity (Tuson & Sinyor, 1993). Well-being also tends to be a rather broad term that can include physical well-being, cognitive functioning, and life satisfaction, in addition to psychological states commonly associated with affect and mood. As a result, the conclusions on the contribution of physical activity to the well-being of older adults depend on the constructs included under the terms psychological benefits or well-being and therefore, they should always be evaluated with caution.

The importance of this problem is well illustrated in Brown (1992, p.187) where psychological well being is defined as "whatever an investigator has identified in his/her investigation" whereas Seraganian when addressing the exercise/mental health literature (1993; p.385) stressed that "the absence of a unifying superstructure is noticeable". Furthermore, he said that, "when delving into the realm of psychological well-being, what seems to characterise the literature is a bewildering variety of loosely formulated constructs that are often coupled to problematic measurement protocols" (p.385).

Trying to overcome this problem, many researchers in physical activity and ageing research avoid the use of well-being altogether and instead use specific aspects of well-being as their dependent variables. This is clearly illustrated in the following two sections that present current evidence on the contribution of physical activity on the physical and the psychosocial aspects of well-being. However, for the purposes of this research, the section on the contribution of physical activity to the physical aspects of well-being is brief and summarised whereas the main focus is on the presentation of the possible psychosocial benefits for older adults accruing from participation in physical activities.

Finally, the term *physical activity* is used to describe any bodily movement produced by the skeletal muscles that result in energy expenditure. *Exercise* forms a subset of physical activity that is volitional, planned, structured, repetitive and aimed at improvement or maintenance of an aspect of fitness or health (Caspersen, Powell, & Christenson, 1985). Habitual physical activity has not been systematically studied in ageing research. Therefore, almost all the studies reviewed here regarding the effect of physical activity in the enhancement of subjective well-being aspects have focused on the impact of involvement in forms of programmed exercise such as brisk walking, swimming, aerobic exercise, strength/balance/stretching and flexibility training.

2.4.1. Physical activity and physical aspects of subjective well-being

The first motto of the Gerontological Society of America in 1955 called for "adding life to years, not just more years to life" and in recent years this has also been the basis and the target of ageing and physical activity research (Spirduso, 1995).

Older adults have the greatest proportion of chronic disease burden, disability and health care utilisation compared to younger people. Approximately 88% of those over 65 have at least one chronic health condition and many older adults suffer from impaired functioning (King et al., 1998). Although regular physical activity has been considered as critical for the promotion of health and function as people age (American College of Sports Medicine, 1998), older adults represent the most sedentary segment of the adult population (U.S. Department of Health and Human Services, 1996). In England, 33% of men and 38% of women aged between 55 and 74 years are sedentary (i.e. participate in less than half an hour of moderate intensity physical activity a week) (Health Education Authority, 1995).

Physical activity is inversely associated with mortality in all age groups and provides protection well into later years (Smith & Tommerup, 1995). While participation in physical activities may not always elicit increases in the traditional markers of physiological performance and fitness in older adults, it improves health and functional capacity. The Heidelberg Guidelines for Promoting Physical Activity among Older Persons (World Health Organisation, 1997) acknowledged the positive influence of physical activity on the physical health and psychological well-being of older adults. In a published position stand, the American College of Sports Medicine [ACSM] (1998) also stressed the importance of physical activity to successful ageing.

More specifically, increased levels of physical activity can assist in improvements in the following aspects of subjective well-being:

General cardiovascular fitness and function

The decrease in VO_2 that accompanies ageing may accelerate from 65-75 years of age. As a result, many of the least fit older individuals may not have the minimum fitness necessary to maintain an independent lifestyle and many 65 years old sedentary people are poised near the edge of disability (Shephard, 1997).

Although exercise cannot prevent an age-related loss in VO_2 max, it can substantially slow the rate of decline and certainly improve the overall levels of VO_2 through training. When middle-aged or older individuals begin a training programme, they can achieve significant improvements. These improvements range from 10-25% in cardiovascular function and aerobic capacity even in individuals 70-79 years old who have never exercised before (Spirduso, 1995). The magnitude of the increase in VO_2 max in older adults is a function of training intensity, with light intensity training eliciting minimal or no changes (ACSM, 1998). However, there is growing evidence that a large fraction of potential health gains can be realised from prolonged periods of moderate-intensity effort (Shephard, 1997).

Risk of coronary heart disease

The cardioprotective effect of physical activity among older adults has been attributed to its influence on the various inter-related components of a cluster of diseases and conditions that include hypertension, dyslipidaemia, hyperinsulinemia, abdominal adiposity and glucose intolerance known as the *metabolic syndrome* (Pescatello, 1999).

Coronary heart disease is responsible for about a third of all deaths in older men and it accounts for about a third of deaths in women 65 + years old (Shephard, 1997). There is an inverse relationship between amount of physical activity and incidence of coronary heart disease in older adults (Bokovoy & Blair, 1994). Fit people tend to develop less coronary heart disease than inactive people do. Also, if active people develop coronary heart disease, it occurs at a later age and tends to be less severe. Epidemiological and intervention studies have reported more favourable lipid and lipoprotein profiles among active middle-aged and older populations compared with their less active counterparts

(Pescatello, 1999; Spirduso, 1995). Low to moderate levels of physical activity attenuate age-related elevation of some blood lipids, help in the decrease in triglycerids and may be at least as effective as or even more effective than high intensity training (Bokovoy & Blair, 1994; Costanzo, Murphy, & Pescatello, 1998). However, the volume of exercise necessary for favourable blood lipid and lipoprotein alteration as a function of the interaction of intensity, frequency and duration needs further exploration (Hardman, 1999).

Control of high blood pressure

At least 40% of people 65+ have hypertension whereas 65-70% of fatal and non-fatal cardiovascular events occur in hypertensive persons (Spirduso, 1995). Active older adults have lower blood pressures than their less active counterparts (Pescatello & Dipietro, 1993). Physical activity has utility as an antihypertensive therapeutic modality for older adults, the majority of whom are hypertensive and women (Seals, Silverman, Reiling, & Davy, 1997; Young, Appel, Lee, & Miller, 1999). From a public health perspective it is important that low to moderate intensity training is effective in lowering blood pressure in older hypertensive adults (ACSM, 1998; American Heart Association, 1997). Therefore, further intervention studies are needed to determine the relationship between low to moderate levels of physical activity and blood pressure in older adults.

Joint mobility and muscle strength

Nearly 30% of men and 50% of women aged between 55 and 74 years do not have sufficient muscular strength around the thigh to rise easily from a low chair. Furthermore, amongst women aged over 55 years, only half have sufficient leg power to climb stairs easily (Health Education Authority & Sports Council, 1992). These statistics underline the effects of sedentary lifestyle and inactivity which lead older adults to the threshold of dependency and immobility.

A growing body of research demonstrates the capacity of the elderly to cope safely with high intensity training and moreover to adapt and improve at rates similar to those of younger groups (Phillips & Haskell, 1995). These programmes can yield substantial gains of strength with corresponding improvements in gait, balance and overall

functional ability without muscle soreness or significant muscle cell disruption (Hurley et al., 1995; Shephard, 1997).

Older adults who stay physically active have greater strength levels than do sedentary persons (Viljanen, Viitasalo, & Kujala, 1991). The effects of regular physical activity on the muscular system of the ageing adult are impressive and the results of a well-planned programme can be spectacular showing that 'at least some of the deterioration of muscles appears to be secondary to disuse' (Cartee, 1994). In a recent review Hurley & Roth (2000) reported that two decades of age-induced muscle mass loss can be reverted with only about two months of strength training. Improvements are relatively rapid, visible changes occur in the shape and tone of body muscles and as a result, strength training programmes may provide a psychological feeling of accomplishment for many of the elderly who participate in them.

Furthermore, intervention studies report small but significant range of motion increases in elderly populations ranging from 60-85+ years of age. Such increases have been achieved with a variety of exercise and testing protocols, both in community and institutional settings (Phillips & Haskell, 1995) and therefore, prolonged stretching should be an integral part of any properly designed strength training programme (American College of Sports Medicine, 1998).

Osteoporosis and falls prevention

Bone loss contributes to the decline in fat free mass and when excessive, leads to osteoporosis, lower bone strength, and increased risk of fracture. The loss of bone mass density after menopause in women results in a doubling of hip fracture risk for every 5 years of age past the age of 50 years (Hurley & Roth, 2000). Osteoporosis has become a significant public health concern in the elderly accounting for ~1.5 million fractures yearly at a cost estimated above $10 billion in the US (Going, Williams, Lohman, & Hewitt, 1994).

Physical inactivity can result in significant mineral loss. Numerous cross-sectional studies have demonstrated that the bone mass of active men and women is higher than that of their less active peer. Women of 43-72 years of age who walked 1.6 km/day had higher bone density than those who walked less (Shephard, 1997). After 9 months of weight bearing and resistance exercise, there was a 5.2% increase in bone mass density in postmenopausal women (Smith & Tommerup, 1995). Finally, Going et al. (1994), reported that weight training exercise lasting 5-9 months increases bone mass density by ~2% in pre-menopausal women and that with continued training the gains in bone mass density are maintained.

Falls are a major cause of disability and the leading cause of mortality due to injury in older people aged over 75 in the UK (Health Education Authority, 1999b). Persons who incur hip fractures are 1.1-1.2 times likely to die within the following year as persons without hip fractures (Smith &Tommerup, 1995). Up to 14.000 people a year die in UK as a result of an osteoporotic hip fracture. Furthermore, hip fractures results in an annual cost to the NHS of around £1.7 billion for England (Department of Health, 2001).

Physical activity plays a dual role on fracture risk in the elderly by decreasing the frequency of incidence and severity of falls and increasing the quantity and quality of the bone (Lord, Ward, Williams, & Strudwick, 1995). Physical activity can improve bone and muscular strength, flexibility, balance, reaction time, gait and postural stability, reduce the number of falls, alter the direction of falls, and reduce the impact to vulnerable areas, as well as increase the bone's resistance to fracture (Smith and Tommerup, 1995). A recent review of randomised controlled trials showed that exercise is effective in lowering falls risk in selected groups. However, there is need for further research on the most effective balance and strength training exercises, the groups most likely to benefit, the determinants of compliance and the possible ways to improve it (Gardner, Robertson, & Campbell, 2000).

Risk of Diabetes (Type II)

Non Insulin Dependent Diabetes Mellitus [NIDDM] is one of the most common chronic diseases in older adulthood. Glucose intolerance and insulin resistance are less common among older people who engage regularly to vigorous, aerobic activity (Pescatello, 1999; Staten, 1991). Although vigorous exercise is most effective in decreasing the risk of diabetes among middle-aged and older individuals, moderate physical activity may also be protective (Pescatello & Murphy, 1998). More, randomised, controlled, clinical trials therefore are needed in order to establish the appropriate dose-response relationship between physical activity and risk of diabetes (Pescatello, 1999).

Weight control

The prevalence of obesity is increasing in older people (Poehlman, 2000). In older men and women there is a centralisation of subcutaneous fat from limbs to the trunk with increasing age. Several epidemiological studies from Europe, Canada and the US suggest a preferential loss of abdominal fat in response to exercise training in older men and women (Shephard, 1997). Age-related changes in physical activity might be a more important determinant of changes in glucose disposal and lipoprotein profiles than changes in body weight (Going et al., 1994). Low to moderate intensity habitual physical activity appears to improve the metabolic risk profile of older people in the absence of significant weight loss and improvements in aerobic capacity via the preferential mobilisation of visceral adipose tissue (Pescatello, 1999). However, the extent to which changes in body fat and fat distribution affect health risks in older people requires further research.

In conclusion, physical activity appears to be an important contributor to the physical aspects of older adults' well-being. Frailty, illness, suffering or even threat of disease have important consequences for subjective well-being. Not only does physical activity influence the health and fitness of older people but it helps them to be less likely to develop chronic disease, more likely to recover faster from an acute disease and more likely to remain functionally independent. Furthermore, physical activity could reduce the need for intensive and costly care for older adults even those living in a chronic care

facility (McPherson, 1994). Recent findings indicate that moderate intensity physical activity is advantageous for the physical health of older people. However, much scientific inquiry remains to be done regarding the exercise quantification of the amount of physical activity needed for optimal physical health and functionality among older people.

2.4.2 Physical activity and psychosocial aspects of subjective well-being

Although the case for physical activity in older adults has been built largely on its impact on physical health, there is growing research interest in its potential to influence aspects of mental health. Reviewing the literature for over a 10-year period for adults over 45 years of age, McAuley and Rudolph (1995) located 38 studies. Biddle and Faulkner (in press) over a shorter period (1995-beginning of 2000) located 30 studies concerning adults over 60 years of age.

What is clear is the positive effect of physical activity on older adults' subjective well-being. McAuley and Rudolph (1995) reported that 73.7% of the studies reviewed showed "some evidence of a relationship between levels of physical activity and enhanced well-being" (p.79) with 26.3% showing no relationship or change. Biddle and Faulkner (in press) found that 86.7% of the studies reported positive results with only 13.3% showing no effects. Furthermore, 81.3% of the 16 studies used experimental reported positive results. Interestingly, both reviews did not show any negative effects.

Although the positive effect of physical activity on the mental health is often moderate in magnitude, it appears to be independent of research design, age, gender, nationality, and length of physical activity intervention and psychological measures. More specifically, participation in physical activities contributes to the following specific elements of subjective well-being:

Cognitive performance

Decrease in cognitive performance seems to be an inevitable consequence of advancing age (Dustman, Emmerson, & Shearer, 1990). Behavioural slowing is the most significant aspect of reduced cognitive performance in the later years of life with

important consequences for the older adults (Boutcher, 2000). Behavioural slowing affects the ability to drive a car or cross the street and such factors contribute to higher accident rates. However, as people age not all the aspects of cognitive performance decline. Chodzko-Zajko and Moore (1994) have suggested that age related changes in cognitive performance appear to be maximised for tasks that require rapid and/or attentionally demanding processing. Tasks that are more automatic or can be performed at a self-paced rate do not seem to be significantly affected. The prevalent view is that behavioural slowing is caused by central processing limitations rather than peripheral factors (Boutcher, 2000).

Apart from the consequences of normal ageing, a wide variety of disease states are associated with decreases in cognitive performance and this is more pronounced in older adults (Birren, Lubben, Rowe, & Deutchman, 1991). The maintenance of an active lifestyle can compress morbidity and mortality in older adults (ACSM, 1998; Smith & Tommerup 1995) and this prolonged state of functional health in itself is likely to assist in cognitive performance. In addition, physical activity is one of the few non-pharmacological interventions that could compensate for the steady decrease in cognitive performance that often accompanies ageing (Biddle & Faulkner, in press).

Although the mechanisms explaining the relationship between physical activity, ageing, and cognitive performance are unclear and the methodological barriers many, there is some positive evidence from cross-sectional and intervention studies (Boutcher, 2000).

Cross-sectional studies testing reaction time have shown that physically fit older adults often process cognitive information more efficiently than less-fit individuals of the same chronological age and similar to younger fit adults (Boutcher, 2000; Chodzko-Zajko & Moore, 1994; Spirduso, 1995). Their findings, detected by several different methods of assessing fitness (like self-report inventories as well as more traditional laboratory tests of physiological fitness and aerobic capacity) were similar irrespectively of exercise modalities (Arito & Oguri, 1990; Baylor & Spirduso, 1988; Hawkins, Kramer & Capaldi, 1992). However, studies examining parameters such as memory, fluid and

crystallised intelligence have found inconsistent results in the differences between active and sedentary older adults (Chodzko-Zajko & Moore, 1994). In a meta-analysis on cross-sectional studies, Thomas, Landers, Salazar and Etnier (1994) reported a significant but moderate effect size (ES=0.31; SD=0.54). DiPietro, Seeman, Merrill, and Berkman (1996) reported that participation in physical activity was significantly related to better cognitive performance. However, when educational levels were added to the model, this relationship was significantly reduced. Furthermore in a large follow-up study (5 and 8 years respectively), Ruoppila and Suutama (1999) and Suutama and Ruoppila (1998) found inconsistent associations between cognitive functioning and physical activity. In addition, Biddle and Faulkner (in press), in a further review of cross-sectional studies published since 1995, reported results that are less supportive of the consistency of the relationship.

Physical activity effects are most likely to be observed in tasks that require rapid or effortful cognitive processing and are less likely to occur in self-paced or automatic processing tasks. Given the evidence that the performance of effortful tasks is mostly affected by advancing age, the exploration of the mechanisms by which physical activity contributes to better cognitive performance becomes more important. Therefore, as numerous task and subject-related factors can influence the relationship between physical activity and cognitive performance and cross-sectional studies cannot claim causality, caution is warranted in the interpretation of their findings.

Inconsistent results are also presented in 14 intervention studies reviewed by Boutcher (2000) where five studies reported increased performance and nine did not show any significant change. The biggest increases in cognitive performance were found in people who had the greatest increase in aerobic fitness suggesting that older individuals may have to achieve large increase in aerobic power before cognitive performance is enhanced. Out of the 14 studies reported by Boutcher (2000), only four included strength training in the intervention protocol stressing the need for more substantial evidence regarding the importance of different modes of physical activity on the cognitive performance of older adults. Interestingly, in five studies conducted after

1997, only one did not show improvements in cognitive function and two studies reported significant increase in muscular strength and cognitive function (Biddle & Faulkner, in press). Intervention studies support also the 'selective improvement' hypothesis with an important contribution of physical activity mainly to tasks that require executive control processes. Finally, in a meta-analysis, Etnier et al. (1997) found that the overall effect size for intervention studies was large and significant for 45 to 60 year old adults (ES=1.02; SD=1.15) and significant but small for older adults 60 to 90 years of age (ES=.19; SD=.37).

Research so far has suggested a number of other mechanisms besides improved aerobic fitness that may underpin the possible physical activity-cognitive performance relationship. First, evidence suggests that impaired cerebrovascular circulation is associated with accelerated cognitive decline. Chronic exercise may maintain cerebrovascular integrity by enhancing oxygen transportation to the brain. Second, physical activity may be associated with a diminution of age related degenerative changes throughout much of the central nervous system. Third, participation in regular aerobic exercise is associated with enhanced central nervous system processing. However, these remain speculative at this stage (Boutcher, 2000; Chodzko-Zajko & Moore, 1994).

Well-designed experimental studies and qualitative process-oriented studies are necessary to unravel the complex interaction of programme-related variables with their possible effect on different aspects of cognitive functioning. Moreover, more studies are required to explore the contribution of different activities to the enhancement or maintenance of cognition and the age and gender differences in the physical activity-cognitive performance relationship. So far quite a restricted view has been taken of the important questions whether exercise/fitness can keep people mentally agile and alert. Therefore, understanding the different elements of cognitive function and using the appropriate assessment tools is essential before the notions "exercise keeps me alert" and "it helps me to focus better" can be fully substantiated.

Mood, affect and feeling states

These constructs tend to be used interchangeably and are important indicators of how life is experienced and accommodated. However, *emotion* has a clear focus, a short duration and a close temporal relationship to an eliciting stimulus, *mood* has a cognitive basis, lacks a distinctive focus and has a longer duration than emotions, and *affect* is a general term including but not limited to emotions and moods (Ekkekakis & Petruzzello, 1999). As a result, the findings of several studies may vary greatly depending on the conceptualisation and operationalisation of the above terms.

Mood and affect present a dual role in the physical activity domain. They possess motivational properties for a healthier lifestyle as the way that people feel during and after participating in physical activities affects their decisions of whether or not they maintain their involvement (Biddle, 2000). Mood and affect are also important outcomes on their own right as they represent emotional states and therefore aspects of mental well-being. Biddle (2000) reported 20 narrative and meta-analytic reviews on these constructs and exercise and concluded that, "there is a cautious support for the proposition that PA is associated with enhanced affect and mood" (p.71).

Earlier reviews of studies addressing the relationship between physical activity and mood in older adults were not optimistic about the effect of exercise. Fillingim and Blumenthal in 1993 reported that "research has not consistently borne out that exercise holds psychological benefits for the elderly" (p. 247). However, McAuley and Rudolph in 1995, concluded that there are "overwhelmingly" positive results but there is need for further establishing causality. Furthermore, in a recent review, Biddle and Faulkner (in press) reported that "clear effects are evident for enhanced psychological well-being from physical activity in older adults".

In the first meta-analytic review of 32 studies on the effects of exercise on mood in older adults, Arent et al. (2000) concluded that exercise is associated with improved mood in older people.

- In studies comparing *experimental-versus control groups* there is evidence of the positive effect of exercise on enhanced mood (ES=O.34). Interestingly, participation in exercise < 3 days per week presented a larger ES than exercising > 3 days per week. In addition, low intensity exercise, self-selected duration of exercise bouts and protocols lasted < 12 weeks presented the most effective results in mood improvement. The finding that improved mood was not necessarily related to increased number of weeks of participation might indicate one way in which older participants respond differently than do younger participants to exercise. Furthermore, it points out that future research should examine whether these findings interact with initial fitness levels (McAuley, Mihalko, & Bane, 1996).
- In studies comparing *pretest-posttest gains*, exercisers had a significant better global mood (ES=0.38) than control groups (ES=0.06). Resistance training presented better effects than all the other activities and increases in cardiovascular fitness were associated with larger average ES.
- In studies comparing *active-inactive older adults*, physically active older adults demonstrated an enhanced global mood in comparison with their physically inactive counterparts (Arent et al., 2000).

National survey data from England (Skelton et al., 1999) shows that positive mood is more common in frequently active older adults than those showing more sedentary lifestyles. Biddle and Faulkner (in press) reviewed 9 studies (7 experimental, 2 non-experimental) investigating the influence of exercise on affect in older adults. All (Engels, Drouin, Zhu, & Kazmierski, 1998; Hall & Petruzzello, 1999 (cross-sectional); Hassmen & Koivula, 1997; Hilleras, Jorm, Herlitz, & Winblad, 1999 (cross-sectional); Mihalko & McAuley, 1996; Shin, 1999; Tsutsumi, Don, Zaichkowsky, & Delizonna., 1997; Tsutsumi et al., 1998) but one (Jette et al., 1998) reported small but significant improvements in positive and negative affect.

In one of the few studies examining the affective responses to acute exercise, Pierce and Pate (1994) reported improved affect following a single bout of intense exercise. Interestingly, Biddle and Faulkner reviewing the literature between 1995-1999 they did

not track any studies examining the effects of acute exercise to affective responses. Recently, McAuley, Blissmer, Katula and Duncan (2000) found that there is a relationship between acute exercise and affect in older people suggesting that greater benefits take place in low intensity levels. However, Ekkekakis and Petruzello (1999) questioned such findings stressing that protocols limited to pre-post assessment of affect offer a restrictive representation of dose-response affects and furthermore, the recovery time before conducting the post exercise assessment may allow any effects to dissipate. Concluding, they stressed the need for protocols tracking affective change across time, during and after exercise and they recommended the study of the distinction between 'self-selected' versus imposed exercise doses and the examination of aerobic fitness or activity levels in future dose-response studies.

Mood and affect in older adults has been related mainly with the existence or absence of negative symptoms and there is a lack of studies examining the effects of exercise on positive affect in older adults (Arent et al., 2000; McAuley & Rudolph, 1995). This reflects on the measurement tools used in the exercise research. Instruments such as the Profile of Mood States (McNair, Lorr, & Droppleman, 1971) with only one positive scale (vigour), and the Multiple Affect Adjective Check List (Zuckerman & Lubin, 1965) which examines only depression, anxiety and hostility, have been used extensively in studies examining the relationship between exercise and mood. However it seems that exercise experience produce affective responses not tapped by such measures (McAuley & Rudolph, 1995) and they are criticised for providing a limited and biased view of the relationship between physical activity and mood (Biddle & Faulkner, in press; Ekkekakis, & Petruzello, 1999). The Exercise-Induced Feeling Inventory (Gauvin & Rejeski, 1993) and the Subjective Exercise Experiences Scale (McAuley & Courneya, 1994) have been developed to address the need for appropriate instruments for the exercise environment but they have received several criticisms and must be used with caution (Ekkekakis, & Petruzello, 1999; Biddle, 2000).

Arent et al. (2000) evaluating the evidence following the criteria for evaluating scientific literature for public policy issues (Dunn & Blair, 1997), reported that the consistent

findings presented in their meta-analysis are strong evidence for making conclusions concerning public policy. Despite the methodological limitations, physical activity is strongly related with enhanced mood in older adults. The beneficial effects of low to moderate intensity physical activities could be achieved through walking and simple activities that easily fit into a typical day of an older adult's life.

Future research should focus on the dose-response relationship between physical activity and mood. Further examination on the impact of the several types of activities is also required as findings stress the influence of strength training programmes over that of cardiovascular training alone. Finally, there is need to further explore the possible mechanisms that cause the "feeling good" effect of participation in physical activities as the process of physical activity (exercise setting, social interaction) may be most important for enhancing mood in older adults. A bout of intense exercise performed in the laboratory and in a nice physical or social environment might have different effective outcomes. The social composition of the exercise environment, the distraction of worries and problems, and the improved physical self-perceptions and self-efficacy could all influence the physical activity-mood relationship and therefore they require further examination.

Life satisfaction

Global self-assessments of life satisfaction and well-being are often used as indicators of life adjustment and mental health. McAuley & Rudolph (1995) reported equivocal results on the effect of physical activity to the life satisfaction stressing the need for adequate operational definitions and appropriate measurement tools. Despite the fact that life satisfaction refers to the cognitive component of subjective well-being (Diener et al., 1999), in several studies examining this relationship the terms life satisfaction, well-being and quality of life have been used interchangeably. This point needs to be kept in mind when appraising the literature as distinctions between these terms do appear.

Cross-sectional data have shown that active older adults appear to have higher levels of life satisfaction than inactive ones (Brown, 1992; Fillingim & Blumenthal, 1993; McAuley & Rudolph, 1995; O' Connor, Aenchbacher, & Dishman, 1993). In addition, experimental (Damush & Damush, 1999; Kutner Barnhart, Wolf, McNeely, & Xu, 1997; McRae et al, 1996; Mihalko & McAuley, 1996), and quasi-experimental (King et al., 2000) studies concluded that walking, strength training and stretch and flexibility programmes are effective in improving life satisfaction.

Interestingly, studies using health related quality of life measures such as the Medical Outcomes Study SF-36 (McNair et al., 1971), or the Rand Medical Outcome Study (Ware, Snow, Kosinski, & Gandek, 1993) did not report any changes from participation in physical activity, questioning the appropriateness of such measures in the exercise and physical activity environment. In conclusion, it could be said that experimental studies show a moderate positive effect of physical activity on life satisfaction and perceived health of older people. However, there is need for appropriate operational definitions and use of measures sensitive to outcomes from participation in physical activities.

Self-esteem and self-perceptions

Self-esteem is widely accepted as one of the strongest predictors of subjective well-being and an important element of quality of life (Diener, 1984). High self-esteem has been related to life satisfaction, independence and adaptability whereas low self-esteem is a feature of clinical depression, and is associated with trait anxiety, suicidal ideation and low perceived personal control (Fox, 2000). However, there is a similar lack of definitional precision in this area of work. Often global constructs such as self-concept and self-esteem are used interchangeably. More specific self-perception measures such as body image, physical self-efficacy and sports competence are numerous and diverse making studies difficult to compare. In a review of 38 studies for adults over 45 years of age, there was a complete absence of direct measures of self-esteem (McAuley & Rudolph, 1995) and more recently, only 2 out of 30 studies regarding older people over 60 years of age used such measures (Biddle & Faulkner, in press). The newer

comprehensive physical self-perception measures such as the Physical Self-Description Questionnaire (PSDQ) (Marsh, Richards, Johnson, Roche, & Tremayne, 1994) and the Physical Self-Perception Profile (PSPP) (Fox & Corbin, 1989) have just started to be used.

Despite the importance of the concept of self-esteem, few reviews of exercise and self-esteem have been published (Leith, 1994; Sonstroem, 1984). Fox (2000) reported that only 36 RCTs had been located in the literature since 1970 and this represents little more than a study per year. Interestingly, the population where this lack of research is mostly apparent is older adults. Although seven of the most recent and best designed RCTs have been conducted in middle-aged adults (Alfermann & Stoll, 1995; Brown et al., 1995; King, Taylor, & Haskell, 1993; King, Taylor, Haskell, & DeBusk, 1989; Talbot & Taylor, 1998; Tucker & Mortel, 1993), no RCTs were located for older adults (Fox, 2000).

In four unpublished controlled studies Fox (2000) found that although flexibility programmes did not produce positive results (Bozoian & McAuley, 1994; Yeagle, 1982); strength and fitness programmes produced positive self-concept changes (Bozoian & McAuley, 1994; Olfman, 1987).

No significant changes from pre-post or at follow-up measurements on self-esteem were reported in a 15-week intervention programme with 200 participants randomised to Tai Chi training, balance training and health education (control group) (Kutner et al., 1997). In a 3-months programme, 83 older adults took part in either a home-based or class-based programme (Mutrie & Davison, 1994). The Physical Self-Perception Profile (Fox & Corbin, 1989) was administered pre- post and 6 months after the programme and positive changes were reported in both groups. Participants in the class-based group reported greater improvement in physical self-perceptions, perhaps stressing the importance of the social aspects of participation in physical activities.

The most recent randomized controlled trial examined the growth and form of multidimensional self-esteem over a 12-month period (6-month exercise intervention and 6-month follow-up) in 174 older adults engaged in either a walking or stretching/toning programme (McAuley, Blissmer, Katula, Duncan, & Mihalko, 2000). The results showed a curvilinear pattern of growth in esteem with significant increases at all levels of self-esteem upon completion of the intervention followed by significant declines at 6 months post-intervention in both groups. Frequency of activity and changes in physical fitness, body fat, and self-efficacy were related to improvements in perceptions of attractive body, strength, and physical condition. These findings stress that "self is best described as complex system of constructs" (Fox, 2000, p.89) and underline the need for trials that utilize comprehensive assessments of self-perceptions at different levels of specificity (Fox, 1998).

Research so far presents encouraging evidence that physical activity can be beneficial for the improvement of older adults' self-esteem and self-perceptions. Although the mechanisms underpinning such improvement are still not fully understood, and there may be several mediating variables involved in the relationship between physical activity and self-esteem, physical activity appears to be an important tool for enhancing mental well-being and quality of life in older adults through changes in the way older people feel about themselves.

Strength training and group exercise programmes have produced the better results so far and future research should focus on the types of physical activity and the characteristics of the exercise environment that influence the levels of self-esteem in older adults. Finally, consideration of the specific characteristics and needs of this age group (need for independence, personal control, sense of belonging) is necessary in order to explore the pathways through which physical activity influences their self-perceptions.

Self-efficacy

A sense of control is important to positive physical and psychological health in later years of life (Schulz & Heckhausen, 1996). Unlike self-perception constructs, that are

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generalised statements of perceived competence or adequacy, self-efficacy beliefs reflect the individual's perceptions or assessments of their ability to perform specific behaviours successfully (Bandura, 1982) and have been demonstrated to be important factors in physical and psychological function. Such beliefs influence the types of activity people choose to engage in, the effort they expend and their persistence in the face of difficulties. As people grow older, performance of everyday activities requires greater effort and perseverance (McAuley et al., 1999). Low efficacious individuals tend to curtail their range of activities, demonstrate less effort and experience greater anxiety and depression (Bandura, 1986). This results in less experience with successful performance and as a consequence, there is an increase in the likelihood of older adults perceiving themselves as being unable to perform several activities.

A cross-sectional study in older adults aged 70+ reported that self-efficacy beliefs regarding the ability to perform everyday activities without falling were associated with higher levels of physical and social functioning (Tinetti, DeLeon, Doucette, & Baker, 1994). Longitudinal data also have shown that self-efficacy beliefs predict reported disability in activities of daily living (DeLeon, Seeman, Baker, Richardson, & Tinetti, 1996). In addition, a longitudinal study based on the McArthur studies of successful ageing found that although efficacy beliefs were related to self-reported levels of functional disability such beliefs were unrelated to measured changes in actual performance-based assessments of physical ability (Seeman, Unger, McAvay, & De Leon, 1999). These findings highlight the importance of self-efficacy beliefs in shaping older adults' ability perceptions and their important role as a potential modifiable factor that can be targeted through interventions promoting optimal functioning at older ages.

Until recently, self-efficacy was mainly investigated as a determinant of physical activity (Dishman, 1994). It has been found to be positively correlated with levels of physical activity (Gill, Kelley, Williams, & Martin, 1994) and predictive of adherence to exercise in asymptomatic (McAuley, 1993) and clinical populations (Kaplan, Atkins, & Reinsch, 1984). In addition, self-efficacy is negatively related with fear of falling

(McAuley, Mihalko, & Rosengren, 1997), and slower gait speeds (Rosengren, McAuley, & Mihalko, 1998).

In a path analysis of efficacy expectations and exercise behaviour in older adults, findings supported the notion that efficacy expectations exert an influence on the older adults' adherence to a regular exercise programme (Resnick, Palmer, Jenkins, & Spellbring, 2000). Resnick et al. (2000) stressed also the role of outcome expectancies. She concluded that the exercise behaviour of this age group could be improved by strengthening both self-efficacy and outcome expectation related to exercise by interventions such as, teaching older adults about the benefits of exercise and exposing them to role models of other older adults who are successfully exercising.

Recent studies have shown that self-efficacy can be improved through physical activity. Although the majority of studies refer to middle-aged people, the results show that both, acute and chronic exercise involvement helps in the enhancement of more generalised feelings of competency and self-efficacy. As a result, older adults should be encouraged to a greater involvement in exercise (McAuley, 1994; McAuley, Courneya, & Lettunich, 1991). In 38 respective studies reviewed by McAuley and Rudolph (1995), four (one with older adults over 60 years of age) used self-efficacy measures and all reported positive results. Longer study protocols appeared to be more effective and McAuley and Rudolph concluded that greater exposure to exercise participation appears to improve perceptions of personal capabilities and this in turn leads to positive changes in well-being. Since that review, seven studies have reported positive self-efficacy effects in older adults (Bosscher, Vanderaa, Vandasler, Deeg, & Smit, 1995; Katula, Blissmer, & McAuley, 1999; King & Brassington, 1997; King et al., 2000; McAuley et al., 1999; Parkatti, Deeg, Bosscher, & Launer, 1998; Tsutsumi et al., 1997). Most of the studies exploring the effects of physical activity on self-efficacy have been aerobic in nature (McAuley et al, 1991; McAuley, Lox, & Duncan, 1993). McAuley, Talbot, and Martinez (1999) examined the effects of differential modes of physical activity on exercise specific and more general physical self-efficacy. The effects of a walking programme were more pronounced in the exercise efficacy assessments however, the

stretching and toning group presented some positive results with exercise efficacy suggesting a generalisation effect of one physical activity to efficacy perceptions specific to another activity. Furthermore, the accumulation of successive mastery experience through consistent activity participation, independent of physical activity improvements, was found to result in improvements in self-efficacy. In a recent RCT exploring the importance of the nature of the environment in influencing self-efficacy, McAuley, Blissmer, Marquez et al. (2000) partially supported the proposition that improvements in efficacy may come about as a function of social comparison with efficacy improvements being based on performance relative to exercising peers.

The determination of how older adults maintain high levels of efficacy and the extent to which compromised efficacy can be enhanced are primary issues in the study of ageing (Bandura, 1997). As self-efficacy has been quite consistently associated with participation in physical activities there is need to further explore this relationship. The importance of different modes of activity clearly requires consideration in further research particularly in relation to its potential role in initiating change in more generalised perceptions such as perceived self-worth and global self-esteem.

Depression

Major depression alone ranks second only to ischemic heart disease in magnitude of disease burden in established market economies such as the US (Murray & Lopez, 1996) and hospitalises more people than any other disorder except cardiovascular disease (Katona, 1994). Depressive symptoms are reported by approximately 15-25% of the older population in US (Friedhoff, et al., 1992; Koenig & Blazer, 1992). More specifically, 8 to 20% of older adults in the community and up to 37% in primary care settings suffer from depressive symptoms (US Department of Health and Human Services, 1999). In a recent systematic review, Beekman, Copeland, and Prince (1999) reported that major depressive symptoms were rare in older people (1.8%), and non-clinical symptoms were more common (9.8 %). In UK, at any one time, almost 10-15% of the population aged 65 and over will have depression. More severe states of

depression are less common, affecting about 3-5% of older people (Department of Health, 2001).

Depressive symptoms in older adults "are still too common to be ignored" (O' Connor et al., 1993; p.36), and they are associated with decline in physical performance, increased mortality, lower quality of life and higher utilisation of health services (Penninx et al., 1999; Unutzer et al., 1997). However, depression in people aged 65 and over is especially under-diagnosed (Department of Health, 2001). The interaction of mental and physical problems in older people makes their overall assessment and management more difficult (US Department of Health and Human Services, 1999).

Pharmacological and psychological treatments are the most frequently used treatments for depression in older adults (Gerson, Belin, Kaufman, Mintz & Jarvik, 1999). However, drug treatments are expensive, not always desired by patients, and cognitive behavioural therapy is often in short supply (Mutrie, 2000). In comparison, physical activity appears to be an alternative low cost treatment, with minimal side affects. Its potential use as an adjunctive treatment for depression, has become a public health issue (American College of Sports Medicine, 1998; Department of Health, 1999; Morgan 1997). However, in two recent governmental reports in mental health and older adults, (Department of Health, 2001; US Department of Health and Human Services, 1999) there are no references in the potential preventive or therapeutic role of physical activity. That stresses the need for more 'hard' evidence before medics adopt physical activity as a way of preventing or treating depression.

A number of narrative reviews exploring the relationship between physical activity and depression have concluded that methodological limitations inhibit the drawing of definitive conclusions (Brown, 1992; Fillingim & Blumenthal, 1993; O' Connor et al., 1993; Paluska & Schwenk 2000; Singh & Fiatarone Singh, in press).

Epidemiological studies have reported a moderate inverse relationship between physical activity and depression (Camacho, Roberts, Lazarus, Kaplan, & Cohen, 1991; Farmer et

al., 1988; Stephens, 1988). Stephens (1988) reported that physical activity is consistently associated with fewer symptoms of depression independent of socio-economic status as well as physical health status especially for women and for persons over the age of 40. However, the inclusion of older adults in such a broad category (40+) does not allow the extraction of clear conclusions. Stephens suggested an association between physical inactivity and higher depression scores, but no relationship between increasing levels of physical activity and lower depression scores. Furthermore, Farmer et al. (1988) supported the role of inactivity as being predictive of developing depression in the future.

In summarising the results of the Alameda County Study, Camacho et al. (1991) stressed that "the findings regarding activity change provide even stronger evidence for a direct link between activity level and subsequent depression" (pp. 228-229). Interestingly, he reported that people who had been inactive but increased their activity later were at no greater risk for depression than were those who had been highly active all along, suggesting that the high risk of depression is modified if the activity level is changed. Mobily, Rubenstein, Lemke, Ohara, and Wallace (1996) suggested that the results from the Iowa 65+ Rural Health Study stressed the importance of moving from a sedentary lifestyle to one of minimal physical activity and the importance of parameters such as health conditions and marital status on the report of depressive symptoms.

Based on the findings from the Evergreen Project, Ruuskanen and Ruoppila (1995) reported that intensive and regular participation in exercise was associated with a lower prevalence of depressive symptoms in the two youngest (65-69 and 70-75 years) age groups for both female and male respondents. They also stressed that the level of psychological well-being was an important predictor of participation in physical activities underlying the reciprocal relationship between well-being and physical activity. Furthermore, the follow up data of 663 participants from the Evergreen Project (Lampinen, Heikkinen, & Ruoppila, 2000) showed that people who increase their exercise reported less depressive symptoms. However, more depressive symptoms were reported from the participants in the strenuous physical exercise intensity group.

The Nottingham Longitudinal Study (Morgan et al., 1991) reported a weak and indirect relationship between customary physical activity and depression. In an 8 year follow-up, Morgan and Bath (1998) concluded that "while physical activity levels consistent with maintained or improved levels of functional capacity appear to contribute to subsequent levels of psychological well-being in later life, the contribution is extremely modest (p. 39)".

Epidemiological studies have supported a moderate inverse relationship between physical activity and depression and they also offer some evidence regarding a dose-response relationship. The evidence is stronger where programmed exercise has been assessed. Broader definitions of physical activity as recreation or leisure have produced less conclusive results (Bennet, 1998; Dupuis & Smale, 1995; Morgan et al., 1991). This stresses the need for further epidemiological research in order to explore the contribution of recreational activities, which may be easier to be adopted by older adults than strict exercise regimens.

Physical activity is associated with decreased risk of developing clinical depression and there is support for a causal link between exercise and decreased depression in adults at large (Mutrie, 2000). However, the preventive and therapeutic role of physical activity to the depressive symptoms in older adults has yet to be established although research so far presents positive findings.

Although several meta-analyses have been conducted in the area of physical activity and depression (Craft & Landers, 1998; Kugler, Seelbach, & Kruskemperet, 1994; Lawlor & Hopker, 2001; Mc Donald & Hodgdon, 1991; North, McCullagh, & Tran, 1990) none focus specifically in older adults. Craft and Landers (1998) reviewing 30 studies reported a mean effect size of 0.72 across age groups and specifically an effect size of 0.49 was reported for three studies that included older adults (60+). Recently in a systematic review, Lawlor and Hopker (2001) concluded that it is not possible to

determine the effectiveness of exercise in the management of depression and better quality research in the area of depression and exercise is needed.

Among the non-randomised experimental studies with older adults, a significant effect for aerobic and non-aerobic forms of exercise on depressive symptoms has been found by King et al. (1993), and McMurdo and Bernett (1992), whereas Blumenthal et al. (1991) and Gitlin et al. (1992) failed to find significant change. However, these latter studies involved older adults reporting low levels of depression at the baseline and therefore, the lack of robust results apart from methodological limitations may be due simply to the few depressive symptoms at the outset.

Biddle and Faulkner (in press), reviewing the literature on physical activity and symptoms of clinical depression, note that there are more reviews than randomised controlled trials. McNeil, LeBlanc, and Joyner (1991) conducted the only randomised controlled trial [RCT] on exercise and older adults with clinical depression prior to 1993. They reported that both the exercise and the social contact group exhibited significant reductions in the psychological symptoms but only the exercise group had a significant decrease in somatic symptoms. Interpreting the results, they concluded that most of the positive effect of exercise on depression stems from the social interaction.

In a recent randomised controlled trial in older adults with moderately elevated depressive symptoms (Beck Depression Inventory>12), Singh, Clements, and Fiatarone (1997) reported 2 to 3 times greater improvements in depression scores in the exercise group compared to the control group. Extending the RCT for ten more weeks, the exercise group reported a significant further reduction in depression and less musculoskeletal symptoms compared to control group (Singh & Fiatarone Singh, in press).

Mutrie (2000) stressed the lack of research in the comparative effects of exercise treatment with drug treatment. In this neglected area, Blumenthal et al. (1999) conducted a study with an exercise group, an antidepressant therapy group and a

combination of exercise and antidepressant group. All the groups (Mean age=57, SD=6.7 years) reported significant reduction in depression symptoms with no significant differences among them suggesting the effectiveness of exercise and its potential role as a form of treatment either in conjunction with traditional forms of therapy or as a main tool for achieving reduction in depressive symptoms.

The evidence from meta-analyses, experimental studies and narrative reviews show an important antidepressant effect for exercise despite the inconsistent results from epidemiological studies (Biddle & Faulkner, in press). Mutrie (2000) using Hill's (1965) criteria of strength of association, consistency, specificity, temporal sequence, dose-response, plausibility, coherence, experimental evidence concluded that there is supportive evidence for a causal link between inactivity and depression. This remains to be confirmed in evidence-based research with older adults.

Physical activity research in the area of ageing poses some particular characteristics as age is confounded by health status which is further confounded by several factors such as medication, loneliness, loss of significant others, which are different from physical inactivity (O' Connor et al., 1993). Functional limitations caused by physical disability or illness can have important and sometimes devastating effects on mental well-being and on the ability to be active. Furthermore, they have been shown to be predictive of depressive symptoms, and suicidal ideation among older adults (Bookwala & Schultz, 1996; Newsom & Schulz, 1996; Zeiss, Lewinsohn, Rohde, & Seeley, 1996). Therefore, it is important to establish whether depression is the primary problem or secondary to another condition.

Several theories have been developed to explain how physical activity might be useful in treating depressive disorders or reducing their symptoms. The social interaction theory suggested that the antidepressant effects of exercise might stem from more opportunities for social interaction (North et al., 1990). The self-efficacy theory (Simons, Epstein, McGowan, Kupfer, & Robertson, 1985) proposed that participation in physical activities leads to improvements in one's belief in capacity to perform work.

That leads to an increase in sense of mastery over physical tasks and a greater sense of confidence, which in turn reduces the symptoms of depression. Finally, the endorphin (Hoffman, 1997), serotonin (Chaouloff, 1997), norepinephrine (Dishman, 1997), and the thermogenic (Koltyn, 1997) hypotheses have been proposed as possible mechanisms through which physical activity may be helpful in the prevention and treatment of depressive symptoms.

Regardless of the possible antidepressant effects and the notion that "depression and poor physical function are mutually reinforcing" (Penninx et al., 1998, p.1725), the physical health benefits alone justify the need for promoting physical activity in older adults (ACSM, 1998; Pescatello, 1999). It is also important to note that there has been no documentation of a negative effect of physical activity on depression scores (Mutrie, 2000). However, further research is needed in order to explore the existing theories and their potential application to older adults. Cost-effectiveness studies comparing exercise with existing treatments for clinical depression are required before health services are likely to embrace activity promotion as a viable alternative. Furthermore, the impact of lifestyle physical activity as opposed to formal exercise regimens requires more attention as it is possibly more feasible in terms of delivery and adoption in older adults.

Social aspects

Ageing is a social as well as a biological process wherein individuals interact with, and are influenced by, the particular social, physical and cultural environments in which they age (McPherson, 1994).

A reduction in demand on health and social services, more positive images of older people and their value to society, and increased contribution to society and the economy by older people are considered to be important societal outcome from the participation of older adults in physical activities (HEA, 1999).

Physical activity could play an important role towards an age-integrated society through the development of intergenerational programmes aiming in broadening the horizons of

both the young and the older populations (Sidorenko, 1999). Educational programmes that bring together college students and older adults have reported lower negative stereotypes about the ageing process and formulation of more meaningful relationships between different age-groups (Dellmann-Jenkins, Fowler, Lambert, Fruit, & Richardson, 1994). Furthermore, programmes with older adults and nursery school children resulted in improved social interaction levels among both groups (Short-DeGraff & Diamond, 1996; Strom & Strom, 1995). However, there is a lack of research on the impact of such programmes in the area of physical activity and ageing, stressing that in order to achieve "a society of all ages" initiatives that bring together people of all ages in mutually supportive and stimulating environments are warranted (Chodzko-Zajko, 1999).

Increasing evidence support the contribution of physical activity to the avoidance of loneliness and social isolation. According to data from Europe and the United States (Dykstra, 1995; Weeks, 1994), approximately 40 % of older adults experience some degree of loneliness. Older adults have been regarded as particularly vulnerable because they are considered at high risk for "experience of change and loss" (Lopata, 1995).

Social and family relationships comprise the second most important element of life satisfaction after health (Cummins, 1996) and are strongly related with health in later life (Krause, 1996a; Seeman, Kaplan, Knudsen, Cohen, & Guralnik, 1987). In addition, availability of social support prevents loneliness and provides a positive input to older adults' well-being (Chamberlain, 1988; Dykstra, 1995). Older adults who have friends are known to meet various developmental challenges such as widowhood, with better outcomes than individuals who do not have friends (Connidis & Davies, 1990).

Engagement in social activities helps older adults to be active members of the community, to contribute to society and maximise pleasant interactions because people who participate more often in voluntary social activities are likely to experience greater pleasure than others (Ellison, Gay, & Glass, 1989). Apart from negative psychological reactions to functioning limitations that accompany ageing, disability may disrupt the

usual norms of social relationships older adult's support system and prohibit older adults from feeling "needed" by others and engaging in reciprocal exchanges (Newsom & Schulz, 1996).

Participation in group physical activities provides opportunities for older adults to foster new friendships, to enhance social and intercultural interactions and to widen available social networks (Department of Health, 1999). There is also the belief that it helps older adults to maintain independence and self-sufficiency and empowers them to sustain or acquire new roles in order to become more active members in society. A reduction in demand for health and social services, a better public image of older people and appreciation of their value to society are considered to be important societal outcome from the participation of older adults in physical activities (Health Education Authority, 1999a). Although these effects appear intuitively appealing, there is still no sound evidence base for such claims and this presents an important gap in this area of research, which is according to Biddle & Faulkner (in press), "even more difficult to define and delimit than psychological outcomes".

A qualitative study among people over the age of 50 (Finch, 1997) reported that participation in physical activities offer important social benefits to older adults. Respondents emphasized that physical activity regardless of its various forms (joining a club, exercising as a group of friends or simply walking outside in the community) is a way to help counter loneliness and isolation because "... if you go out you [walking] you most likely bump into somebody, have a little chat". Older adults use exercise as a way to meet people and expand their network and that is an important motive for them to perceive a possible tiring and exhausting activity as something tolerable or enjoyable. These perceptions stress the relationship between physical activity and social aspects of older adults' well-being and justify the importance they have received in the physical activity guidelines in England (Health Education Authority, 1999a) and Japan (Ohta, Tabata, & Mochizuki, 2000).

In a cross-sectional survey, Ohno et al. (2000) reported that being healthy and physically active is associated with high social activity in old age for both men and women and concluded that maintaining social activity is an essential component of successful ageing. Based on longitudinal data from the MacArthur Studies of Successful Aging, Unger, McAvay, Bruce, Berkman and Seeman (1999) stressed that social networks have a stronger effect on functional status for men than for women. Men are less skilled at marshalling social support when they need it, and that puts them at high risks for negative health outcomes. They also reported that social ties are significant for older people with impaired physical abilities and therefore, health promotion programmes that enable them to participate in group activities could be beneficial for them. Examining the relationship between activity and social support in a cross-sectional study, Everard, Lach, Fisher, and Baum (2000) reported that low-demand leisure activities may replace work activities after retirement or changes in family demands and they may be important for successful ageing because of their effects on mental health.

An emerging literature shows that reductions in social contact in late life are not due to decreased contact with family and close friends but a reflection of decreased contacts with peripheral members of the social network such as acquaintances (Carstersen, 1995). As networks are stable in older adults, the consequences of their disruption (loss of a significant other) are also greater. Evidence from the Cardiovascular Health Study (Martire, Schulz, Mittelmark, & Newsom, 1999) support this notion showing that there was no change in family and close friend network contact over a 5-year period.

Research has shown that a decline in or absence of social support is predictive of loneliness (Fees, Martin, & Poon, 1999). In a recent review, Chogahara, O'Brien Cousins and Wankel (1998) stressed that social support is the most frequently studied social construct in physical activity and health. However, social support has been studied mainly as a predictor of participation in physical activities and not as an actual outcome. Environmental and social influences appear to be significant determinants of exercise behaviour (Sallis & Hovell, 1990; Sallis & Owen, 1999). A cross-sectional study examining the relationship between physical activity and social-cognitive

influences suggested that support from family and friends stands out as one of the most significant determinants of participation in physical activity (Booth, Owen, Bauman, Clavisi, & Leslie, 2000). Analysing the meaning of social support, Chogahara et al. (1998) stressed that it can have positive and negative aspects. They also stressed that positive social influences are at least as important as self-efficacy in explaining participation in physical activities in older adults. Furthermore, negative social influences such as social rejection, negative social interactions and unsupportive behaviours, are as strong as positive ones or even stronger determinants of health behaviour than positive ones.

Given the increased importance placed upon social structures and support as antecedents of mental health, McAuley et al. (2000) examined the influence of exercise environment regarding opportunities for social interaction among older adults. Not surprisingly, the group exercise environment produced a more positive effect than the individual exercise condition. Turner, Rejeski, and Brawley (1997) maintained that the social composition of the exercise environment may provide one of the key mechanisms for the influence of exercise on affect.

The qualities of the exercise leader, the quality of the facilities, the characteristics of fellow exercisers and the individual characteristics of the participants in the physical activities could play an important role in the way that physical activity might enhance the social aspects of well-being in the older adults. The current literature stresses that the process of physical activity as a whole enables older people to enjoy higher levels of well-being. However, there is a need for further studies into the identification of the exercise characteristics which maximise the social interaction effect, and also in the factors that facilitate exercise adoption in the socially isolated older adults.

Biddle and Faulkner (in press) reported that it has been difficult to ascertain the relationship between physical activity and social factors. Current trends suggest that physical activity is less in black and minority ethnic groups, and in groups with lower education levels (Coggins, Swanston, & Crombie, 1999). Furthermore, people with

higher SES are more likely to participate in health promotion interventions and are more likely to succeed at changing risk behaviours than people with lower SES (Robert & House, 1994). Social policies, health promotion strategies and physical activity interventions in older adult population should therefore target the low SES people, understand their characteristics and help them to adopt a healthier lifestyle.

2.5. Physical activity and ageing research issues

The review of the literature clearly demonstrates that one way to improve the physical and psychosocial aspects of older people's well-being is through participation in physical activities. However, although the contribution of physical activity on the aspects of older people' physical health is well-established (ACSM, 1998), there are a number of issues that require further examination before a clear and straightforward relationship between physical activity and psychosocial aspects can be presented.

2.5.1. Research designs

The support for the relationship of physical activity and psychosocial aspects of older adults' well-being comes from relatively few randomised controlled trials and derives, by and large, from studies of inferior design. Little epidemiological evidence has been produced on older people, although the depression literature indicates that remaining active might be protective from mental illness.

There remains too strong a reliance on cross-sectional studies so a cause-and-effect relationship is not conclusively established. Longitudinal studies (Costa & Andres, 1986; Lehr & Thomae, 1987) support the notion that ageing is a very individual and differential process with regard to mental, behavioural, and social outcome variables (Baltes & Baltes, 1990; McPherson, 1994). This heterogeneity of ageing restricts further the findings of cross-case studies. A broader age range including individuals in the "Third Age" (approximate age range of 60-75 years) and "Fourth Age" (persons 85 and older), which are theorized to be distinctly different groups in terms of physical and psychological functioning, has been initiated recently in an attempt to establish groups with common characteristics among the older adults (Baltes & Baltes, 1998). However,

individuality and variability remain the main characteristics of ageing and research with older adults should always be cautious in making generalisations for this broad age group.

An intervention study eliminates the self-selection if subjects are randomly assigned to treatments and there is no substantial attrition rate. However, if significant subject attrition does occur and this is often the case in research with older adults, it could have a negative effect on randomization. Even when an intervention approach is used, many studies do not randomize to treatment and control groups and many studies present inadequate control groups that are small and often non-representative (McAuley & Rudolph, 1995). That is well-illustrated in the final note of Arent et al. (2000) in which they stress that " small, but significant improvements in mood with exercise can be washed out if this is not controlled for in the course of study design" (p. 425). Therefore, there is need for more well-designed randomised controlled trials before it is possible to establish strong enough evidence to fully convince those who deliver policy and practice in health and social services that exercise is a cost-effective alternative to existing treatments and interventions.

2.5.2. Positive versus negative aspects of subjective well-being

Many studies have focused on changing negative emotional states as quite often in the physical activity and ageing research the absence of negative states such as depression and anxiety is considered to be an indicator of sufficient well-being for older adults (McAuley & Rudolph, 1995). In their meta-analysis, Arent et al. (2000) stressed that although it might seem a semantic issue, physical activity could be much more appealing to the elderly if they were told it could make them feel "good" rather that feel "less poorly". Furthermore, Diener et al., (1999) have suggested that the literature carries a bias towards negative mental states such as depression and anxiety and therefore, more research is required that documents the positive dimensions of well-being and quality of life.

The existing definitions of mental health clearly state the positive dimension and the need for taking into account both sides, positive and negative before making conclusions about the well-being status of older adults. Therefore, according to Grant (2000),

> "Mental health is the emotional and spiritual resilience which enables us to enjoy life and to survive pain, disappointment and sadness. It is a positive sense of well-being and underlying belief in our own and others' dignity and worth" (Grant, 2000).

There now appears to be greater recognition of the importance of also increasing the positive elements of well-being, such as self-esteem, self-confidence, positive mood, perceptions of health-related quality of life and life satisfaction (Biddle & Faulkner, in press). This is reflected in national campaigns such as the 'Active for life' in England or the Surgeon General's Report on physical activity and health in the United States (US Department of Health and Human Services, 1996), which are based on the motto "adding life to years, not just more years to life".

2.5.3. Perceptions of older adults regarding subjective well-being

Ageing is a very individualised and differentiated process with regard to mental, behavioural, and social outcome variables (Baltes & Baltes, 1990; McPherson, 1994). In health services research, health and functional status are judged to be important dimensions of older adults' well-being (Farquhar, 1995). As a result much of the conceptual framework for measurement of well-being is derived from the World Health Organisation's definition of health as a state of complete physical, mental and social well-being, with the emphasis on physical health and functional ability. Therefore, a number of health-related quality of life measures were developed in an attempt to capture this framework. However, much of these attempts are based on 'expert' than 'lay' opinions and as a result the question of what older adults perceive as well-being and whether health is the most important element of well-being in later life remains unclear.

In an attempt to answer this question, Farquhar (1995) asked older adults to describe the quality of their own lives, in their own words, using their own frames of reference. He concluded that social contacts and activities, life satisfaction, adequacy of material

circumstances, suitability of the environment as well as health and functional ability are important elements of older adults well-being. He also stressed that using health related measures in ageing research might not be appropriate as older people value family, home life and marriage higher than health.

In a recent study, qualitative data from 1000 older adults [from the on-going Economic & Social Research Council "Growing Older " Program], stressed that health, independence, social relationships, financial circumstances, home and neighbourhood, social activities and roles are important elements of quality of life of older adults (Bowling, Gabriel, Banister, & Sutton, 2001). Bowling et al. also stressed that there is need for broader measures when investigating the well-being of older people.

In the physical activity and ageing research literature, several researchers (Brown, 1992; Fillingim & Blumenthal, 1993; McAuley & Rudolph, 1995; O' Connor et al., 1993) have commented on the limited quality of the literature, which is highly dependent on quantitative perspectives based on inadequate instrumentation. Interestingly, in this chapter only one qualitative study (Finch, 1997) was reviewed stressing the lack of qualitative approaches in the physical activity and ageing research. Although this study explored the benefits of and the barriers from participation in physical activities, it did not provide a framework of the important elements of subjective well-being to which physical activity particularly contributes. Therefore, well-conducted and documented qualitative research that uses a variety of techniques, including case study design, is required in order to explore what subjective well-being means to older people and in which ways physical activity can contribute to the elements that mostly affect successful ageing.

2.5.4. The measurement of subjective well-being

One problem judging the effects of exercise on the mental health of older adults is that diverse measures of psychological well-being are used across studies (Biddle, Fox, Boutcher, & Faulkner, 2000). According to McAuley and Rudolph (1995), what is very important is whether the measures employed adequately assess the stimulus properties

of the exercise environment. They expressed serious concerns on whether the traditional psychometrically valid measures of well-being can capture the essence of psychological change that is evidenced when measures of perceived psychological change are employed and therefore they question the appropriateness of clinically validated measures. Exercise experience contains unique elements that produce distinct feeling states not necessarily tapped by traditional measures. States as fatigue, which is associated with exercise participation, is mentioned as an important psychological response only in the Profile of Mood States (McNair et al., 1971), which along with the Multiple Affect Adjective Check List (Zuckerman & Lubin, 1965) are the most common measures used in assessing changes in mood through participation in physical activities. However, the Multiple Affect Adjective Check List [MAACL] assesses only anxiety, depression and hostility. Similarly, the Profile of Mood States [POMS] is comprised of five negative mood scales and only one positive scale (vigour). Studies using the MAACL, therefore, cannot be considered adequate for the study of psychological well-being or mood and those using the POMS are limited due to the single positive mood subscale.

In ageing research, there is need for further investigation of the characteristics of older adults that might be affected by physical activity before any assessment of their psychological well-being is made. As an example, measuring motivation may be different in the older adults as they are more concerned with conserving energy and surviving than achieving socially accepted goals (Resnick, 1995). Furthermore, the assessment of depression may be more difficult in older adults who deny depressive symptoms and may have difficulties in understanding the questions and recalling information due to cognitive declines and therefore, the existing depression measures have been criticised for their validity in the older adult population (O' Connor et al., 1993). Table 2.1 presents a list of scales that have been used to assess well-being in physical activity research with older adults. Two review papers (Biddle & Faulkner, in press; McAuley & Rudolph, 1995) and a search in personal files and the Web of Science were used to identify the instruments.

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Some of the instruments that were developed for assessing subjective well-being in psychological research demonstrate good psychometric properties however, according to Andrews and Robinson (1991) "there is no single scale, or even small set of scales, that stands out as especially widely used or markedly better that others". McAuley and Rudolph (1995) argued that the vast majority of instruments assessing well-being in exercising older adults might have questionable content and construct validity. As a result, they fail to adequately present the properties of the physical activity environment. Indeed, from the 27 instruments reviewed here, only 5 were designed for the physical activity environment. Interestingly, only one instrument (The Vitality Plus Scale) was specifically designed for the older adults and the physical activity.

Finally, according to Sell and Nagpal (1992), quantitative instruments almost always lack a "thorough conceptual mapping process" before items are phrased. Qualitative research is usually considered complementary to quantitative data but not the basis for quantitative research.

Adapting a questionnaire designed for use with young adults in order to study elderly and creating a new instrument especially for older adults is inappropriate without prior investigation of the concepts that are relevant to older adults' own experiences and the meaning they place on those concepts. Interestingly, the Vitality Plus Scale is the only instrument designed for the physical activity environment using a qualitative approach for the generation of items reflecting the perceptions of older adults. However, it focuses mainly in the physical aspects of well-being and requires extensive psychometric testing.

Table 2.1. Measures of subjective well-being in physical activity and ageing research

Instrument	Purpose	Scale characteristics	Items	Comments
WELL-BEING SCALES				
Affect-Balance Scale. (Bradburn, 1969).	Well-being	10 items- 5 positive, 5 negative. Dichotomous answers.	Positive and Negative affect	Acceptable levels of validity and reliability. It is easily administered. Criticisms on the adequacy of the model.
Self-Anchoring Ladder Scale. (Cantril,1965).	Life satisfaction	Single-item scale		Simple to apply. Commonly used in population surveys.
Exercise Induced Feeling Inventory.(Gauvin & Rejeski, 1993)[a]	Mood	4 feeling states 12-item scale 5-point scale	Revitalisation, tranquillity, positive engagement, physical exhaustion	Especially designed for the exercise environment. No evidence that these are the most salient affective changes associated with exercise.
General Well-being Schedule (Dupuy, 1977).	Subjective feelings of well-being and distress	6 domains 22 items 6-point scale, visual analogue scale (0-10).	Anxiety, depressed mood, positive well-being, self control, general health, vitality	Good general population indicator of subjective well-being. Criticisms on test-retest reliability. Most of the validation studies are unpublished.
Life Satisfaction Index A. (Neugarten, Havighurst, & Tobin, 1961).	Life satisfaction	LSI-A: 20 items. 3-point response scale.	Zest and apathy, resolution and fortitude, congruence between desired and achieved goals, positive self concept and mood tone	Its global nature poses uncertainty about what is being measured.

Life Satisfaction Index Z (Wood et al, 1969).	Life satisfaction	A 13-item version of Scale A		It is the most commonly used to measure well-being in gerontological research.
Multilevel Assessment Instrument (Lawton, 1982).	Well-being	147 items 7 dimensions	Physical health, cognition, activities of daily living, time use, social relation and interactions, personal adjustment, perceived environment	50' minutes to administer. Weak ability to distinguish community-dwelling from institutionalised older adults.
Philadelphia Geriatric Center Morale Scale (Lawton, 1975).	Morale	3 dimensions 17 items	Agitation, attitude towards own ageing, lonely dissatisfaction. It is believed to be the superior of the existing life satisfaction and morale scales	Reliable and internally consistent scale. Inclusion of happiness and satisfaction items is questionable. Various response forms and time references.
Positive and Negative Affect Schedule [PANAS]. (Watson, Clark, & Tellegan, 1988).	Positive and negative affect	20-item scale 5-point scale	10 positive affect items 10-negative affect items	Based on the circumplex model. Reasonable psychometric properties.
Profile of Mood States (POMS). (McNair et al, 1971).	Mood	6 dimensions 65-item/30-item 5-point scale	Tension-anxiety, depression-dejection, anger-hostility, vigour-activity, fatigue-inertia, confusion-bewilderment	Valid and solid measure. No check for desirability bias. Its use in the physical activity research is questionable.
Subjective Exercise Experience Scale. (McAuley & Courneya, 1994)[a].	Global psychological responses to exercise	12-item scale 3 dimensions 7-point scale	Positive well-being Psychological Distress Fatigue	Especially designed for the exercise environment. Further studies for its psychometric properties are required.

The satisfaction with life scale. (Diener et al., 1985).	Life satisfaction	5 items 7-point scale		Good psychometric properties.
Vitality plus scale. (Myers et al., 1999)[b].	Health-related benefits from exercise participation	10-item scale 5-point scale	Energy, pep, aches and pains, stiffness, appetite, constipation, feel rested, sleep, feel good, feel relaxed	Developed specific for older adults and the exercise environment. No published studies of using this scale. Need for further studies testing its psychometric properties.
HEALTH RELATED QUALITY OF LIFE SCALES				
Medical Outcomes Study Short Form *SF36*. (Ware et al., 1993).	Health status	36-item scale Physical functioning, role limitations due to health problems, bodily pain, social functioning, general mental health, general health perceptions, vitality		Widely used. Criticisms about the broad categories covered. Comprehensiveness vs Precision.
Quality of Well-being Scale (Bush &Kaplan, 1973).	Health related quality of life	4 domains	Symptom-complex, mobility, physical activity, social activity	Provides estimates of Quality-Adjusted Life Years.
Sickness Impact Profile (Bergner et al., 1976).	Perceived health status	136-item scale Physical, psychosocial, sleep and rest, eating, work, home management, recreation and pastimes		Extensively used. Appropriate where comprehensive assessment is required.
SPECIFIC SCALES-Anxiety and Depression-				
Beck Depression Inventory (Beck et al., 1971).	Intensity of depression	21 items 4 point scale	Emotions, behavioural changes, somatic symptoms	Established and well-researched scale. Criticisms that the content of the instrument should be broadened.
Center for epidemiological studies depression scale	Frequency and severity	6 symptom areas 20 item scale	Depressed mood, feelings of guilt, sense of helplessness,	It is a screening test to identify groups at risk of depression.

CED-S. (Radloff, 1977).	of depressive symptoms	Short version-8 items 4-point scale	psychomotor retardation, loss of appetite and sleep disturbance	Caution in interpreting the nature of the disorders it detects.
Geriatric Depression Scale GDS. (Brink & Yesavage, 1982).	Screening test for depression	30-item scale Yes/no answer format	Affective aspects of depression	Good psychometric properties. Easy and quick to administer. Comprehensible to older adults.
Hamilton Rating Scale for Depression (Hamilton, 1960).	Severity of depression	21-item scale	Administered through semi-structured clinical interview	Frequently used clinical rating scale. Not a diagnostic instrument.
State-trait Anxiety Inventory STAI. (Spielberger et al., 1970).	Stait-trait anxiety	40 items 4-point scale	20 items for state anxiety and 20 for trait anxiety	One of the most widely used measures of anxiety.
The symptoms of anxiety and depression scale. (Bedford et al., 1976).	Assessment of anxiety and depression	14-item scale 4-point scale	7 states of anxiety and 7 states of depression	Further studies on its psychometric properties are required.
Zung Self-Rating Depression Scale. (Zung, 1965).	Depression	20 statements 4-point scale	Pervasive effect, physiological-psychological concomitants	Short and easy to complete. Questionable validity and reliability.
SPECIFIC SCALES-Self-Perceptions				
Physical Self-Efficacy Scale. (Ryckman et al., 1982)[a].	Perceived physical ability	10-item PPA subscale. 12-item PSPC subscale 6-point scale	Perceived physical ability Physical self-presentation confidence	Psychometric properties and norms available for student populations.
Physical Self-Perceptions Profile-Older Adults Version (Chase, 1991; Fox, & Corbin, 1989)[b].	Physical Self	4 subscales 24 items, 4-choice structured alternative format	Sport competence, bodily attractiveness, functional capacity, health/disease	This is the version for older adults and no published data are available.

The Self-esteem scale (Rosenberg, 1965).	Self-esteem	Unidimensional 10 items 4-point scale	It is attractive due to its brevity and simplicity but still requires further testing	Need for more testing of psychometric properties.
The Tennessee Self-Concept Scale (Fitss, 1965).	Self-concept	100 items 5-point scale	Physical self, moral-ethical self, personal self, family self and social self	Lengthy to administer. Relatively inaccessible due to cost of obtaining it.

Inclusion criteria:
1. Instruments used in physical activity studies
2. Studies with older people over 60 years of age

a=Instruments designed for the physical activity environment
b=Instruments designed specifically for physical activity studies with older adults

All the details and the comments for the instruments presented in this table are cited in:

1. Bowling, A. (1995a). Measuring Disease. UK: Open University Press.
2. Bowling, A. (1997). Measuring Health: A Review of Quality of Life Measurement Scales. Milton Keynes: Open University Press.
3. Kane R. L. & Kane, R. A. (2000). Assessing older persons. Measures, meaning, and practical implications. New York: Oxford University Press
4. McDowell, I., & Newell, C. (1996). Measuring Health. 2nd Ed. New York: Oxford University Press.
5. Ostrow, A. (1996). Directory of psychological tests in the sport and exercise sciences. Morgantown: Fitness Information Technology.

2.6. Objectives of this research

Research in physical activity and ageing is based on the examination of specific elements of subjective well-being. If well-being is a multidimensional construct as many researchers have proposed this is a valid approach. By this approach however, a number of other problems are created. First, many of the specific terms that are used to define well-being (mood, self-esteem, morale) are themselves concepts not easily understood. Second, trying to investigate the specific elements does not help to resolve the issue of what constitutes the superordinate concept of subjective well-being and how we can accurately measure it. Is subjective well-being a relatively transitory and easily influenced construct (Spirduso, 1995) or are the constructs comprising subjective well-being relatively global and therefore changes over time are typically rather small (McAuley, 2001)?

Current research with older adults may capture parts of the meaning of subjective well-being, but the problems of how we can capture the bigger picture of subjective well-being in later years of life remains unresolved. Without this knowledge it is difficult to identify and demonstrate the ways through which physical activity can contribute to subjective well-being of older persons and as a result to justify why older adults should be more physically active.

This dissertation utilises qualitative and quantitative research techniques in an attempt to explore the meaning and the relationship of subjective well-being with physical activity during the later years of life. This is to establish a theoretical base for the development of a well-being measure specifically designed for the ageing and physical activity research. An overview of the structure of this research is set out in Figure 2.2.

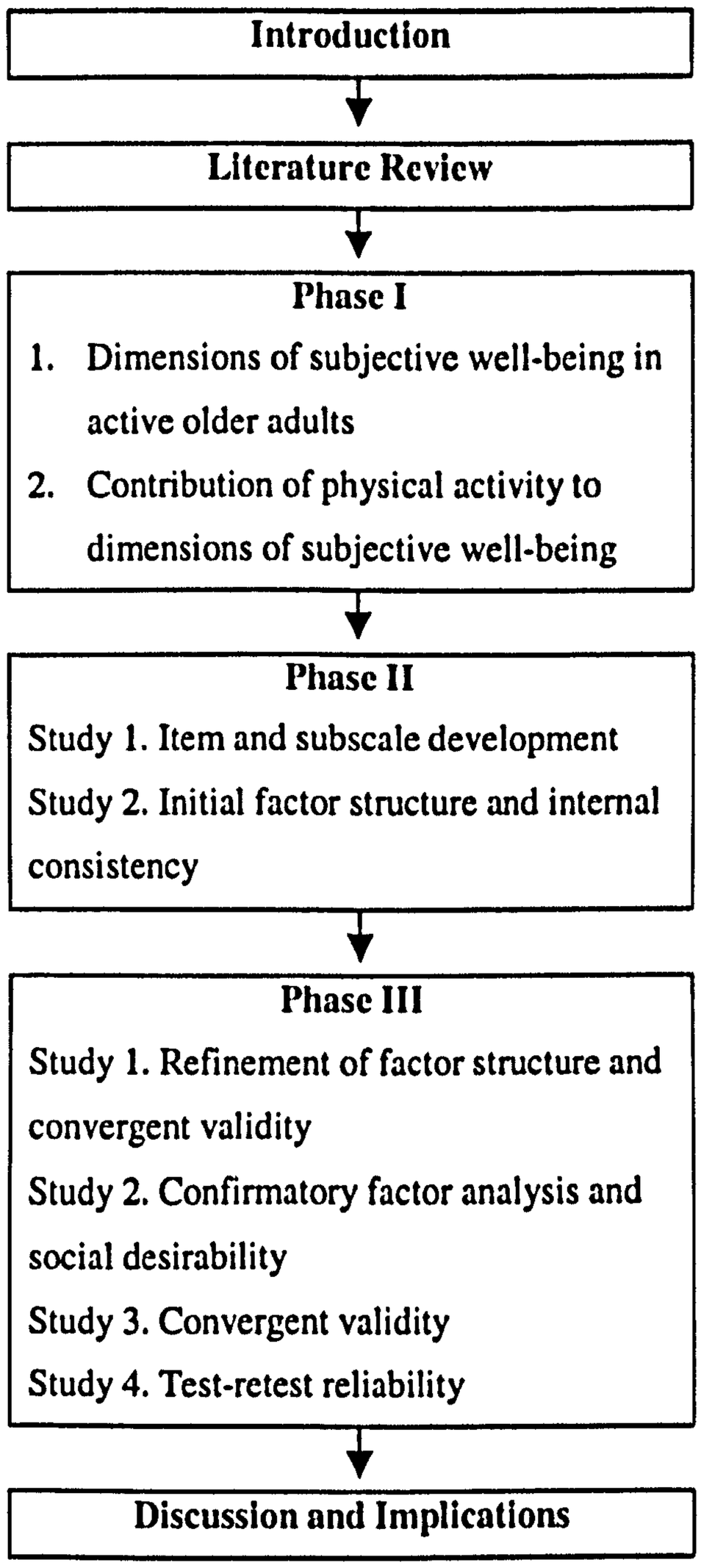
1. **Phase I** explores the components of subjective well-being of active older adults using qualitative methods. The delineation of key dimensions would allow more insight into the potential routes through which physical activity may impact upon the global statements of subjective well-being of older adults and contribute to successful ageing. The qualitative work of Phase I on the identification of elements of subjective well-being relevant to the

physical activity experience of older adults forms the base for the development of a multidimensional subjective well-being profile that has the capacity to be sensitive to change initiated by physical activity participation.

2. **Phase II** formulates the subscales and the items of the new instrument that are based on the hypothesised dimensions of subjective well-being identified in the Phase I study. It also develops further and refines the instrument through a range of psychometric techniques.
3. **Phase III** aims to provide further evidence for the psychometric properties of the new instrument through exploration and confirmation of the factor structure, presentation of the internal consistency and examination of the convergent validity of the new instrument with well-established inventories.

For the first time in human history, society has been characterized as "ageing" and "graying" and terms such as "successful ageing" have received much attention. Physical activity cannot make every older adult a "Ulyssean Adult", a term based on the Ulysses who was over 50 years of age when he began the adventures described in the Odyssey (McGuire et al., 1999). However, it contributes to a better sense of well-being and an improved quality of life. Subjective opinions and individual perceptions appear to be an important way to explore the characteristics and the dynamics of a highly heterogeneous age group conventionally called 'older adults'. More sophisticated research designs with carefully defined populations and instruments sensitive to physical activity benefits will help establish the case for investment in physical activity programmes for the sake of improved physical and mental health of older people.

Figure 2.2. Research Outline



CHAPTER 3

PHASE I

DIMENSIONS OF SUBJECTIVE WELL-BEING IN ACTIVE OLDER ADULTS

3.1. Introduction

Growing evidence using the experimental approach supports the positive effect of physical activity on aspects of mental well-being of older adults irrespective of how it has been conceptualised (Biddle & Faulkner, in press). However, this research has primarily been located within the quantitative paradigm and revealed little to further our understanding of the ways in which physical activity makes a difference to older adults. This is hardly surprising, as questionnaire based reports are unable to take full advantage of the subjective knowledge about the lived experience that is revealed by personal account.

Biddle and Faulkner (in press) specifically state that "qualitative research is strongly recommended for illuminating the role of exercise in the lives of the elderly" which comes in accordance with the call for more research that explores the depth of the lived experience of older adults (Ruth & Coleman, 1996). Furthermore, Bytheway (1996), Rudinger and Thomae (1990), and Sherrard (1994) have suggested that inadequate attention has been paid to the viewpoints of older adults themselves so that the richness of the subjective experience of older adults has not been fully documented and analysed. It would therefore seem appropriate to listen to what the older adult thinks about his or her life and well-being as a way to better understand the multiple realities of the physical activity experience.

Further exploration of the key dimensions of life involvement that contribute to the global subjective well-being of older adults, particularly for those who have already been experiencing regular physical activity, is required. The delineation of key dimensions of well-being might provide an alternative insight into the potential routes through which physical activity may impact upon the global statements of subjective well-being of older adults and thus their mental health. This in turn could help in the design of more rewarding and effective physical activity programmes for older adults, which will stimulate sustained involvement and help them enjoy any subsequent mental and physical benefits.

The purpose of this study therefore, was to explore the components of subjective well-being of active older adults with a view to identifying possible pathways through which physical activity participation might enhance their mental health.

3.2. Method

Qualitative research is "an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyses words, reports detailed views of informants and conducts the study in a naturalistic setting" (Creswell, 1998, p.15).

Qualitative methods aim to study phenomena in their natural settings and to interpret them according to the meanings people bring to (Greenhalgh & Taylor, 1997). They can be regarded as a "complex, dense, reflective collage-like collection that represents the researcher's images, understandings and interpretations of the world or phenomenon under analysis" (Denzin & Lincoln, 1998, p. 4). The interpretive / constructivist paradigm posits that reality is socially constructed and that there is no single "truth" awaiting discovery since mental constructions differ between individuals and over time (Mertens, 1998). It is based on an interest in understanding the nature of the social world at the level of subjective experience and therefore it seeks information within the individual consciousness and subjectivity domain.

The present study was thought to be suited to a qualitative approach as it aimed to find out "what" subjective well-being means to older adults and "how" physical activity might enhance their levels of well-being (Creswell, 1998). Furthermore, the qualitative methods were appropriate for this study which, ascribing to the interpretive/constructionist ontology of multiple realities, attempted to gain an understanding of the perceptions of a range of individuals rather than trying to uncover the one "truth" about their experiences (Mertens, 1998). Finally, the scarcity of qualitative data in physical activity and ageing research and the need to address older adults' own framework of meanings regarding the contributing elements of subjective

well-being and the influence of physical activity on them justified the adoption of an interpretive approach.

3.2.1. Participants

The most useful generalisations from qualitative studies are analytic not 'sample-to-population' (Miles & Huberman, 1994) therefore, qualitative samples tend to be purposive rather than random. The power of purposeful sampling lies in selecting information- rich participants who would make a significant contribution to a better understanding of issues of central importance to the study process (Patton, 1990). The inclusion criteria for the participants were:

1. Retired people over the age of sixty
2. Community-dwelling people
3. Regular participation in organised physical activities

Participants were recruited from settings where they were engaged in organised forms of physical activity. Programmed forms of physical activity were chosen in this initial research because most physical activity interventions are designed around organised activities. They offer a range of discrete experiences with potential physical benefits as well as enhancement of social interaction and this provides a suitable starting place for study. This choice does not preclude the potential importance of less programmed activity such as walking or gardening to well-being. Active people were chosen, as they will have experiential information about the contribution of physical activity to subjective well-being.

The sample was 28 community-dwelling retired older adults, with ages ranging from 62 to 81 years (average age=71). The respondents included 15 women and 13 men who participated in an organised form of regular physical activity at least once per week. Twenty of the respondents were married, two were divorced, five were widowed and one had not been married. All the participants had completed high school with eight having university degrees. Thirteen respondents were recruited from General

Practitioner (GP) exercise referral schemes, ten from 50+ exercise groups (aerobic, keep-fit classes, badminton) and five from social dance groups. Twenty-three participants were members of leisure centres and five were members of the Age Concern network.

3.2.2. Interview Protocol

Semi-structured interviews were used as the method of data collection, because the aim was to obtain an understanding of the participants' own framework of meanings. First, one-to-one interviews were conducted and secondly, group interviews were held, as they encourage the participation of people who are normally wary of an interviewer, or who do not feel sufficiently comfortable to talk about themselves (Kitzinger, 1995). This may be particularly the case in studies concerning older adults especially when the interviewer is someone who is not considered a peer or of a similar age.

The semi-structured interviews consisted of open-ended questions, which allowed the interviewer to probe and to divert in order to pursue an idea in great detail as well as expand and paraphrase the interviewees' responses. Furthermore, open-ended questions permitted the interviewees to respond in their own terms and to select from their full repertoire of responses (Patton, 1990).

All volunteers participated by choice either in an individual interview or in a group interview. This choice was offered in order to maximise the contribution of information by placing participants in situations in which they felt comfortable.

3.2.2.1. Introductory Tasks

According to Green and Gilhooly (1996), 'warm up' tasks are very important in the interview procedure as they allow the interviewer to clarify any misunderstandings that an individual participant may have about what is required in the procedure. Furthermore, introductory tasks help to ensure that participants are convinced about their ability to do what is asked of them and as a result, they feel more relaxed about the interview.

Before each interview, participants were asked to complete Cantril's Self-Anchoring Ladder (Cantril, 1967) and the 5-item Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) (Appendix I-1). The Self-Anchoring Ladder is a graphic of a ladder with 10 rungs and 11 numbers (0-10) in the spaces above and below the rungs. Its purpose is to allow the participant to express levels of subjective well-being by evaluating his/her life at present. The Satisfaction with Life Scale is a self-administered questionnaire with five non-specific items on a seven-point scale aimed at assessing global life satisfaction. These instruments were used to stimulate discussion on the topic in the interview. Participants were asked to explore the issues they had considered as they completed these initial prompting activities. High scores on the Ladder (M=7.6; SD=1.68), as well as in the Life Satisfaction Scale (M=5.14; SD=1.09) indicated that participants generally had high levels of well-being.

3.2.2.2. Interview Guide

In order to maintain a rigorous approach to the study, an interview guide (Patton, 1990) was designed to collect information regarding a) the main dimensions of subjective well-being for this group of active older adults, b) the dimensions that might be particularly influenced by participation in physical activities (Appendix I-2). The development of the interview guide was based on the following broad definition of subjective well-being:

> 'Subjective well-being is a broad category of phenomena that includes people's emotional responses (pleasant-unpleasant affects), domain satisfactions, and global judgements of life satisfaction' (Diener et al., 1999).

The main themes of the semi-structured interviews are presented in Figure 3.1. The interview process was first explored with two individuals (pilot study) and subsequent refinements of the interview questions were made.

Figure 3.1. Semi-structured interview themes

a. Evaluation of well-being in introductory tasks	**What do you consider in evaluating your life at the moment?**
b. Dimensions of subjective well-being	**What is important for your well-being?** ▪ the important things in your life ▪ things that make you happy ▪ things that you dislike ▪ things that you would like to choose
c. Contribution of physical activities	**Do you find physical activity important for you?** ▪ Influence of physical activity in levels of well-being ▪ Changes in physical health ▪ Changes in psychosocial health

3.2.2.3. Procedures

An initial contact with managers of settings that offer activity programmes to older adults was made, information regarding the demographic characteristics of the older adults using these facilities was taken and access to the settings was agreed. Respondents were recruited at the settings after a brief presentation of the scope and the aims of this study.

Fourteen individual interviews and six group interviews were conducted in the physical activity settings or in respondents' homes. Each interview lasted from 20-60 minutes. With respondents' expressed permission, after reassurance of confidentiality, the interviews were tape recorded and later transcribed verbatim. Appendix I-3 presents the transcript of one interview.

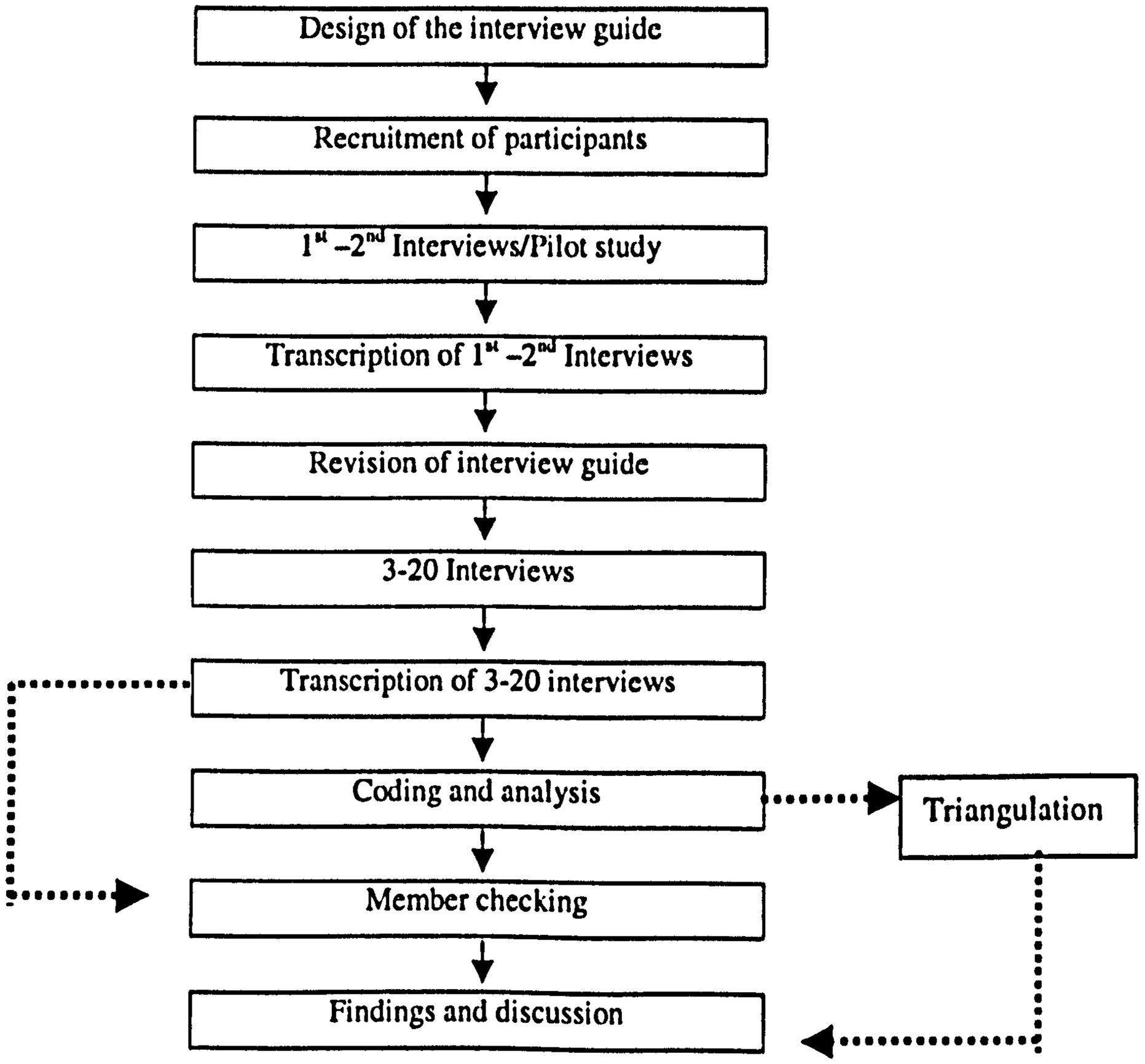
3.2.2.4. Member checking and triangulation

The interviews were transcribed immediately after the meetings and were given to participants for 'member checking' in a follow-up meeting. After the coding and analysis of the transcripts, respondents were re-approached to comment on the emerging themes. Conduct was feasible with ten respondents, who all agreed to participate in the 2nd member checking. Finally, triangulation of data analysis was incorporated into the

procedure by asking five independent assessors to comment on the classification of themes and their groupings into higher-order categories.

An overview of how the procedures were carried out over the course of the study is set out in Figure 3.2.

Figure 3.2. Flowchart of procedures



3.2.3. Data Analysis

In qualitative research, data collection and analysis are not separate procedures and take place simultaneously (Marshall & Rossman, 1995). Accordingly, in this study, instead of analysing all the data after the end of the collection period, ongoing analysis of emerging themes took place throughout both stages. As the aim of the present study was to explore the dimensions of subjective well-being and the experience of participation in physical activities in a diverse group of active older adults, it was decided to analyse the data using the variable-oriented cross-case analysis.

3.2.3.1. Cross-case analysis

Data analysis consisted of the identification of categories, recurrent themes, ideas, language and belief systems generated and in some cases shared across research participants and settings (Marshall & Rossman, 1995). Cross-case analysis is defined as "a thematic analysis across cases" (Creswell, 1998, p.63). Miles & Huberman (1994) note that cross-case analysis helps in learning about a concept that makes sense beyond a specific case and suggest that such analysis increases generalisability by showing that events are not wholly idiosyncratic. Furthermore, they defined variable-oriented analysis as an approach where "the 'building blocks' are variables and their intercorrelations rather than cases" (p. 174).

As such as a description of common parameters of older adults' subjective well-being has the capacity to generalise across individuals, the cross-case technique was chosen for data analysis. The aim, however, was not to seek 'a smoothed-down set of generalisations that may not apply to a specific case in the set' (Miles & Huberman, 1994) but rather to deepen the understanding of the subjective well-being concept. Cross-case analysis permits the reconciliation of an individual's case uniqueness with the need of general understanding of generic process occurring across cases (Silverstein, 1988). While simply adding cases does not help in that perspective, the use of multiple cases, adequately sampled and carefully analysed, could enhance generalisability and ensure saturation of content.

3.2.3.2. Coding process

Both one-to-one and group interviews followed the same analysis procedures. The transcription of the first two interviews helped to refine the interview guide, by rephrasing elements that respondents found difficult to understand and by adding further questions.

The first stage of the coding process consisted of preparing a description for each participant. These descriptions provided a brief presentation of the participants' responses to the interview questions and were used as part of the member checking process to verify that respondents' views were being accurately represented.
In the second stage, the transcripts provided the raw data, that were segmented, coded and put back together in categories based on common content. Transcripts were segmented into meaning units: "a segment of text that is comprehensible by itself and contains one idea, episode or piece of information" (Tesch, 1990, p.116). A word or phrase was written to capture the meaning and the meaning units were coding for identification purposes. Before coding, every line in each transcript was numbered. An open coding strategy was used to identify meaningful pieces of information (Cote, Salmela, Baria, & Russell, 1993). A provisional start list of codes was created based on the interview questions and the current literature, tested on a sample of the transcriptions and further developed and expanded through the emerging codes.

A formal quantitative analysis of the data was not thought to be in accordance with the purpose of this study which aimed to offer an insight into what subjective well-being means to older adults and how they value their participation in physical activities. As Scanlan, Stein, & Ravizza (1989) pointed out in their discussion:

> a particular source might not have been mentioned by a large number of participants but could have been critical to the enjoyment experienced by the individual(s) who did identify it (p.74)

The transcripts contained 983 themes that were logged and grouped into categories establishing a hierarchy of responses, moving from specific to general levels. This produced 158 lower order themes (specific) that coalesced into 19 higher order themes

(general) that were finally grouped into five dimensions (highest order themes). The inductive process was complete at the dimension level when no additional meaningful groupings coalesced. A database software programme (Microsoft Access) was used for the reduction and identification of the hierarchy of themes.

3.2.3.3. Credibility of data analysis

Qualitative research has been criticised for lacking scientific rigour (Mays & Pope, 1995). The main criticisms are that qualitative research lacks objectivity, reproducibility, and generalisability. Guba and Lincoln (1994) and Lincoln (1995) have expressed the view that the criteria they suggested in the 1980s have been criticised as attempts to emulate positivist criteria. Commenting on the ongoing re-conceptualisation of qualitative trustworthiness criteria, Sparkes (1998) argued that:

> The emergence of a multitude of criteria for judging the qualitative research process and product clearly signals that there can be no canonical approach to this form of inquiry, no recipes or rigid formulas, as different validation procedures or sets of criteria may be better suited to certain situations, forms of representation, and desires for legitimisation. (p.380)

Qualitative analysis is based on the value of trying to represent accurately the phenomena studied (Giacomini & Cook, 2000). In order to ensure credibility in this study, the following procedures were chosen:

a. Description of the chosen methods and procedures, presentation of findings linked with raw data themes, consideration of rival perceptions and analytic list of all emerged themes that can be tested in further research (Appendices 4-8).
b. Triangulation of the transcripts and the theme classifications. Two researchers independently coded parts of the transcripts in order to reduce the danger of misinterpretation of the data. Furthermore, three other researchers checked the emerged themes and agreed upon their appropriateness.
c. Member checking through a pilot study helped in the exclusion of irrelevant questions and in the enhancement of the interview guide's clarity and relevance. Furthermore, all the respondents were asked to affirm the accuracy of the interview transcriptions and furthermore, a sample of ten interviewees was asked to comment on the theme

classifications. Participants confirmed the accuracy of their transcripts and the interpretation of their comments and any observations on the hierarchy of themes as they applied to themselves were taken into consideration.

Ensuring the credibility of the account is determined by the accuracy with which it reflects the lived experience of this specific group of participants. In this study, the participants were regularly active, reported high-perceived levels of well-being, and were in the young old and old age groups.

3.3. Findings

Among the interviewees, a number of common features were important contributors to their subjective well-being. Table 3.1 demonstrates the dimensions of subjective well-being that emerged from the raw data points and the reduction of sub-themes as described in the coding process. The final dimensions were developmental, financial, physical, mental and social well-being. In reality, these dimensions are not likely to exist as completely independent constructs, as subjective experiences are able to contribute in different ways to more than one dimension. However, the delineation of initial dimensions provides a useful framework for the investigation of the contributory components of older adults' subjective well-being and the potential influence of physical activity on them. Participants reported that some issues were not directly influenced by participation in physical activity and therefore, these issues are presented in parentheses in Table 3.1.

Further details on the influence of participation in physical activities to the dimensions of subjective well-being, as it emerged from the coding process and the analysis of the interviews, are presented in Appendices I-4 to I-8. The analyses are presented individually for the Developmental (I-4), Financial (I-5), Physical (I-6), Mental (I-7), and Social Well-being (I-8).

Table 3.1. The Dimensions of Subjective Well-Being

Lower Order Themes	Higher Order Themes	Dimensions
Achievement, adjustment, challenge, cope, creativity, expectations, goals, purpose, ageing, improvement, fulfillment, interest in life, replacement for work, retirement	Personal development	**Developmental Well-being**
Ability to do things, dependence, independence, freedom, control over one's life, restriction	Independence	
Habit, being active, keep being busy, something to hold on, vegetate	Maintenance	
(Financial security, money concern)	(Financial independence)	**(Financial Well-being)**
(Home, garden)	(Personal possessions)	
Adrenaline, ageing, agile, being fit, be nimble, comfort, co-ordination, exhaustion, flexibility, loose, mobility, pain, supple, stiffness, strength, sweat	Fitness	**Physical Well-being**
Being healthy, genes, disease, tiredness, breathing, deterioration, diet, function, heart, insomnia, low back pain, sleep, stamina, weight control	Health	
Alertness, concentration, state of mind, peace of mind, discipline, distraction, focus, information, memory, mind, obligation, skills, think different, think fast.	Cognitive function	**Mental Well-being**
(Having faith, church)	(Faith)	
Hold back, loneliness, nervous, pressure, sluggish, stagnation, stress, tension, worry	Negative affect	
Ability to enjoy life, better mood, calming effect, concentration on the inner being, contentment, energy, enjoyment, feel good, forcible, happiness, hope, young attitude, satisfaction with life, positive attitude, luck, pleasure, relaxation, stability	Positive affect	
Belief in self, body image, physical self, self-confidence, self-control, self-esteem, self-satisfaction	Self	
(Contribution, church, help people, modern trends, voluntary work)	(Community involvement)	**Social Well-being**
Activities in and outside home, change of scenery, happiness with surrounding, natural environment, noise, man-made surrounding, weather	Environment	
Children, family life, marriage, spouse, parental role, partner, looking after parents	Family	
Acquaintances, different approach to people, friends, isolation, meet people, meet people with the same interests, neighbours, personal relationships, to be needed	Social life	

3.3.1. Developmental Well-Being and Physical Activity

This dimension embodies personal development, independence and healthy adjustment to older age. It refers to the need for development of one's self, to the importance of being independent in order to continue to pursue personal goals and aspirations and furthermore, to the need for maintaining a busy and active life. According to respondents, well-being is "to achieve mainly what you want", "to be able to do what you want to do" and " to achieve a little bit more all the time". Although "having challenges" is significant, "having challenges which are not too challenging" underlines the significance of going on at one's own pace, as what respondents dislike is "to be pressurised, to being expected to achieve this or that".

Through physical activity the participants "take something out" and they feel better because they have made "a little bit more". Physical activity gives them the opportunity to be successful in something and it also gives them a challenge. "You have to remember what the steps are and you have to make them with the beat and this is challenging" said an interviewee. Additionally, it does not matter if the result is always successful but what is important is to "try to go a little bit further, try things a little bit more difficult". According to one respondent "when you have been successful and you finally find that you are old and you do not have anything to be successful at, it is very difficult".

"The majority die soon after their retirement because there is nothing there for them" one respondent stressed and he added that " if you do not have anything to look forward to, do you want to live?" Physical activity offers a sense of "achievement" and makes respondents feel "pleased" for themselves because they are still able to do things they have enjoyed in the past and are able to improve further. Physical activity gives respondents "a purpose in life" and "something to look forward to". Furthermore, exercise is a goal itself because some respondents want to sustain their fitness to continue participating in sport activities. Finally, what is also significant is the feeling of

fulfilment when, according to a respondent "you see that you have achieved a quality just a little bit better than you thought that you could achieve".

Participants mentioned the significance of maintaining their independence because it is important "not to have to bother anybody" as they "hate to rely on someone else" and "it drives them crazy not to be able to do things". Simply, as one respondent stressed, "That's the most important thing in my life. That I am capable of doing anything and everything I want". The image of a frail elderly person gives respondents "horror. Absolute horror. Being in a wheelchair, in a nursing home. I hate that". Therefore, they use exercise "to keep my legs strong so I can stand on my two feet". More importantly, the maintenance of independence comes along with the feeling of success as an interviewee mentioned that "I found my self able to do a few more things and it comes sharply 'oh I managed that!' and that gives you a better quality of life".

Retirement "is not the end" and is seen as an opportunity for spending more time in furthering who you are as " there is more time now, there is more flexibility now, you can find the time when you can do things". However, it brings "a big change" and some respondents find difficulty in coping with it because "the first week after retirement it was a holiday" but after a while "it became very difficult." Having nothing to do makes people feel depressed as they ask themselves "what can I do now?" Respondents also reported the fear of vegetation as "the worst thing that can happen when you retire is to vegetate and do nothing". Being active and busy is very important and activity protects them "from having time on their hands" that they otherwise find difficulty in filling. Furthermore, an interviewee stressed that " when you are used to doing something that you can not do anymore, you miss it. So you try to find ways to replace it and up to a point exercise put things together". Through exercise, respondents try to avoid the "defeating attitude" and "sitting on a chair all day long and not getting up". Being active and busy seems to be critical because "if you stop, you vegetate".

Finally, having things to do helps older adults to "keep going" as according to one respondent "I could quite easily at one time have said 'I do not want to bother' when I

retired. But it does make a difference when you wake up and you have to do things that you enjoy". Through exercise they try to avoid the stereotype of the elderly who believe that "oh! I am retired now, I do not do anything," so they "shut the door and wait for the end!" Interviewees believe that "you can very easily lie down" so they try to "keep active with every way". Physical activity is "filling your time", "keeps you going" and gives respondents who "did have nothing to do" a purpose in their everyday life. Finally, being active is a necessity for the older adults and they have to make themselves "do these things" because "if you do not use it, you lose it!"

3.3.2. Financial Well-Being and Physical Activity

This dimension embodies the need for financial independence and security, and material possessions. "Not to have financial worries" is important for the respondents as "you need enough money to live on". Although respondents "dislike worrying about money" and some mentioned that they would like more money, income does not seem to play an important role in their well-being. Respondents reported "As long as I pay the bills I am happy" and additionally "we can not fly to Australia if we want to but it does not matter, we have got enough, enough to make us happy" stressing that money is important up to the point that it covers basic needs. A "decent, reasonable, warm" house and a garden seem to be enough for the respondents and statements such as "I have home, car and television but I do not specifically need them. I prefer enjoying doing other things" show that possessions are important but they do not ensure well-being. No respondents mentioned aspects of financial well-being as outcomes of activity. On this basis, material well-being appears to be unaffected by physical activity participation.

3.3.3. Physical Well-Being and Physical Activity

Responses indicated that being physically healthy and free from illness are important contributors to their subjective well-being. Being healthy appears to be one of the most important things for older adults' life as eleven of the respondents said that "health is the number one". Furthermore, one participant stated "no matter how much money you have, if you do not have your health you do not have anything". "Not to have illness" is obviously a desired commodity and respondents pointed out that diseases cause several restrictions and influence all other aspects of well-being as "anything that is happening

out [in the community], I cannot really do it. I do not pretend that I am going out a lot. I am stacked with medical problems, which can be really embarrassing. It is a permanent thing that will never change". It should be noted that many of the participants had been referred by their physicians for exercise at a local leisure centre in order to improve their health.

There is also a functional element in physical well-being. Respondents notice that their body "is running down" and that every year their physical abilities "are getting less". What they believe however is that they "would have deteriorated much more" if they "did not have the exercise". For respondents with specific health problems such us arthritis, "physical activity is to slow down the effects" of their disease because if they can "slow things down and maintain the quality of life" they "would be happy". Fitness is a significant element of physical well-being and one respondent stressed that "you need to feel fit because if you do not feel fit everything you do, you do not enjoy it". "If you have aches and pains and you are not well, you cannot do the things you want to do". Pains are common in older adults but a respondent mentions that "we all get pain, but you just have to push yourself, make yourself do these things". Some had to stop certain activities as "it is painful, it is hard". However, interviewees reported that although they had problems such as low back pain "for many years" and "everything seemed not to be working properly", exercise helped them to feel better. The belief in exercise benefits makes respondents determined to continue their participation. Although one respondent can not think that in his age exercise "can do so many things" about him, the majority of the respondents "know that exercise is good" for their condition and "it overcomes any extra pain" they feel. They stress that there is "no gain without pain" and moreover, that exercise is necessary for their "total well-being".

"Well-being is to be physically in a good condition" and physical activity helps respondents to keep "loose", comfortable" and "trim". Interesting is the comment of an active interviewee who said that having always done exercise, he "never looked at it from the point of view of what it could do" for him, because "when you are fit you never think that's the key".

"Breathing easily" seems to be an important outcome of exercise. Interviewees reported that because of participating in physical activities they are not "so breathless" and activities such as cycling gives them "a better breath control". Moreover, a respondent who had bronchitis stressed that, although in the beginning she had to stop when she was trying to walk, now she does not have to stop and she is "very pleased" with herself.

Through exercise "sleeping is better". A respondent argued that he does not know, if it is because of exercise, but also his wife has noticed that he "gets up in the morning more easily and with better mood". Weight control is also a significant outcome of physical activity, as respondents notice that, when they sit around too much, they "get bigger". An interviewee reports that he gets upset when "I see people in my age and they look like eight months pregnant". He does not understand "how they allow themselves to come to this stage of overeating, inactivity, drinking" and he believes that "if I can avoid that, it is an achievement". Although some respondents mentioned that exercise helps them "controlling weight" some others reported that they are "very careful with their weight" but they "can not lose any weight". However, there is also the belief that "it is just getting old" and "there is nothing you can do about that". Moreover, some interviewees report that they have put on weight, but because there is not much to do, they "do not bother about it". Interesting also is the opinion, that exercise does not make much difference in weight because "you put on muscles and you lose fat but you do not win". This statement, along with the notion that "muscle is better that fat, probably it weighs more" indicates the lack of knowledge for a number of respondents and stresses the necessity for accurate information on the benefits of physical activity regarding weight control.

Respondents recognise the necessity of exercise because if they do not exercise they get "very stiff" and become "more and more immobile". Exercise therefore, helps them to keep "mobility" and "function" because after participating in an exercise programme they "perform better" and they "bend and stretch with no problem". Moreover, they "fairly enjoy the house work" and for them it is important that during exercise they "use

the muscles that help (them) get up from a chair, carry the shopping" and do inside ("hoover", "cleaning up") and outside ("gardening", "walking the dog") activities. Interestingly, a respondent mentioned that when he started exercise he realised "how much mobility" he had lost "over years" and most importantly "that is up to me to keep going".

Some interviewees suggested that exercise had negative elements such as making them feel "more tired" and they are not sure if "there are gains". However, most of the respondents believed that they need exercise to "keep on going", they "must not give it up" and as one interviewee stressed, with participation in physical activities "the blood is flowing, the heart is doing its job and the system feels lively".

3.3.4. Mental Well-Being and Physical Activity

The statements "feeling well", "being satisfied with how life is going" and "being mentally alert" indicate the main characteristics of mental well-being. Respondents mentioned that it is important to be "content", keep "a young attitude" and "enjoy life". Furthermore, well-being is a "peaceful approach to everything" and respondents prefer to live peacefully, and have a "nice, calm, collective and stable life". The retirement is something that respondents are not afraid of as "it is not the end" and there is an opportunity for spending more time in a "relaxing mode". Living in a " relaxing atmosphere" and enjoying themselves in a "quiet way" give happiness to older adults and furthermore, "stability" is a significant characteristic in their lives. "Having faith" and being " faithful in your life" reflects the spiritual aspect of well-being. Going to the church is in their "roots" and in addition, people enjoy the "lovely atmosphere", "the worships" and the social aspects of going to the church.

Physical activity plays a multiple role in respondents' mental well-being, as it keeps them "mentally alert", it "takes away the problems" and helps them to "focus better" on what they are doing. An interviewee mentions that he has noticed improvement in his memory and although he has not "related" that with exercise, probably this is because he has become more "physically active". During exercise "you have to think what to do,

how you are going to do it". "It is an activity that you use your head" and "you certainly have to think". In addition, physical activity makes them feel "content" and therefore, it is very important that they can participate in "enjoying" activities that make them feel "happy".

Through physical activity, "life looks better" and respondents mention that exercise is "as much a mental thing as a physical thing" and it helps them to do things with a much more "positive" and "young" attitude which lead in a modern lifestyle that makes "grandmothers say 'bye' and go to the gym". Although few respondents are reluctant to express positive feelings towards physical activity, most of them do enjoy it. Some are very enthusiastic and they stress that although they were exhausted afterwards, they "enjoyed it". What respondents enjoy most is the "quality of contemplation" that activity gives to them and finally, some report the joy of "competitiveness" and the "calming effect" that physical activity offers to them.

In advancing age "it is very easy to give up in life" and physical activity helps respondents to feel "lively" and "forcible". Participants stressed that physical activity is something to "hold on to" and offers them "support", and more importantly, it gives them "the quality of concentration on the inner being". Furthermore, respondents reported that through exercise they have "more control" and that increases their self-confidence. In addition, body image appears to be important as "feeling fit does affect your mood because you do not want to get up in the morning when you know you are fat and overweight do you?" and moreover, "it is very important that you always look nice". "Feeling fitter" helps respondents "feeling better" for themselves because improvements in physical fitness increase the "belief in self" and make respondents instead of saying "I can't do this, I can't do that" to "wake up" and be sure that they "can" do things.

Not to hold back" and "stagnation" are negative effects of ageing that respondents are afraid of. They dislike being under "stress" and "worrying about things" especially health, which becomes an important issue for them. Physical activity is a good diversion

for them because, after participating in physical activities, they find themselves "more able to solve problems". As one respondent put it simply "it is just jumping on the bike and going out and forgetting everything". Exercise is "something that can help to take the stress out of anything" and helps respondents with "controlling" their way and "controlling" their mind. Although some respondents stress that exercise was helping them to "cope with stress in the workplace" and now that they are retired "some of the stress went away", many report that they still use exercise to keep themselves "feeling well". Finally, according to one respondent, physical activity is beneficial "because it is good for your health" which "influences your mind", and that in turn "influences your general health" implying the mutual interaction of the mental and physical dimensions of subjective well-being.

3.3.5. Social Well-Being and Physical Activity

The majority of the respondents consider family life as very important and they said that "well-being for me is when my family is well. That gives me good feelings". Marriage is an invaluable source of well-being as according to respondents "we have a good marriage so we solve the minor problems. The two of us makes all the difference". The role of spouse is paramount in older adults' life as "the best thing that make me happy is the fact that I have my wife, being together". Furthermore, people mentioned that they are happy because they have their partners and they are not alone. They "hate to be alone" and that makes the loss of spouse a devastating experience as according to a woman, "we were married for forty eight years, so half of my life is gone". Additionally, everyday life becomes difficult because even "if you go for a walk alone there is nobody there to say 'that's a lovely view'. I suppose that it is just when you miss your partner, your husband". Children's achievements and happiness reassures respondents that they have succeeded in their parental role, they have done their "job as parents as well as could be expected, as any parent would do". Finally, they stress that their happiness is related with children's happiness because "when the children have worries, you have worries".

Furthermore, "well-being is friends, it's the social life". Respondents stressed the importance of having nice friends "who support you" and the need for friends of "your own age". Most of all, respondents need friends and social life because they "need to be needed", they "need to be wanted" and they are afraid of "living alone". Community involvement is also an important aspect of respondents' social well-being. "Getting back to society" and "to feel that [you] contribute" shows that although respondents have retired from their professional occupations they do need to be a part of the community and play an active role in it. A common way to participate in community activities is through church. Although older people visit church for spiritual reasons they also "enjoy the other activities connected with the church". Some respondents mentioned that they enjoy organising things in church as they " do a lot of things" there. Helping people through voluntary work is another way of contributing to community. Respondents reported that voluntary work is "very important", they are "committed" to it and they do not want to stop doing it because "people rely on" them.

All the interviewees reported that one of the most important outcomes of participating in physical activities is the opportunity to "meet people" and "broaden" their social life. Physical activity helps respondents to maintain social networks and do the things they "want to do", because "without being fit you cannot do any of these things, you cannot go out, just sit". Exercise appears to be enjoyable as a great number of interviewees report that they enjoy doing it, because "it is good fun". As they stress, "it is not just rigid exercise" but "there is more going on" as they meet their friends and "laugh and joke" with them. Through participation in physical activities, respondents have the opportunity to meet a lot of "different people" and this is important "when usually you do not get out of the house". Especially after retirement the danger of isolation becomes bigger, as "you could be cocooned in your home and do not meet anyone". Exercise gives respondents the chance not only to meet other people but also, to "meet people with the same interests". "Having a lot in common" helps people to build new friendships more easily. Some interviewees argue that exercise does not help them to make new friends because "when people learn what they want to learn they just go off and we do not see them again" and moreover, they stress that "you are literally in the

class but then everybody is gone. They are all busy". However, most of the respondents believe that "you make some close friends" and also that the sports centres are "a talking point".

Meeting people is a necessity for some respondents who report that they "need to go and find people" that they can really be "happy with" and going to sports clubs does help them to find the people that they "like to be with". Joining an exercise class could be the only opportunity for some older people to socialise as according to an interviewee "there is a lady in our class, who unless she comes to the classes she does not see anybody". Exercise also helps respondents to "have a different approach to people" and be more open and less reserved in making new friends. Meeting people is beneficial for respondents because "people help each other without realising it. Just a smile makes me feel better. So probably makes other people feel better as well".

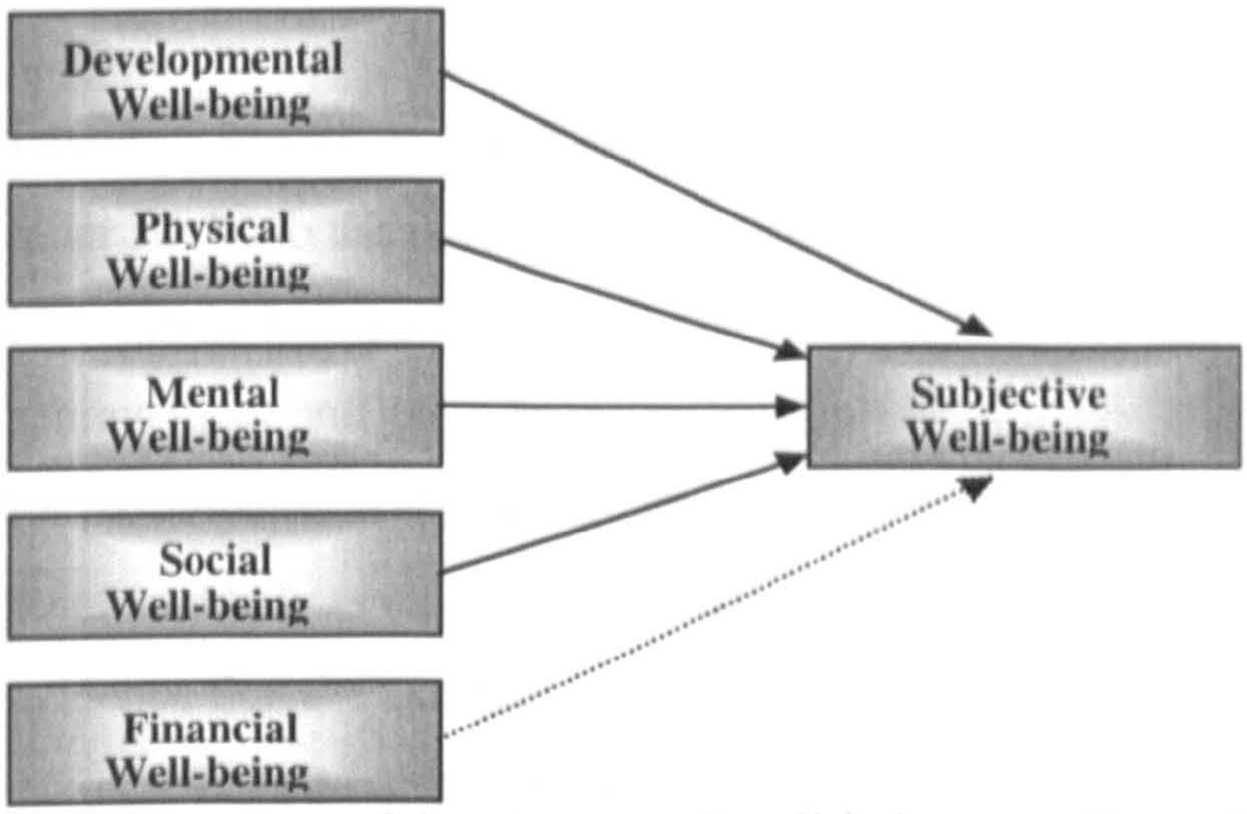
Finally, respondents stressed that "a pleasant surrounding in which to live" is important to them as "well-being is being able, when friends come, to walk outside in the nice atmosphere". Participation in physical activities offers participants the opportunity to be "outside home" in the natural environment, "mixing with other people in the fresh air" and having a "change of scenery".

3.4. Discussion

The purpose of this study was to explore the dimensions of subjective well-being of older adults and to identify ways in which dimensions might be influenced by participation in physical activities. Human ageing is a process of interrelated constancy and change involving physical, psychological, social and institutional dimensions that interact with each other (Baltes & Lang, 1997). The notion of this "structural ensemble" is very important in the effort to understand and describe the parameters of older adults' subjective well-being. Five main dimensions (Figure 3.3.) emerged from the interviewee's responses with high correspondence to those emerging in research with older people (Bowling et al., 2001; Farquhar, 1995) and in the general literature (Cummins, 1996). The features of these dimensions reflect older adults' perceptions and

therefore there are some unique or different elements in each dimension, which stress the special characteristics of subjective well-being in older people.

Figure 3.3. The dimensions of subjective well-being



The emergence of developmental well-being as a dimension that describes how older adults seek growth, independence and adjustment to old age contrasts with the stereotype that older people passively accept their declining ability to perform and contribute (Andrews, 1991). The notion that a way to successful ageing is to "go on pursuing ends that give our existence a meaning" (Simone de Beauvoir, in Andrews, 1991) is supported from the interviewees who saw themselves to be far distanced from the passive traditional image of old age. Personal development suggests 'moving onwards and forwards' and this was clearly apparent in the comments of these older active adults.

Respondents mentioned that participation in physical activities offers them feelings of achievement and success. This may help to counteract the decline in sense of personal control and competence and the subsequent loss of independence that is often reported as a feature of old age (Baltes & Baltes, 1990). Greater exposure to physical activity participation appears to improve perceptions of personal capabilities and this in turn, leads to positive changes in well-being (McAuley & Rudolph, 1995). Furthermore, commitment to a set of physical activity goals may provide a sense of personal agency and of structure and meaning to daily life for older adults (Diener et al., 1999). This is considered to be particularly important for a successful ageing that includes self-acceptance, autonomy and purpose in life (Baltes & Lang, 1997). Self-enhancement is

important and older adults want to continue improving themselves and to manifest their ability to offer and to contribute. Physical activity may help to provide a substitute and therefore help replace lost roles with new ones (Atchley, 1993).

Financial resources and personal possessions contribute to the subjective well-being of older adults to the point that they cover basic needs such as shelter and security. Once individuals feel that they have sufficient resources to manage, then personal achievement and goals become more salient (Krause, 1996b). This seems to be the case for participants in this study. Respondents reported that more wealth beyond comfortable housing and subsistence did not contribute to well-being, supporting the evidence that the external objective factors account for less that 20% of the variance in subjective well-being (Diener et al., 1999).

Although financial and housing status was not assessed in detail in this study, the majority of participants came from professional backgrounds before retirement and this clearly requires consideration when analysing their responses. Participants did not link this dimension with participating in physical activity, other than being necessary to enjoy reasonable financial standing before physical activity becomes a priority or perhaps even a feasible option.

The findings of the present study stress the importance of good health to the subjective well-being of older adults. This confirms previous research showing that the health domain is consistently ranked highest in its contribution to life satisfaction (Cummins, 1996). Functional limitations caused by physical disability or illness can have important and sometimes devastating effects on well-being and have been shown to be predictive of depressive symptoms, reduced life satisfaction and even suicidal ideation (Bookwala & Schulz, 1996; Bowling, Farquhar, Grundy, & Formby, 1993; Newsom & Schulz, 1996; Zeiss et al., 1996). A good physical condition is required for participation in a number of activities which older adults find very important for their subjective well-being. The influence of health on the subjective well-being appears therefore to depend upon the personal perceptions of health since older adults evaluate the effect of their

condition in basic (activities of daily living) and expanded (social participation, leisure) activity competence, and in their overall quality of life.

The active older adults in this study certainly feel that physical activity is critical in helping them avoid or delay physical deterioration and serious illness. This amounts to belief in participants that activity slows the ageing process. It is important to remember that several participants were sensitised to the potential of exercise to improve health. They have been referred for exercise for ill-health reasons such as cardiovascular diseases, stroke and arthritis by their GPs and were probably told that exercise was an important part of their treatment. Doctor's advice can be motivating to at least getting started in exercise. However, a number of respondents stressed that experiencing the benefits of physical activities was required for them to really believe and accept that exercise was important for their well-being. One participant reported that physical activity made him feel more tired. "They tell me there are gains but I do not know. I will wait to see if there is any difference in the end of the 10 weeks and if not I will stop it". This implies that experiencing health gains may be critical for some individuals and that programmes need to be attractive to ensure that there is persistence so that health gains are experienced. In general, however, the voluntary participation in exercise of GP referred individuals and their positive comments provide supporting evidence for the effectiveness of exercise for this group.

Physical activity is also seen to lead to the direct improvement of functional ability and mobility as respondents reported that it keeps them "mobile", "supple" and helps them to move easily. This in turn, through maintenance of autonomous functioning, helps participants to perform everyday activities independently and enjoy higher levels of well-being as fewer self -limitations in performing instrumental activities of daily living significantly predict better perceived health (Bookwala & Schulz, 1996).

Findings suggest a significant contribution of physical activity to the mental well-being of older adults, which encapsulates maintenance of mental alertness, positive affect, avoidance of stress and negative function and faith.

Religion offers an important coping mechanism and reflects the spiritual aspect of mental well-being. Findings indicate the existence of personal and group related religious behaviours as older adults value both the role of personal faith and the importance of church-related religious activities. Faith is used by older adults as a means of achieving control over their destiny and offers them cognitive benefits by helping them creating an interpretive framework for their experiences (Ellison et al., 1989; Koenig & Blazer, 1996). Moreover, church provides an institutional setting in which older adults can interact, find instrumental social support during difficult times and make friendships (Ellison et al., 1989). In conclusion, religion, either as an internal personal behaviour or as a social activity, contributes to subjective well-being of many older adults and appears to be an important aspect of their mental health.

Impaired cognitive performance is one of the signs of advancing age having direct negative effects on older adults' life (Chodzko-Zajko & Moore, 1994). Participants reported that physical activity helped their cognitive performance through better concentration and focus.

Furthermore, as with younger populations, activity is seen to enhance affect (Biddle, 2000). Although mental well-being has often been operationalised as the absence of psychological distress (Diener, 1984), the meaning of mental health extends beyond the absence of psychopathology and it includes also positive states (Zautra, Guarnaccia, & Reich, 1988). The "feeling good" effect of physical activity is evident in older adults' statements of better mood and pleasant emotions. Increased levels of happiness, enjoyment and a more positive attitude in general, are seen to be important outcomes from participation in physical activities. Important also is the role of physical activity in the alleviation of negative symptoms and feelings as respondents mentioned that physical activity helps them to reduce stress and tension, to deal with problems more effectively and to feel comfortable and relaxed. Furthermore, respondents did not mention depression as a negative affect although it is one of the major problems faced by older adults (O' Connor et al., 1993). That could be explained by their high scores in

the introductory well-being scales, which show that participants in this study have high levels of subjective well-being and therefore they might not have experienced mental disorders such as depression.

An important finding is that participants reported that the "feeling good" outcome of participation in physical activities and the positive change in mental health conditions are independent from improvement in physical fitness. Consistent with this are the findings from experimental research which have repeatedly failed to identify links between changes in fitness and improvements in measures of mental well-being. The qualitative data here clearly indicated that physical activity might invoke many mechanisms such as sense of accomplishment and control and sociability as a means of improving well-being in the absence of functional changes.

Findings support previous research showing that social and family relationships come only second in importance to health in their contribution to life satisfaction (Cummins, 1996). Family is very important and the parental role gives older adults happiness. Furthermore, the respondents appraise having a partner as an invaluable source of well-being. As a result, loss of spouse is a major event in older adults' life that leads to loneliness and reduced feeling of well-being.

Social relationships have also been found to be strongly related with health in later life (Krause, 1996a). Among older adults, absence of friendship support is closely tied to feelings of loneliness (Dykstra, 1995). Having friends is correlated with good psychosocial functioning and a sense of well-being across the life course (Hartup & Stevens, 1997). Adults who have friends are known to meet various developmental challenges such as widowhood, with better outcomes than individuals who do not have friends (Connidis & Davies, 1990). The voluntary nature of friendships distinguishes friendships from social relationships with relatives, acquaintances or neighbours. Support from friends is characterised through reciprocity and the feeling of being needed. Friends provide emotional intimacy and companionship and also they provide referents for evaluating one's own health and social role (Matt & Dean, 1993).

Furthermore, friends are more effective in enhancing self-esteem among older persons than family members (Felton & Berry, 1992). Engagement in social activities helps older adults to be active members of the community, to contribute to society and maximise pleasant interactions because people who participate more often in voluntary social activities are likely to experience greater pleasure than others (Ellison et al., 1989). Pleasant surroundings and a nice atmosphere are considered very important by the respondents, making environment, both natural and man-made, a significant influence of subjective well-being for older people. Older adults may be more vulnerable to environmental factors than younger people (Krause, 1996a). Pollution and excessive noise are related with health problems. Moreover, houses that are in poor condition increase the likelihood of falls, important concern in older populations. Finally, dangerous neighbourhoods inhibit social interaction and are related with more social isolation in later life.

The participants in this study reported the necessity of having friends, meeting people and socialising. They mentioned that participation in physical activities gives them the opportunity to avoid isolation and provides a reason for getting out and about and expanding their social network. Physical activity also contributes indirectly to helping older adults avoid social isolation by helping them maintain functional capacity and their ability to complete daily tasks of living. Disability is more harmful than any life stressor for older adults (Zautra et al., 1988) and physical impairment may disrupt the usual norms of social relationships and prohibit older adults from feeling "needed" by others and engaging in reciprocal exchanges. Therefore, the avoidance of physical deterioration may enable older adults to feel as though they are able to contribute to the social fabric of the communities in which they live.

Physical activity is in itself a diverse phenomenon, taking many different forms. In this study, participants were intentionally drawn from organised physical activity such as social dance, competitive sport such as badminton, and aerobic exercise that took place in groups. Clearly the characteristics of the activity and the setting in which it takes place may have important influences on the potential for contributing to different

elements of subjective well-being. Although the unit of analysis in this study was the participant rather than the form of activity, contributions revealed some insight into the differential effects of involvement in different types of physical activity. Participants in the social dance groups, for example, mentioned that they simply enjoy learning new dances. They also find a challenge in the need to "have to remember what the steps are and make them with the beat". Participation in sports such as badminton has its own set of benefits. Respondents mentioned that they like to improve the skills of the game, and they enjoy the "competitiveness, beating someone and the 'dressing room talk' that follows a game". Physical activity modes appear to offer their own particular formula for enhancing subjective well-being.

It is also conceivable that different characteristics of the setting in which the activity takes place are important considerations. For example, the qualities of the exercise leader, the weather, the lighting and sound qualities, and the "sociability" of the setting are important. The characteristics of physical activity and the mechanisms by which they help stimulate or inhibit the enhancement of subjective well-being are therefore important considerations for further research.

Although this qualitative study has confirmed the existence of several important dimensions of subjective well-being, it has also revealed the complexity of the human experience and the interdependence and interrelatedness of these dimensions. The notion of *healthy body and healthy mind* and their interdependence is encapsulated in the words of the participants. Their physical independence and functioning contributes to better health and reciprocally, improved affect, cognitive function and self-perceptions appear to promote interest and attraction to physical activity. Similarly, developmental well-being is inexorably tied to mental well-being. To this extent, dimensions should be viewed as having permeable and shifting boundaries, with scope for overlap. The potential of them being hierarchically arranged with some dimensions existing as superordinate to others should also be considered.

Finally, the psychometric translation of subjective well-being into components incorporating the multidimensional nature that was evident in this study could provide a theoretical base for the development of structural models that could shed more light in the ways that physical activity influences the different elements of older persons' subjective well-being. The development of an activity specific well-being measure that is soundly based on theory, systematically evaluated and refined on the basis of subsequent theoretical or substantive developments could offer an important contribution to the ageing and physical activity research where adequate instruments are much in need.

3.5. Conclusions

The qualitative techniques used in this research with active older adults have allowed considerable insight into the potency of different elements of life experience to contribute to their subjective well-being. Sources of subjective well-being for this group were reduced through content analysis to five underpinning dimensions. These broad dimensions appear to exist in some form throughout the adult lifespan but have characteristics that are unique to later life that can feature retirement, bereavement, loss of function and independence. A qualitative approach has enabled a part of that uniqueness to be documented so that dimensions have been described in older adults' own terms and from their own experiences. The richness of the data also allowed an examination of the interrelatedness of the dimensions of subjective well-being illustrating the value and the opportunities offered by a qualitative approach. The outcomes of this study have provided a useful insight into how physical activity can contribute to the subjective well-being of older adults. All dimensions of well-being seem to be influenced with the exception of financial well-being and the spiritual aspects of mental well-being. These adults seemed to be able to express their need for challenge, fitness and functional health, mental health and friends and family and they had clear views about how physical activity assisted in fulfilling some of their current needs.

Further qualitative research might be launched with non-physically active older adults to determine whether the same dimensions are potent and how and the extent to which their well-being needs are met in the absence of physical activity. Furthermore, exploring the subjective well-being characteristics of sedentary older adults in comparison to active adults might inform us further of the specific elements through which activity can contribute. Further research is also needed in a variety of settings and subject groups. Institutionalised older adults, in particular, comprise a large important group who is likely to have different needs and priorities. Finally, exploring the perceptions of older people who suffer from economic deprivation and social inequalities and have the lowest participation in health-related behaviours could help in designing and targeting health promotion interventions towards their needs.

The information from this study suggests some early pointers for the design of successful exercise programmes for older adults. Certainly, the older active adults in this study felt that physical activity had contributed in many ways to their well-being. Although the focus of the study was not directly on their motives for physical activity, it is reasonable to assume that the benefits to well-being that they experienced helped motivate them to participate. This suggests that activity programmes should be designed to maximise opportunities for participants to experience:

- personal achievement and an improved sense of personal control
- improved functional capacity, strength and mobility
- improved mood, alertness, vigour and less stress
- a sense of belonging and social confidence

Finally, the qualitative open-ended data and the five-dimension structure of subjective well-being presented in this study were used as the theoretical base for the development of a self-assessment scale for older adults, designed to capture multiple aspects of subjective well-being relevant to the physical activity experience. The rationale and the details regarding the development and the initial validation of the new instrument are presented in the following chapters.

CHAPTER 4

PHASE II

DEVELOPMENT OF THE AGEING-WELL PROFILE

4.1 Introduction

The demographic shift towards an ageing population and the estimated costs for the health care of the older persons have produced an increased spurt of research directed towards the delivery of services for them (R. L. Kane, 2000; Newhouse, 1993). Evidence-based research requires valid and reliable measures as assessment of older adults' physical and mental health status is necessary to make decisions on possible treatments and it may serve as the basis for determining eligibility for allocation of health care resources.

Furthermore, assessment is necessary for the evaluation of the effectiveness of intervention programmes or services specifically designed for older adults. Without measures, we cannot produce convincing evidence and increase the interest of both clinicians and researchers in order to expand and advance the existing knowledge in issues such as the quality of older persons' life. The challenge, therefore, is to develop measures that can tap the phenomenon of specific interest (in this case the subjective well-being) and can contribute to more accurate conclusions and subsequent decisions regarding the enhancement of quality of older adults' life.

Assessment of older persons may be more complicated than that of younger people because older people often have several simultaneous chronic health problems (R. A. Kane, 2000). In addition, physical health problems can be exacerbated by psychosocial dysfunction, therefore a clear distinction between physical and psychological symptoms may not be identifiable. This is often the case in depression research in older adults (O' Connor et al., 1993). Furthermore, older adults may have different needs (functionality, independence) and concerns (social isolation, mental alertness) from younger ones. Numerous researchers have questioned the suitability of general population quality of life measures for assessment with older adults (Birren et al., 1991). Measures of quality of life make the assumption that the underlying construct is stable and relevant across populations differing by age and disease burden (McHorney, 1996). However, ageing research shows that different domains of quality of life may have different importance for older people or there may be domains that are unique to older adults' quality of life

(George & Bearon, 1980; Katz & Gurland, 1991). Therefore, in the absence of measures that are tailor-made for older adults, one area of work should focus on succinctly delineating those elements that are important for the quality of later years of life (Frytak, 2000).

Ongoing debate focuses on how broad or narrow, negative or positive, objective or subjective one's conceptualisation of quality of life is. Most clinical and gerontological researchers differentiate the concept of quality of life from subjective concepts such as happiness, morale and life satisfaction and measures of well-being are too often overlooked (McDowell & Newell, 1996). This may be because the dimensions of well-being are not well distinguished conceptually or empirically (Andrews & Robinson, 1991; Fillip, 1996). Current definitions of subjective well-being have been criticised as being too broad and general (Andrews & Robinson, 1991; Diener, 1994; Diener et al., 1999). Furthermore, the successful ageing movement requires instruments designed to measure positive aspects, development and growth in older persons and therefore there is need to conceptualise subjective well-being and delineate the dimensions that are important for older adults.

Research in the physical activity and exercise environment has been based on numerous well-being instruments that have elicited a number of criticisms:

- Widely used health-related quality of life measures such as the Medical Outcomes Study Short Form *SF36* (Ware et al., 1993), the Quality of Well-being Scale (Kaplan, Anderson, & Ganiats, 1993) and the Sickness Impact Profile (Bergner et al., 1976) were designed for the adult population in general rather than older people.

- Many specific questionnaires (anxiety-depression) have been used in physical activity and ageing research, however, there are not many instruments that tap multiple dimensions of well-being and quality of life. If so, these instruments are usually lengthy and time-consuming (Sickness Impact Profile) causing difficulties for older adults especially when they require self-administration.

- The sensitivity of a number of well-known geriatric instruments to the feelings and experience accruing from participation in physical activities is questionable. As an example, the original 23-items Philadelphia Geriatric Center Morale Scale (Lawton, 1975) included only 6 positive items, enhancing the perception that well-being is mere the absence of negative feelings. However, participation in physical activities may elicit a number of positive feelings that need to be evaluated.

- Most of the geriatric instruments have a broad time reference and quite often they include items referring to different time periods within the same instrument, from the very present to general evaluation for life as a whole. As a result, they are not ideal to be used in the evaluation of physical activity intervention programmes that usually last from 8-12 weeks.

The purpose of this section of the research was the preliminary development of a self-assessment scale for older adults, designed to capture multiple aspects of subjective well-being relevant to the physical activity experience. The development of this measure was based on the definition of subjective well-being as:

> A broad concept comprising a wide range of distinct dimensions which evaluated by the individuals lead them to a phenomenological, global expression of the quality of their state of existence

The specific objectives were to create an instrument able to:

1. assess the effects of specific exercise and physical activity programmes on the dimensions of older persons' well-being
2. be used as a screening tool for the identification of the needs of the older participants and as a guide for the design of appropriate activity programmes for them

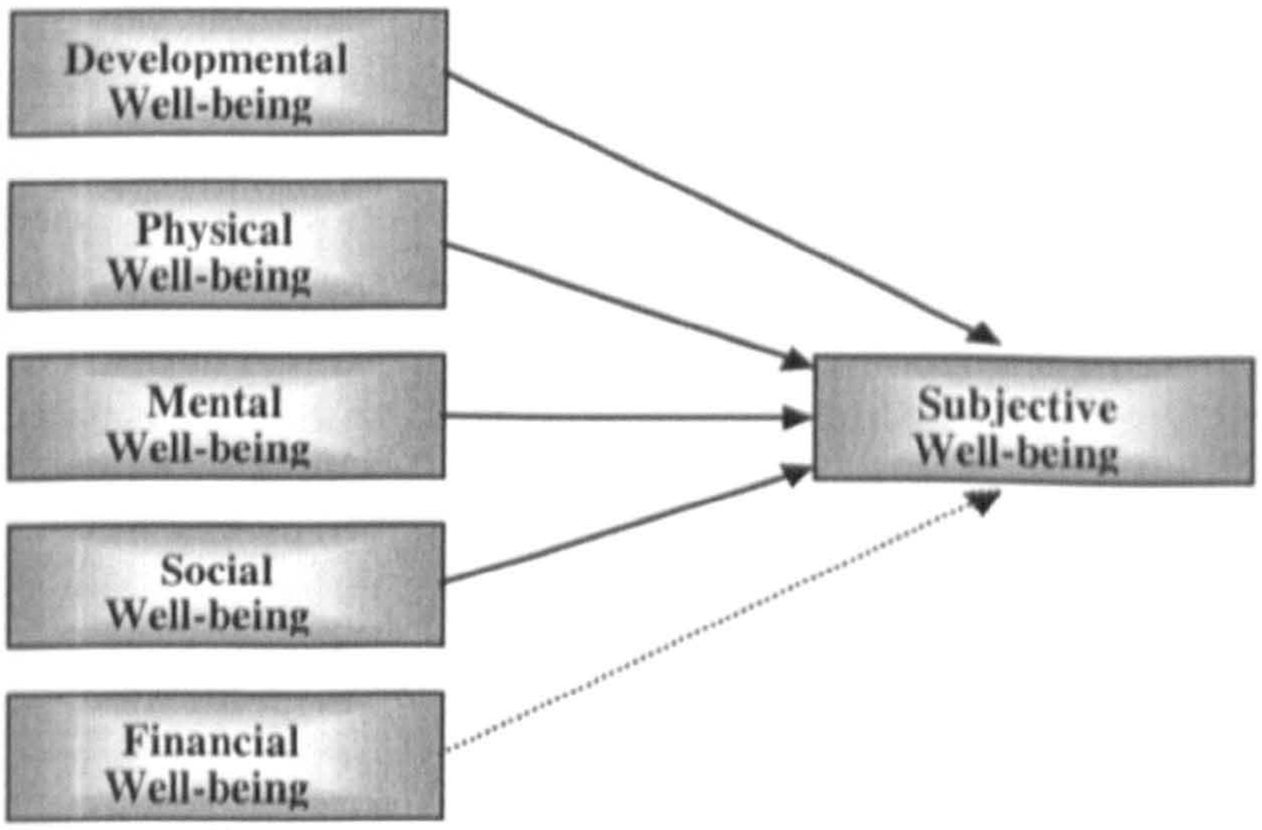
Furthermore, this instrument was designed specifically for older adults with the need to demonstrate the following properties:

- Being a measure that is easy to understand by older adults
- Being an instrument that is short and easy to administer

The formulation of the subscales of the new instrument was based on the hypothesised dimensions of subjective well-being identified in the Phase I study (Figure 4.1.).

The initial target population for the instrument presented similar characteristics as the sample of the Phase I study. These were community-dwelling older adults who were retired and physically active. However in later stages (Phase III), the purpose was to expand the use of the instrument and test its psychometric properties with older adults who participate in other forms of non-physical activity.

Figure 4.1. The hypothesised dimensions of subjective well-being



All new measures need to satisfy the basic properties of validity, reliability, repeatability, sensitivity and responsiveness (Fayers & Machine, 2000). Phase II explored several aspects of validation. This is the process of determining whether the instrument measures what it is intended to measure and if it is useful for its intended

purpose. Study 1 explored aspects of *face validity* and study 2 explored aspects of *construct validity*. An overview of how the procedures were carried out over the course of Phase II study is set out in Figure 4.2.

Figure 4.2. Flow chart of Phase II procedures

Purpose	Procedure	Data Collection	Data analysis
Study 1: Item and Subscale development			
a) Subscale and item development		**Questionnaire Development (a)** ***4 Subscales - 12 subcategories*** ***80 Items*** ⇩	
b) Face validity	1. Experts opinion 2. Lay people opinion	1. 10 Experts 2. 34 Older active adults **Questionnaire Development (b)** ***4 Subscales - 12 subcategories*** ***48 Items*** ⇩	1. Item Classification 3. Rating of items' importance in a 5-point scale
Study 2: Establishment of initial factor structure and internal consistency			
a) Factor Structure	Exploratory Factor Analysis	148 older adults Mean age = 68.5, SD= 6.5	1. Item and subscale characteristics 2. Exploratory Factor Analysis with varimax rotation
b) Reliability	Cronbach's alpha		1. Internal Consistency
		Questionnaire Development (c) ***5 Subscales - 14 subcategories*** ***36 Items*** ⇩	
		PHASE III	

4.2. Study 1. Item and subscale development

The aim of this study was to develop items and subscales that reflect the hypothesised dimensions of subjective well-being identified in Phase I. The first part of this study (Stage 1) provided details regarding the item generation and the salience of item content. The second part of this study (Stage 2) provided information on the procedures followed in order to ensure the face validity of the instrument.

4.2.1. Method and Procedures

4.2.1.1. Stage 1-Salience of item content

Well-being and quality of life scales have been developed mainly through the health professionals' (experts) quality of life definitions and through the review of existing scales (Bowling, 1995b). However, it has been argued that as the components constituting subjective aspects of well-being and quality of life are personal, an approach where subjects (lay people) create their own definitions of content may be a more appropriate measure (Farquhar, 1995). Therefore, the initial qualitative Phase I study was necessary for the identification of relevant and salient content regarding older adults' subjective well-being which provided the basis for the item-generation. Furthermore, the dimensions and themes that emerged from the interviews were used for the development of the initial subscales and sub-categories of the new instrument respectively. Finally, existing measures were also examined for their content and considered in the development process.

- Four subscales were developed according to the dimensions of well-being identified to be influenced by participation in physical activities.

A. Developmental Well-being: The extent to which you feel you are able to develop yourself, adjust to changes in your life and maintain a busy and active lifestyle.
B. Physical Well-being: The extent to which you feel that you have good physical health and a body that is fit and working well.

C. Mental Well-being: The extent to which you are mentally alert and you have a positive rather than negative attitude about yourself and your life in general.
D. Social Well-being: The extent to which you are enjoying a socially active life and you avoid feeling isolated or lonely.

- The identified themes from the older adults' responses (see Table 3.1) were used for the development of 12 sub-categories (Table 4.1).
- The generation of 80 items for all the sub-categories was based on the content of participants' responses and on their own words.

Table 4.1. Sub-categories of the Ageing Well Profile

Subscales	**Sub-categories**		
Developmental	Personal Development	Adjustment	Independence
Physical	Health	**Fitness**	Functionality
Mental	Mental alertness	Positive- Negative affect	Self perceptions
Social	Social activity	**Contribution**	Social Support

4.2.1.2. Stage 2-Face validity

The content validity of the generated subscales and items was judged by multiple experts on applicable dimensions such as relevance, representativeness, specificity and clarity (Haynes, Richard, & Kubany, 1995). Investigators in the field of exercise psychology and a sample of active older adults representative of the target population were the judges of the initial instrument content and they helped in the identification of items that required refinement or items that were inappropriate and they should be omitted:

a. The description of the subscales and the initial 80-item pool were given to 10 investigators in the field of exercise psychology. The experts rated the representativeness and clarity of each item by placing them under one or more of the five subscale descriptors that they believed was appropriate (see example in Table 4.2.).

Confusing items and also, items that experts judged as difficult to understand or inappropriate for the purpose of the instrument were subsequently excluded.

Table 4.2. Face validity (Experts)

Items	Developmental	Physical	Mental	Social
I feel happy about my appearance		✓	✓	
My body feels stiff and limits what I can do		✓		
On the whole, I have a fulfilling life	✓		✓	✓

Twenty-eight items were categorised correctly in the intended subscale. From the remaining 52 items, 10 which were classified in a different subscale by 50% of the experts were placed in that subscale, 32 were reworded to fit in the intended subscale and 10 items were excluded as being confusing and inappropriate.

b. An independent sample of 34 older adults representative of the target group (retired, physically active) was asked to indicate on a 5-point scale (1=Not really true for me, 5=Really true for me) the salience of each item content in contributing to the subjective experience of their physical activity participation (see example in Table 4.3.). The responses were analysed with the SPSS statistical package and items that were rated highly (>3) were retained in the scale whereas items that were rated low were considered along with other information for subsequent exclusion.

Table 4.3. Face validity (Lay people)

	Not really true for me				**Really true for me**
I am able to do everything I want.	○	○	☑	○	○
I feel that I can focus my mind when I need to.	○	○	○	☑	○
I do not have many pains or much discomfort.	○	○	○	○	☑

The analysis of their responses resulted in the exclusion of 22 items that were rated as unlikely to be influenced by participation in physical activities or poorly worded. Stages 1 and 2 resulted in the exclusion of 31 items and therefore, a 48-item pool comprised the first version of the new instrument which was named the Ageing-Well Profile [version 1] [AWP].

4.1.2.3. Characteristics of the Ageing-Well Profile [version 1]

Response set. A 5-point Likert scale response format with *1= Not really true for me*, and *5= Really true for me* was used (Table 4.4.). This format was tested in the stage establishing face validity and older participants did not report any difficulties in understanding. Either 3 or 7-point formats were thought to provide very little information or to be too analytical and were considered inappropriate for this instrument. Furthermore, the specific statement "true for me" was chosen as way of avoiding social desirability bias and helping older participants to think and respond to the questionnaire based on their own experiences. Finally, the Times New Roman 14-typeface was used in order to avoid problems in reading for older adults who may not have good eyesight.

Table 4.4. Response format of the Ageing-Well Profile

About your life...

During the last two months:	**Not really true for me**				**Really true for me**
I have felt in full control of my life.	O	O	O	O	O

Time reference. Research with older persons often stresses the difficulties that they might have in recalling information and therefore, it was decided that two months is a quite short period which may not cause problems to the older respondents. Furthermore during face validity/stage 2, older respondents were asked what "recently" meant to them. The majority reported the time period between 1 and 2 months. In addition, the aim of the instrument was to monitor changes in subjective well-being due to

participation in physical activities, changes that usually occur after 8-10 weeks of participation. Therefore, the two months time reference was chosen.

Format of subscales. Respondents in subjective well-being instruments appear to anchor their report of well-being on their perceptions regarding any significant life domain to which attention has been drawn. As a result, selective attention to a significant domain of life produces substantial influence of this domain in reports of overall subjective well-being (Kahneman, 1999). Therefore, in order to minimise the risk of having one specific item influencing responses in all the others it was decided to prepare distinct categories for every dimension of subjective well-being. With the introduction *"about your..."* it was thought that respondents could make a clear judgement about every dimension. Therefore, the influence of the perceptions about one dimension upon all the other dimensions could be minimised.

General versus specific items. Very specific item content was avoided. For example, in the physical well-being subscale there were items such as "My life has been restricted because of physical problems" or "I have not had many pains or much discomfort". In the developmental well-being subscale there were items such as "Most of the things I have done were of interest to me" or "I have felt that I have improved myself". Avoidance of reference to specific diseases or activities allows respondents to generate their own framework of reference and thus provide a more personally directed and meaningful answer. Furthermore, they reduce the risk of missing or ambiguous answers which may be the result of specific questions that are not applicable to some respondents (Fayers & Machin, 2000).

Comparison techniques. The construct tapped by each subscale was inclusive of comparisons with peers or perceived norms. Items such as " I have been quite fit for my age", "I have been able to keep going for longer than most people my age" or "I have been feeling less left out of things than I used to" were included. These items give respondents the opportunity to use techniques (social comparison, social norms,

discrepancy theories) in order to make judgements about their subjective well-being (Diener et al., 1999).

Finally, six additional items regarding demographic data and activity information were included (Appendix II-1). After the item and subscale development the Ageing Well-Profile [version 1] was submitted to psychometric examination.

4.3. Study 2. Initial factor structure and internal consistency

The aim of this study was to further develop and refine the instrument through a range of psychometric techniques and to determine whether the initial subscale structure could be confirmed by the factors.

4.3.1. Methods and Procedure

Sample. Participants in this study were 103 female and 45 male older adults (mean age = 68.6, SD= 6.5). All the participants were retired and 94% (Table 4.5.) were participating at least once per week in a wide variety of organised physical activities (Tai-chi, line dancing, swimming, keep fit classes, badminton, orienteering) similar to those chosen for the interviews.

Table 4.5. The demographic characteristics of the participants

Characteristics	Percentage %
Marital Status	
Married	58.4
Widowed	29.1
Single/Divorced	13.5
Highest education attended	
Secondary	54.7
Further education	26.4
University	18.9
Participation in organised physical activities	
<1 day/week	6.0
1 day/week	37.2
2 days/week	28.4
3 days/week	28.4

Procedure. Prior to the study, the United Bristol Healthcare NHS Trust approved the research design and ethics for the development of the new instrument (Appendix II-2). 148 questionnaires were then distributed to members of the Bristol Community Sports Centres where various 50+ activity groups (swimming, badminton, keep fit classes,

aerobic classes) have been operated. Respondents participated voluntary in the study after a brief presentation of the scope and the aims of the study by the researcher.

Data analysis

Exploratory Factor Analysis [EFA] was used to determine the best factor solution. The purpose of EFA is to explore interrelationships between items thereby identifying groups of measured items that describe a larger unmeasured construct referred to as a factor.

Determining the best factor solution involves judgement as well as the application of objective criteria. Initially, factors with eigenvalues of greater than 1 indicating that they explained more variance than any single item, were selected for further rotation. However, eigenvalues are dependent upon the number of observed variables (49). In this case an eigenvalue of 1 represents only 2% (1/49) explained variance and so other criteria were also given consideration. A minimum criterion of 4% explained variance was adopted for a factor to be considered, and also consideration was given to Cattell's Scree test, whereby the variance explained by each factor was plotted to identify the point of diminishing returns. Furthermore, the items loading in each factor had to form a clearly interpretable orientation, enabling the factor to be readily labelled.

All subscales were tapping dimensions of subjective well-being and it was necessary to check whether there were significant correlations among the factors. Therefore, an oblimin rotation was performed to demonstrate the correlation between the factors. Except for the correlation between factor1-factor9 (.39) and factor2-factor9 (.35) all the other factors presented low correlations, therefore it was assumed that the factors were orthogonal and the varimax rotation was preferred.

A comparison was then made between item/factor loadings and original subscale item composition. Attention was directed at those items which failed to load at least .4 on their designated factors, and also those items which loaded heavily (above .3) on

unintended factors. This information was combined with that provided by item range, mean and standard deviation to determine the contribution of each item to its subscale. Any item requiring modification or elimination could then be identified.

Finally, internal consistency was assessed with Cronbach's coefficient alpha, which provides a measure of the degree to which all the items in a scale are interrelated and tap the same construct and is regarded as important component of reliability. Coefficients above .7 are generally regarded as acceptable for psychometric scales, although it is often recommended that values should be above .8 (good) or even .9 (excellent). One of the most useful applications of Cronbach's α is in the development of scales and selection of items. If Cronbach's α changes little when an item is omitted, that item is showing redundancy and is a candidate for removal from the scale (Fayers & Machin, 2000).

4.3.2. Results

4.3.2.1. Item and Subscale Characteristics

Using the criteria to test for insensitive items suggested by Rosenbaum (1980), all the items had standard deviations of more than 1 and a full range of scores was represented in each item. The item format allowed a 1 to 5 response and thus the arithmetic mean response is 3.0. However, the means and standard deviations of the items showed that most of them were distributed higher that the mean. The need therefore to avoid any ceiling effects led to careful consideration of all the items, exclusion of those with the highest mean scores and the lowest standard deviations and rewording of others.

Subscale totals were also higher than is the mathematical mean (Table 4.6). A possible reason may be the fact that the majority of respondents in this study were enjoying good physical and mental health and they had elevated levels of well-being. Furthermore, although in a number of constructs the neutral point of the scale is truly neutral and subjectively distinctive, that does not extend to judgements of satisfaction or happiness (Kahneman, 1999).

Table 4.6. The Ageing Well Profile [version 1] subscale means and standard deviations

Subscale/Item	M	Mathematical Mean	SD
Developmental Well-being	4.10	3	1.23
Mental Well-being	3.81	3	1.21
Physical Well-being	3.76	3	1.31
Social Well-being	3.84	3	1.17

Most people describe themselves as happy (Diener & Diener, 1996), but the meaning of this finding is unclear because a neutral statement of well-being has a distinctly negative connotation. Therefore, there is always a tendency to report higher levels of well-being than the actual ones and this might result in the distribution of the items higher than the mean. However, these results pointed toward the inclusion of the "sort of true for me" statement on the 3rd response in order to help respondents choosing the most accurate response for them (see Table 4.4).

4.3.2.2. Exploratory Factor Analysis

The initial principal components factor analysis revealed twelve factors with eigenvalues more than 1 explaining 70.5 % of the variance. However only four factors presented eigenvalues that explained more than 4% of the variance which was the criterion for consideration of a factor for further analysis.

Therefore, these factors were retained for subsequent analysis. Except for the correlation between factor1-factor2 (.32), all the other factors presented low correlations, therefore it was assumed that the factors are reasonably orthogonal (Appendix II-3). As a result, a four-factor varimax rotated solution was performed in order to achieve a more even distribution of variance accounted for among components, to maximise the loading of some of the items and to produce a better interpretation of the four factors.

The matrix supported the distinct existence of four dimensions of subjective well-being (Appendix II-3). The clearest dimensions so far were the social and the developmental. However, the items Dev1 and Ment6 loaded on an unintended factor, the items Soc3,

Ment9, and Ment13 did not load on any factor, and the items Ph2 and Dev2 loaded significantly on both their intended and on an unintended factor. Therefore, the items that did not meet the criteria were excluded and a new rotation was performed. The analysis revealed that the four factors explained 53.09% of the variance among the subscale items (Table 4.8). Different analyses for male and female were not conducted because (a) the sample was mainly females and statistical analyses could not present meaningful results for the number of male participants and, (b) the qualitative study did not report significant differences in the way that older females and males perceive well-being and its specific dimensions.

The evidence indicated that this four-factor solution provided the most parsimonious reduction of the data, and the item construction of these factors corresponded with that of the intended content of subscales. The only exceptions were the items Ment2, which loaded in the social subscale and was re-worded and retained for further analysis and the item Soc7, which loaded highly in the mental subscale and was also retained for further consideration. Finally, the item Ph2 although it loaded in both the physical and the social subscales was retained for further analysis, as its content was considered important for the physical well-being subscale.

Table 4.8. Factor Structure and Internal Consistency

Scale and item content	Principal Component Factor analysis (varimax rotation)			Reliability analysis
	Loading	Eigen Value	% variance	α
Physical Well-being				
Ph6	.77			
Ph5	.73			
Ph10	.73	6.30	17.04	.87
Ph7	.72			
Ph12	.64			
Ph9	.57			
Ph4	.46			
Ph2	.42			
Social Well-Being				
Soc9	.77			
Soc6	.76			
Soc11	.71	5.66	15.30	.87
Soc10	.68			
Soc1	.55			
Ment2	.55			
Soc4	.54			
Soc8	.54			
Ph2	.50			
Mental Well-being				
Ment8	.60			
Ment3	.56			
Ment12	.55	4.92	13.32	.71
Soc7	.50			
Ment10	.49			
Ment5	.49			
Developmental Well-being				
Dev10	.76			
Dev7	.73			
Dev8	.76	2.74	7.41	.85
Dev6	.64			
Dev3	.64			
Dev11	.66			
Dev9	.61			
Dev13	.49			
Dev5	.46			
Cumulative % variance	**53.09**	**Ageing-Well Profile** [version1] **α**		**.92**

4.3.2.3. Internal consistency

The recorded alphas for the subscales of the 48-item Ageing-Well Profile [version1] were very good (Table 4.9).

Table 4.9. Coefficient Alphas for Subscales of Ageing-Well Profile [version1]

The Ageing-Well Profile	48-Items
Subscale	**Cronbach's α**
Developmental Well-being	.91
Physical Well-being	.92
Mental Well-being	.81
Social Well-being	.89

The next step was the selection of the best items, which will:

1. Sustain high alpha scores. The contribution of each item to internal consistency is presented in Appendix II-4.
2. Have sufficient corrected item-total correlation, which represent the contribution of each item to its subscale total.
3. Contribute to a comprehensive description of the different elements of each subscale. As each subscale consisted of three sub-categories (see Table 4.1), it was decided that subscale should be presented with 2 statements for every sub-category. However, the inclusion of more items was decided when there was need for a better description of some sub-categories.

Following these criteria and the results of the exploratory factor analysis, 31 items were retained for further analysis. Although the reduction in the items of each subscale resulted in lower Cronbach's α in all subscales (Table 4.8), the values were still very good. Mental Well-being had the lowest value (.71) which is acceptable (Fayers & Machin, 2000) and it was decided to be further examined in the next data collection.

In addition to the existing subscales, five more items were developed in order to describe the financial well-being subscale. Although, financial well-being did not appear to be influenced by participation in physical activities in Phase I data, this subscale was

decided to be included in the next data collection. First, as financial well-being is an important element of older adults' well-being it was decided to be included in the questionnaire in order to present a full profile of the respondents' well-being. Second, financial well-being was developed for use as a control/comparison subscale as retired people's financial conditions are not likely to change in such a short time period as a response to physical activities. Therefore, this subscale could be used as a reference scale in order to cross-validate the responses of older participants in administration of the Ageing-Well Profile before and after intervention programmes. Table 4. 10 presents the structure of the 36-items Ageing Well Profile [version2] that was further examined in Phase III studies:

Table 4.10. Sub-categories of the Ageing Well Profile [version 2]

Subscales	Sub-categories		
Developmental **(9 items)**	Personal Development	Adjustment	Independence
Physical **(8 items)**	Health	Fitness	Functionality
Mental **(7 items)**	Mental alertness	Positive-Negative affect	Self-perceptions
Material **(5 items)**	Financial Independence	**Personal Possessions**	
Social **(7 items)**	Social activity	**Contribution**	Social Support

CHAPTER 5

PHASE III

PRELIMINARY VALIDATION OF THE AGEING-WELL PROFILE

5.1. Introduction

Following the preliminary development of the Ageing Well Profile in the studies of Phase II, Phase III aimed to provide further evidence for the psychometric properties of the new instrument. It consisted of 4 studies that explored and confirmed the factor structure, presented the internal consistency and reliability, and examined the convergent validity of the new instrument with well-established inventories. An overview of the procedures in Phase III is set out in Figure 5.2.

Study 1 refined the factor structure of the Ageing Well Profile and provided evidence for its convergent validity.

Study 2 confirmed the factor structure of the hypothesised dimensions, provided further information on its convergent validity and explored its susceptibility to social desirability response bias.

Study 3 examined the correlation of the Ageing Well Profile with a well-being scale designed for older adults.

Study 4 provided initial information on the test-retest reliability of the 18-item final form of the Ageing-Well Profile.

Figure 5.1. Flow chart of Phase III procedures

Purpose	Procedure	Data Collection	Data analysis
Study 1: Refinement of factor structure and convergent validity			
a). Factor Structure	Exploratory Factor Analysis [EFA]	154 older adults Mean age = 68.5, SD= 5.3	Item and subscale characteristics EFA with varimax rotation
b). Reliability	Internal Consistency		Cronbach's alpha
c). Convergent validity	1. Satisfaction with Life Scale (Diener, 1985) 2. The Self-Esteem Scale (Rosenberg, 1965)		Pearson Product Moment Correlation (r)
	Questionnaire Development (d) ***5 Subscales – 14 subcategories-31 items***		
Study 2: Confirmatory factor analysis and social desirability- The University of Third Age Study			
a) Factor Structure	1. Exploratory Factor Analysis [EFA]	298 older adults Mean age = 68.5, SD= 6.5	Item and subscale characteristics EFA with varimax rotation
	2. Confirmatory Factor Analysis [CFA]		CFA with EQS
b) Reliability	Inernal Consistency		Cronbach's alpha
c) Convergent validity	1. PSPP clinical version 2. Bachman Revision of Rosenberg' Self-Esteem Scale (Bachman, 1970)		Pearson Product Moment Correlation (r)
d) Social Desirability	3. Marlow-Crowne Social Desirability Scale (Reynolds, 1982)		
	Questionnaire Development (e) ***4 Subscales - 12 subcategories-18 items***		
Study 3: Convergent Validity			
Convergent validity	Philadelphia Geriatric Morale Scale (Lawton, 1975)	112 older adults Mean age=66.6, SD=5.1	Pearson Product Moment Correlation (r)
Study 4: Test-Retest Reliability			
Test-retest reliability	The Ageing-Well Profile [final version]	31 older adults Mean age=67.61, SD=8.3	Pearson Product Moment Correlation (r) Intraclass Correlation Coefficient (ICC)

5.2. Study 1. Refinement of factor structure and convergent validity

The aim of this study was to confirm and refine the initial factor structure through a new data set and to compare the new measure with other established measures of similar constructs in order to establish its convergent validity.

5.2.1. Method

Sample. Participants in this study were 135 females and 19 males (mean age=68.5, SD=5.3). All the participants were retired and 90% were participating at least once per week in a wide variety of organised physical activities (Table 5.1).

Table 5.1. The demographic characteristics of the participants

Characteristics	Percentage %
Marital Status	
Married	67.5
Widowed	24.7
Single/Divorced	7.8
Highest education attended	
Secondary	43.5
Further education	37
University	19.5
Health Conditions (last 6 months)	
0	68.2
1	23.4
2	6.5
3-4	1.9
Participation in organised physical activities	
<1 day/week	9.1
1 day/week	29.2
2 days/week	33.1
3 days/week	20.8
4 + days/week	7.8

Data Collection

A). **The Ageing-Well Profile** [version2] included 36 items and had the following differences from theAgeing-Well Profile [version1].

Response set. The "sort of true" statement was included in the 5-point Likert scale:

Not really true for me		Sort of true for me		Really true for me
O	O	O	O	O

Time reference. The time reference was changed from 2 months to 1 month, as recalling information from the last 4 weeks is easier for older adults. Furthermore, one of the primary aims of this instrument is to be used as an evaluative tool in intervention studies, therefore the one month time reference was decided to be used instead of two months in order to form the instrument on tapping changes in well-being accruing from participation in intervention programmes. The 1-month format was also expected to capture a more specific level of well-being than more general formats that ask respondents to rate themselves on how they usually feel. Such a time format would largely reflect personality influences on well-being and therefore, it was though that the 1-month format could help in avoiding this. Finally, the shorter time period was thought to help older adults to give more accurate responses for the specific dimensions rather than providing more global estimations of their well-being.

B). **Demographic questions.** A question regarding the health conditions that participants have been diagnosed within the past 6 months in order to examine the relationship of their health condition with their levels of well-being was included.

C). **The Satisfaction with Life Scale** (Diener et al., 1985). The Satisfaction with Life Scale [SWLS] is a self-administered questionnaire with five non-specific items on a seven-point scale aimed at assessing global life satisfaction (Appendix III-1). Life satisfaction is an important element of subjective well-being (Diener et al., 1999) and moderate positive correlation between the subscales of the Ageing Well Profile and the SWLS was expected.

D). **The Self-Esteem Scale** (Rosenberg, 1965). The Self-Esteem Scale is a self-administered questionnaire with 10 items on a four-point scale aimed at assessing

global self-esteem (Appendix III-1). High self-esteem has been related to life satisfaction, independence, adaptability whereas low self-esteem is associated with depression, trait anxiety, suicidal ideation and low perceived personal control (Fox, 2000). Self-esteem is widely accepted as one of the strongest contributors of subjective well-being and an important element of quality of life (Diener, 1984) and therefore moderate positive correlation was expected between the Self-Esteem Scale and the dimensions of the Ageing-Well Profile, especially the mental and developmental well-being.

Procedures. 300 questionnaires were mailed to the "Supers" group members at the University of Stirling Sports Centre, and to participants of private 50+ activity groups in the area of Stirling. The returned questionnaires were 154 (response rate = 51.3 %). Respondents participated voluntary in the study after a brief presentation of the scope and the aims of the study by the managers of the physical activity settings.

Data analysis

Principal Components Factor Analysis was used to determine the best factor solution. A minimum criterion of 4% explained variance was adopted for a factor to be considered. Finally, the items loading in each factor had to form a clearly interpretable orientation, enabling the factor to be readily labeled.

The internal consistency of the whole instrument and separately for each scale was assessed through Cronbach's coefficient alpha.

In order to examine the convergent validity of the Ageing-Well Profile bivariate correlations were computed between the new instrument, the Satisfaction with Life Scale and the Self-Esteem Scale. Convergent validity was expected between the two measures and those subscales that represent similar constructs. Separate correlations were computed a) for each subscale and b) the overall score of the Ageing Well Profile with the two other measures.

5.2.3. Results

5.2.3.1. Item and subscale characteristics

All the items had standard deviations of more than 1 except Dev1, Dev7, Dev9, Ph4, Ment1, Fin1, Fin2, Fin3, Fin4, Fin5, Soc1. A full range of scores was represented in each item except Dev1, Dev7, Ph4, Ment1, Fin1, Fin3, Fin4, Soc1. Subscale means were also higher than the mathematical mean (3) (Table 5.2).

Table 5.2. The Ageing-Well Profile [version2] and Subscale means

Subscales	M	SD
Developmental Well-being	4.3	.47
Physical Well-Being	4.0	.74
Mental Well-being	4.2	.70
Social Well-being	4.0	.85
Financial Well-being	4.7	.58

Cummins' meta-analysis of 16 studies containing data on life satisfaction reported that the mean scores expressed as '% of scale maximum' (%SM) were within 70-80% SM (Cummins, 1995). The mean value for the Ageing-Well Profile [version2] was 82.75% without and 85% with the financial well-being factor. The participants of this study enjoyed good health and subsequently high levels of well-being as almost 70% did not report any health conditions and 91% participate in organised physical activities at least one per week. This might be a possible explanation for the highly skewed distribution and might be interpreted as an accurate reflection of the sample's subjective well-being. However, the financial well-being subscale presents strong "ceiling" effects with standard deviations <1 for all the items and not a full range of scores for three of its five items. Although, this might reflect the good financial conditions of the participants in this study, this subscale will be further examined in a new data-collection in order to confirm its sensitivity.

5.2.3.2. Exploratory Factor Analysis

Varimax factor rotation restricted the factors such that they should be mutually orthogonal, i.e. the factors obtained following rotation of the axes delineate statistically

independent variation. The first measure of orthogonality was to examine the correlations between the different subscales. In psychometric instrument construction it is commonly accepted that correlations below .60 indicate discriminant validity (Anastasi, 1979). The highest correlation obtained was .30 showing that the scores obtained on each subscale are relatively independent of those obtained on the other scales. The second indicator of independence was that each item should load on one factor (>.30) and not on the others (Rummel, 1970). As shown in Table 5.3., there is evidence that the Ageing Well Profile possesses these properties. The results revealed unidimensionality for all the subscales except the mental well-being scale that formed two factors. However, when ment3, which loaded also (>.4) in another factor, was omitted, the mental well-being subscale formed one factor.

Table 5.3. Factor Structure and Internal Consistency

Scale and item content	Principal Component Factor analysis (varimax rotation)			Reliability analysis
	Loading	Eigen Value	% variance	α
Physical Well-being				
Ph4	.81			
Ph7	.79			
Ph3	.74	5.64	20.89	.82
Ph8	.68			
Ph2	.68			
Ph5	.61			
Social Well-Being				
Soc3	.90			
Soc7	.88	3.39	12.57	.87
Soc5	.85			
Soc2	.65			
Soc4	.64			
Financial Well-being				
Financial5r	.80			
Financial3	.78	2.94	10.89	.82
Financial1	.78			
Financial4	.75			
Financial2r	.65			
Mental Well-being				
Mental3	.76			
Ment4	.74	2.16	8.01	.74
Ment5	.69			
(Ment2)	(.63)			
Ment7	.49			
Developmental Well-being (1)				
Dev5	.68			
Dev8	.65	1.52	5.63	.51
Dev7	.63			
Ment6	.62			
Developmental Well-being (2)				
Dev4	.68	1.29	4.78	.40
Dev9	.61			
Cumulative % variance	**62.79**		**Ageing-Well Profile α**	**.84**

Table 5.4. Factor structure of individual scales

Subscale	Eigen Value	% Explained Variance
Physical Well-Being	3.40	56.81
Social Well-being	3.38	67.60
Financial Well-being	2.98	59.67
Mental Well-being	2.12	53.13
Developmental Well-being (1)	2.00	50.00
Developmental Well-being (2)	1.25	62.53

Interpretation of the factors. The Ageing Well Profile [version2] was designed with 5 subscales representing the 5 dimensions of subjective well-being as they emerged in the Phase I study. However, in this data collection a new subscale emerges. Developmental well-being appears to split into two subscales influencing also mental well-being. While factor analysis identifies latent factors within groups of variables, it does not provide an interpretation of the meaning of each factor. An accepted practice in psychometrics is to ascertain the primary theme of a factor through examination of the content of those items with the highest loadings. Where the items' content is consistent with the hypothesised conceptual structure it provides evidence that the scale is a valid representation of this structure. The brief descriptions appearing at the heading of each factor (Table 5.3.) were based on the interpretation of the items. Table 5.5 compares the hypothesised model of subjective well-being to the empirically derived model. These are broadly consistent with the exception of the Developmental Well-being.

Table 5.5. Comparison of hypothesised dimensions and dimensions derived empirically

Hypothesised dimensions of subjective Well-being	Empirically derived dimensions of subjective well-being
Physical Well-being *Health-Fitness-Functionality*	Physical Well-being *Health-Fitness-Functionality*
Social Well-being *Social activity-Contribution-Social Support*	Social Well-being *Social activity-Contribution-Social Support*
Financial Well-being *Financial Independence* *Personal Possessions*	Financial Well-being *Financial Independence* *Personal Possessions*
Mental Well-being *Mental alertness-Positive & Negative affect-Self-perceptions*	Mental Well-being *Mental alertness-Negative affect*
Developmental Well-being *Personal development-Adjustment-Independence*	Developmental 1 *Personal development-Self-perceptions*
	Developmental 2 *Independence*

Physical Well-being was hypothesised to consist of health, fitness and functionality and express the extent to which older adults feel that they have good physical health and a body that is fit and working well. The analysis showed that this construct was supported with six items from all the hypothesised elements.

Social Well-being was hypothesised to consist of social activity, contribution and social support and express the extent to which older adults enjoy a socially active life. The analysis showed that this construct was supported with five items from all the hypothesised elements.

Financial Well-being was hypothesised to consist of financial independence and personal possessions and express the extent to which older adults enjoy financial security. The analysis showed that this construct was supported with all the items from its hypothesised elements.

Mental Well-being was hypothesised to consist of mental alertness, positive & negative affect and self-perceptions expressing the extent to which older adults are mentally alert and have a positive rather than negative attitude about themselves and their life in general. The analysis provided moderate support for this construct with four items from two of the hypothesised elements, the mental alertness and the negative affect.

Developmental Well-being was hypothesised to consist of personal development, adjustment and independence and express the extent to which older adults feel able to develop themselves, adjust to changes in their life and maintain a busy and active lifestyle. The analysis showed that this dimension forms two different factors, which are supported with five items from two of the hypothesised elements and one item from the mental well-being factor.

a) Developmental Well-being 1 consists of personal development and self-perceptions expressing the extent to which older adults feel able to develop themselves and are confident about themselves. This construct was supported with three items of the

developmental well-being construct. An item referring to self-confidence (from the hypothesised mental well-being dimension) loaded on this factor. This was consistent with the theme of this factor and remained for further psychometric testing.

b) Developmental Well-being 2 consists of autonomy and independence expressing the extent to which older adults do not rely on others and manage on their own for most things they need. The analysis showed that this construct was supported with two items of the independence element of the developmental well-being construct.

These results stress that the empirically derived six-factor model required further psychometric analysis. A new data collection was therefore necessary to examine the stability of the factor structure and to verify the interpretation of the derived factors.

5.2.3.3. Internal consistency

The internal consistency of each of the five scales ranged from α= 0.87 (Social Well-being Scale) to α= 0.40 (Developmental 2 Well-being Scale). With respect to the internal consistency of the entire instrument the Cronbach α was 0. 84 (Table 5.2). Although the internal consistency of the Ageing-Well Profile ^{version2} and that of the Physical, Social, Financial and Mental Well-being subscales was good, the low α's of the two developmental subscales (0.4-0.51) demonstrated that the developmental well-being subscale required further development. Therefore, before testing its structure and consistency with a new data collection:

- two new items were developed to support the developmental 2 subscale and
- four items were re-worded in order to express more accurately the hypothesised developmental factor

5.2.3.4. Convergent validity

To examine the convergent validity of the Ageing-Well Profile^{version2}, the subscales and the entire instrument were correlated with the Self-Esteem Scale (Rosenberg, 1965) and the Satisfaction with Life Scale (Diener et al., 1985) (Table 5.6).

Table 5.6. Correlations between subscales of the Ageing-Well Profile[version2] and the Self-Esteem and Satisfaction with Life Scales

Subscales	Self-Esteem Scale	Satisfaction with Life Scale
Physical Well-Being	.16	.12
Social Well-being	.25**	.27**
Financial Well-being	.20*	.10
Mental Well-Being	.43**	.33**
Developmental Well-being 1 *Personal development-Self-perceptions*	.54**	.40**
Developmental Well-being 2 *Autonomy-Independence*	.25**	.32**
Ageing-Well Profile[version2]	.50**	.41**

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

The correlations between the Self-Esteem Scale and each of the subscales of the Ageing-Well Profile[version2] were moderate with the exception of physical well-being. The strongest correlations were with the Developmental-1 and the Mental well-being subscales as expected. Both these subscales are close in meaning with the Self-Esteem Scale. First, Developmental Well-being-1 expresses the extent to which older adults feel able to develop themselves and are confident about themselves. Second, Mental Well-being expresses the extent to which older adults have a positive attitude about themselves and their life in general.

The correlations between the Satisfaction with Life Scale and each of the subscales of the Ageing-Well Profile[version2] were also moderate with the exception of the Physical and Financial Well-being subscales. Financial Well-being is the only subscale that does not refer to psychosocial elements of well-being and this would explain the low or no correlation with the two measures. Furthermore, in the qualitative study older adults who had adequate resources did not find life satisfaction through further accumulation of material things. Therefore, in agreement with other studies, these findings do not support a strong relationship between material resources and subjective well-being (Diener et al., 1999) .

Interesting also is the lack of correlation between the Physical Well-being subscale with both the Self-Esteem Scale and the Life with Satisfaction Scale. This could be explained by the fact that the participants in this study enjoy a fairly good health, they are not experiencing health conditions that could affect their satisfaction with life or their self-esteem and therefore, they may not connect physical and mental aspects of well-being directly. Although we would expect at least a low correlation, the reported high levels of well-being do not allow enough variance and therefore, further studies with groups of people with various levels of well-being could probably present a different pattern in the correlation between the physical well-being and the two scales. Further examination is also required through validation studies with measures that include subscales relevant to physical aspects of well-being.

Finally, the two measures are positively correlated with the entire Ageing-Well Profile [version2]. However, their moderate correlation could be explained by the fact that these measures refer to global constructs which are strongly related with personality characteristics whereas the Ageing-Well Profile refers to specific elements and through the 1-month response frame it reduces the influence of personality characteristics.

5.3. Study 2. The University of Third Age Study

The aim of this study was to further refine and confirm the factor structure of the Ageing-Well Profile including modifications to the developmental well-being subscale, to further explore its convergent validity and to determine its potential for social desirability biases.

5.3.1. Method

Sample. Participants in this study were 225 female and 75 male (mean age=72.14, SD=9.1). All the 298 participants were retired, members of the University of Third Age [U3A] and 51.3% were participating at least once per week in a variety of organised physical activities (Table 5.7).

Table 5.7. The demographic characteristics of the participants

Characteristics	Percentage %
Marital Status	
Married	40.9
Widowed	35.9
Single/Divorced	23.2
Highest education attended	
Secondary	21.8
Further education	32.2
University	46.0
Health Conditions (last 6 months)	
0	54.7
1	24.8
2	14.4
3-4	6.1
Participation in U3A groups	
0	19.1
1	38.9
2	26.5
3	11.1
4-6	4.4
Participation in organised physical activities	
Seldom	49.7
1 day/week	23.2
2 days/week	14.1
3 days/week	7.8
4+ days/week	5.4

Data Collection

A). **The Ageing-Well Profile** [version3] included 37 items and had the following differences from the Ageing-Well Profile [version2.]

Item generation. Four new items were included:

Two in the developmental well-being subscale: "Getting through everyday activities has been difficult" and "I have been able to take good care of my self"

One in the mental well-being subscale: "I have been in a good mood more often than not" and,

One in the social well-being subscale: "My social life has not been as good as I would have liked".

B). **Demographic questions.** A question regarding the participation in U3A activity groups (e.g. music, poetry, painting, language, reading) was included to investigate the frequency and the type of participation of members of U3A in activities other than physical ones.

C). **The Bachman Revision of Rosenberg's Self-Esteem Scale** (Bachman, 1970). The Bachman revision [RSE-B] is a self-administered questionnaire with ten items (six from the Rosenberg's Self-Esteem Scale and four added by Bachman) on a five-point scale (Ranzijn, Keeves, Luszcz, & Feather, 1998) (Appendix III-1). The wording of the four replacement scale items emphasises usefulness and competence, while the four that were replaced (Rosenberg, 1965) describe positive self-regard. The concepts of usefulness, competence and achievement have lately received increasing attention in the gerontological literature. Ranzijn et al. (1998) concluded that although this scale was not specifically designed for older adults, usefulness/competence may be an important predictor of older adults' well-being and that this scale could be employed in further research with older adults. Therefore, the RSE-B Scale was used to further validate the Ageing-Well Profile as its correlation with the subscales of the Ageing-Well Profile was thought to be an important indicator of the convergent validity of the new instrument. Correlations were expected particularly with the Developmental and Mental Well-being

subscales and also with the Physical Well-being subscale as the RSE-B includes items reflecting competence, which is related with functionality.

D). **The Physical Self Perception Profile [PSPP]** (Fox & Corbin, 1989). The PSPP is a 30-item psychometrically sound self-report instrument on a 4-point structured alternative scale (Byrne, 1996), comprising four domain specific subscales. These subscales measure perceived sport competence, body attractiveness, physical strength, and physical condition and there is also one more subscale that taps a global perception of overall physical self-worth. Based on the PSPP (Fox & Corbin, 1989) and on the PSPP older adults' version (Chase, 1991), a shorter clinical version was available and used in this study. The PSPP clinical version is a 19-item self-report instrument including three of the PSPP original subscales measuring sport competence, body attractiveness, physical strength, two subscales measuring physical health and functionality taken from Chase and a global subscale measuring physical self-worth (Appendix III-1). Physical self-perceptions are related with self-esteem which is widely accepted as one of the strongest predictors of subjective well-being and an important element of quality of life (Diener, 1984; Fox, 2000). Therefore, a correlation between the PSPP clinical version and the subscales of the Ageing-Well Profile would indicate the convergent validity of the new instrument. Strong correlation was expected between the Health/Function subscale and the Physical Well-being subscale. The weakest correlation was expected between the sport competence and all the subscales of the Ageing Well-Profile. Finally, the Physical Self-Worth subscale was expected to correlate with both the subscales individually and the summed score of the Ageing-Well Profile as it carries well-being properties in its own right (Fox, 2000).

E) **The Social Desirability Scale** (Reynolds, 1982). A validity problem which plagues well-being measurement is the influence of a social desirability response bias (Katula et al.,). In order to test the tendency of respondents to bias their responses in the Ageing-Well Profile, their scores were correlated with scores on the short form of the Marlow-Crowne Social Desirability Scale (Reynolds, 1982).

Procedures. The University of Third Age is a non-profit organisation that offers a wide range of courses and activity groups for older adults and operates as a network throughout UK and abroad. After a presentation of the scope of this study, the president of the U3A allowed access to the member list of the U3A in Bristol. Following that, 495 questionnaires (including the instruments, a letter of the president of U3A and a letter of the Head of the Department of Exercise and Health Sciences) were mailed to all the members of the U3A in Bristol. The returned questionnaires were 298 (response rate = 60.2 %).

Data analysis

Exploratory Factor Analysis [EFA] was used to determine the best factor solution. The highest correlation between factors was .32 (F1-F2) and therefore it was assumed that factors were reasonably orthogonal and Principal Component Factor Analysis with varimax rotation was performed. A minimum criterion of 4% explained variance was adopted for a factor to be considered.

Confirmatory Factor Analysis [CFA] was used as a more sensitive and sophisticated method in order to both refine the factor structure of the Ageing-Well Profile and cross-validate the composition of the latent factors selected in the EFA to represent the hypothesised model of subjective well-being (Figure 5.2.). The hypothesised model can be tested statistically in an analysis of the entire system of variables to determine the extent to which it is consistent with the data. If goodness of fit is adequate, the model argues for the plausibility of postulated relations among variables; if it is inadequate, the tenability of such relations is rejected (Byrne, 1994). Given its sole interest in the link between factors and their measured variables, the CFA model is considered to represent the measurement model. CFA procedures were employed to test the viability and stability of the derived model through the method of maximum likelihood using EQS 5.7 for Windows (Bentler, 1992).

The internal consistency of the whole instrument and separately for each scale was assessed through Cronbach's coefficient alpha.

In order to examine the convergent validity of the Ageing-Well Profile, bivariate correlations were computed between the new instrument, the Bachman Revision of Rosenberg's Self-Esteem Scale and the Physical Self Perception Profile [PSPP] short clinical version. Separate correlations were computed for each subscale and the overall score of the Ageing Well Profile with the two other measures. Finally, bivariate correlations were computed between the subcales of the new instrument and the Marlow-Crowne Social Desirability Scale Short Form.

All statistical analyses were performed with the SPSS 8.0 for Windows with the exception of Confirmatory Factor Analysis which was performed with the EQS 5.7/Windows (Bentler, 1992).

5.3.2.Results

5.3.2.1. Item and subscale characteristics

All items had standard deviations of more than 1 except Fin5 and a full range of scores was represented in all the items. Subscale means were also higher than is the mathematical mean (3) (Table 5.8).

Table 5.8. The Ageing-Well Profile [version3] Subscales' characteristics

Subscales	Mean	SD
Developmental Well-being/ *Personal development-self-perceptions*	3.7	.88
Developmental Well-being/ *Independence*	3.9	.97
Physical Well-Being	3.5	.93
Mental Well-being/ *Mental alertness-negative affect*	3.9	.90
Social Well-being	3.5	.97
Financial Well-being	4.3	.83

The mean value for the Ageing-Well Profile [version 3] as a '% of scale maximum' (%SM) is 74.4% without and 76.2% with the financial well-being factor which is lower than the previous study where 90% of the participants were physically active. 55% of the respondents in this study did not report any health conditions, 81% participated in variety of U3A activity groups and 50% took part in regular physical activities. The distribution in this study although skewed, is not so high as in the previous study and it might be interpreted as an accurate reflection of the sample's subjective well-being which in this case are older and less physically active adults compared to the Study 1 sample. However, the financial well-being subscale presents "ceiling" effects with standard deviations <1 in one of the items and a mean > 4.0. Further psychometric analysis through EFA and CFA is required in order to decide whether the financial well-being subscale will be retained in the Ageing-Well Profile.

5.3.2.2. Exploratory Factor Analysis

The decision between oblique and orthogonal rotation was made by requesting principal factor extraction with oblique rotation of six factors. The highest correlation (.33) was between Developmental-1 and Financial Well-being factors. The level of this correlation can be considered appropriate for accepting an orthogonal solution versus dealing with the complexities of interpreting an oblique solution (Tabachnick & Fidell, 1996). Therefore, the simpler, orthogonal, solution was chosen. Each of the six subscales was then independently subjected to principal components analysis which revealed unidimensionality for all the subscales (Table 5.10).

Table 5.9. Factor Structure and Internal Consistency

Scale and item content	Principal Component Factor analysis (varimax rotation)			Reliability analysis
	Loading	Eigen Value	% variance	α
Mental Well-being/				
Positive Aspects				
Ment7	.83			
Ment8	.80			
Dev1	.59	3.14	11.23	.79
Ment5	.53			
Physical Well-being				
Ph4	.78			
Ph5	.77			
Ph3	.74	3.03	10.82	.81
Ph6	.68			
Ph1	.68			
Social Well-Being				
Soc2	.85			
Soc1	.81			
Soc5	.78	2.95	10.31	.86
soc4	.49			
Mental Well-being/				
Negative Aspects				
Mental2	.83			
Ment4	.73			
Ment1	.64	2.75	9.80	.78
Ment3	.62			
Ment6	.52			
Financial Well-being				
Financial5	.81			
Financial2	.73			
Financial3	.66	2.31	8.24	.74
Financial4	.59			
Developmental Well-being/				
Independence				
Dev9	80			
Dev4	.76	2.07	7.39	.73
Dev11	.57			
Cumulative % variance	**58.02**		**Ageing-Well Profile α**	**.87**

Table 5.10. Factor structure of individual scales

Subscales	Eigen Value	% Explained Variance
Physical Well-Being	3.06	50.95
Social Well-being	3.16	63.21
Financial Well-being	2.27	56.67
Mental Well-being/*Negative aspects*	2.66	53.14
Mental Well-being / *Positive aspects*	2.86	57.26
Developmental Well-being/*Independence*	1.94	64.65

Interpretation of the factors. The Ageing Well Profile [version3] was designed with 6 subscales representing the 6 dimensions of subjective well-being as they emerged in the Study 1/Phase III. The empirically derived dimensions of subjective well-being are broadly consistent with the dimensions of study 1 (Table 5.11).

However, from the 31-item Ageing-Well Profile [version 3], six items were omitted, as they did not meet the criteria for inclusion in the factor structure. Therefore, any subsequent analyses were based on the 25-item version of the Ageing-Well Profile which derived from the exploratory factor analysis.

Table 5.11. Comparison of dimensions derived empirically in Studies 5.1 and 5.2

Empirically derived dimensions of subjective well-being [Study 1]	**Empirically derived dimensions of subjective well-being [Study 2]**
Physical Well-being *Health-Fitness-Functionality*	Physical Well-being *Health-Fitness-Functionality*
Social Well-being *Social activity-Contribution-Social Support*	Social Well-being *Social activity-Contribution-Social Support*
Financial Well-being *Financial Independence* *Personal Possessions*	Financial Well-being *Financial Independence* *Personal Possessions*
Mental Well-being *Mental alertness-Negative affect*	Mental Well-being *Negative aspects* *(Mental alertness-Negative feelings)*
	Mental Well-being *Positive aspects* *(Personal development-Self-perceptions)*
Developmental Well-being *Personal development-Self-perceptions*	
Developmental Well-being *Independence*	Developmental Well-being *Independence*

Physical Well-being was hypothesised to consist of health, fitness and functionality. The analysis showed that this construct was supported with six items from all the hypothesised elements.

Social Well-being was hypothesised to consist of social activity, contribution and social support. The analysis showed that this construct was supported with five items from all the hypothesised elements.

Financial Well-being was hypothesised to consist of financial independence and personal possessions. The analysis showed that this construct was supported with four of all the hypothesised elements.

Although the Mental and Developmental Well-being factors maintained their hypothesised elements, the items' content led to a restructure of these factors. First, *Mental Well-being* consists of two dimensions:

- Positive aspects express the extent to which older adults have positive self-perceptions and are in good mood and satisfied with their life
- Negative aspects express the extent to which older adults have difficulties in cognitive function and deal with feelings of loneliness and isolation

Second, *Developmental Well-being* expresses the extent to which older adults do not rely on others and maintain independence and autonomy in the way they lead their everyday life.

The internal consistency of each of the five scales ranged from $\alpha = 0.86$ (Social Well-being Scale) to $\alpha = 0.73$ (Developmental Well-being Scale). With respect to the internal consistency of the entire instrument the Cronbach α was 0. 87 (Table 5.9).

5.3.2.3. First Order Confirmatory Factor Analysis Model

In the hypothesised dimensions of subjective well-being, financial well-being was the only dimension not influenced from participation in physical activities. It was developed as a control-subscale and in all three data collections presented strong ceiling effects and standard deviation <1. Therefore, CFA was performed in two models:

- A six factor solution including financial well-being

- A five-factor solution excluding financial well-being

In CFA, the assessment of the fit of a model is based on the relative importance attached to the various indices produced by the statistical programme used, a debate that is at present unresolved (Marsh, 1996). Some authorities consider that the best indicator is the root-mean-square error of approximation (RMSEA), which should be below .05 and as low as possible. One model also is considered better than other models if its χ^2 value is lower, the χ^2/df ratio is lower, and the goodness-of fit indices are higher, close to 1.00 that the other models' values (Ranzijn et al., 1998). However, the final determination of best fit should be theoretically based as well as statistically driven (Hertzog, 1990).

Table 5.12. Summary fit statistics for Ageing -Well Pofile model testing

	χ^2	S-B χ^2	RMSEA	RMR	χ^2/df	S-B χ^2/df	CFI	R-CFI	GFI	IFI
6-Factor Model	663.10	543.88	0.06	0.098	2.15	1.76	.88	.90	.85	.88
5-Factor Model (a)	357.34	294.73	0.06	.08	2.23	1.84	.91	.93	.88	.91
5-Factor Model (b)	286.79	237.51	.059	.08	2.01	1.67	.93	.949	.90	.93
5-Factor Model (c)	213.58	176.90	.049	.07	1.70	1.41	.95	.97	.92	.95

Six-factor model. The CFA 6-factor model hypothesised a priori that (a) responses to the Ageing-Well Profile could be explained by six factors, (b) each item would have a non-zero loading on the factor it was designed to measure and zero loadings on all other factors, (c) the six factors would be uncorrelated, and (d) measurement error terms would be uncorrelated.

The univariate statistics revealed that dev11, fin2, fin3, fin4, fin5 and the soc4 variables demonstrated significant nonzero univariate kurtosis. Furthermore, in the multivariate sample statistics the value of the normalised estimate (33.301) is highly suggestive of

nonnormality in the population. The effect of these kurtotic variables may be sufficient for the distribution to be multivariately non-normal, thereby violating the underlying assumption of normality associated with the maximum likelihood method of estimation. Violation of this assumption can invalidate statistical hypothesis testing, with the result that the normal theory test statistic (χ^2) may not reflect an adequate evaluation of the model under study. Hu, Bentler, and Kano (1992) have argued that it may be more appropriate to correct the test statistic than to use a different mode of estimation. Therefore, the robust statistics was used providing the Satorra-Bentler scaled statistics (S-Bχ^2) shown to be the most reliable test statistic for evaluating covariance structure models under various distributions and sample sizes (Byrne, 1994).

According to the summary fit statistics for the 6-factor model, the S-Bχ^2 is substantially lower than the uncorrected x^2 providing evidence that the sample was indeed nonnormally distributed. Although the S-Bχ^2 is lower that the uncorrected x^2 in all derived models, the size of the difference is higher in the 6-factor model stressing the influence of the financial well-being variables (Table 5.12). All the goodness-of-fit values for the six-factor model are clearly indicative of an ill-fitting model. Thus it is apparent that some modification in specification is needed in order to determine a model that better represents the sample data.

Five-factor model (a). The summary fit statistics indicate that the exclusion of the financial well-being variables without any other modification was enough to result in a highly significant improvement in model fit ($\Delta\chi^2$ =305.757). Most of the indices reflect this improvement. Furthermore, the estimates converged after only 7 iterations, with negligible change following the second one, indicating that model specification was on target. Therefore, the six-factor model was rejected and the five-factor model was retained for further modifications in the interest of achieving a better fit.

Five-factor model (b). Modifications were made based on the Lagrange Multiplier Test (LM Test) for malfitting parameters. The review of the univariate increments for the fixed parameters demonstrated that the largest increments are associated with six

covariances and two factor loadings. However, as it was hypothesised that the measurement error terms would be uncorrelated modifications were made with respect to the two variables that appear to load in an unintended factor (Dev1-Ment3). First, the exclusion of Developmental1 was decided in order to enable the Mental Well-being/Positive Aspects factor to be easily interpreted. The goodness-of-fit model supported that decision as all indices improved, presenting a better fitting model (Table 5.12).

Five-factor model (c). The final modification on this model was the exclusion of the Mental3. That led to the best fitting model and any further modification were considered unecessary (Table 5.12). The λ values and the standardised beta coefficients from the CFA analysis are presented in Table 5.13. Finally, the internal consistency of each of the five scales ranged from $\alpha = 0.86$ (Social Well-being Scale) to $\alpha = 0.73$ (Developmental Well-being Scale, Mental Well-being/Positive Aspects). With respect to the internal consistency of the entire instrument the Cronbach α was 0. 85 (Table 5.13).

Table 5.13. CFA (maximum likelihood solution) for Ageing-Well Profile

Scale and item content	λ	R^2	α
Mental Well-being/Positive aspects			
Ment7	.87	.76	
Ment8	.75	.56	.79
Ment5	.67	.45	
Physical Well-being			
Ph4	.85	.72	
Ph3	.75	.56	
Ph5	.66	.43	.81
Ph1	.57	.33	
Ph6	.54	.29	
Social Well-Being			
Soc2	.88	.78	
Soc1	.79	.63	.86
Soc4	.79	.62	
Soc5	.66	.45	
Mental Well-being/Negative aspects			
Mental2	.80	.64	
Ment4	.73	.53	.73
Ment1	.56	.31	
Developmental Well-being			
Dev9	.73	.53	
Dev4	.66	.44	.73
Dev11	.66	.43	
Ageing-Well Profile final version	α		**.85**

5.3.2.4. Second Order Confirmatory Factor Analysis Model

Purpose of the second-order CFA was to provide evidence for the measured dimensions to reflect the hypothesised superordinate structure of subjective well-being in older adults. As such, the CFA model hypothesised a prori that (a) responses to Ageing-Well Profile can be explained by five first-order factors (Developmental, Physical, Mental/Positive, Mental/Negative, Social) and one second-order factor (Subjective Well-being), (b) covariation among the five first-order factors will be explained fully by their regression on the second-order factor. A diagrammatic representation of this model is presented in Figure 5.2.

The hypothesised dimensions of Subjective Well-being consisted of four first-order factors (Developmental, Physical, Mental, Social) that are influenced from participation in physical activities, one more first-order factor (Financial) which is not sensitive to physical activity participation and one second-order factor (Subjective Well-being). The results verified the existence of the first order factors with some modifications:

1. After the first-order CFA, the financial well-being subscale was excluded as it resulted in an ill-fitting model. However, the final determination should be theoretically based as well as statistically driven . Therefore, financial well-being subscale was excluded because it is not related with physical activity directly. As a result, its contribution to the Ageing-Well Profile would not be significant because this subscale could not be sensitive to well-being changes resulting from activity participation.
2. Mental and Developmental Well-being were, as expected, very close in meaning and during the data analysis their interpretation was slightly changed. Therefore, Developmental Well-being is related with maintenance of autonomy and independence and Mental Well-being consists of two separate factors, the positive aspects and the negative aspects.

All the goodness-of-fit values for the second-order AWP model were clearly indicative of a good-fitting model with similar goodness-of-fit values as the first-order model. In agreement with the hypothesised structure of subjective well-being in older adults the Ageing-Well Profile will be modelled as a superordinate structure (Table 5.14).

Table 5.14. Summary fit statistics for second-order Ageing -Well Pofile model

	χ^2	S-B χ^2	RMSEA	RMR	χ^2/df	S-B χ^2/df	CFI	R-CFI	GFI	IFI
First Order Model	213.58	176.90	.05	.07	1.70	1.41	.95	.97	.92	.95
Second Order Model	223.84	185.15	.05	.08	1.72	1.42	.95	.96	.92	.95

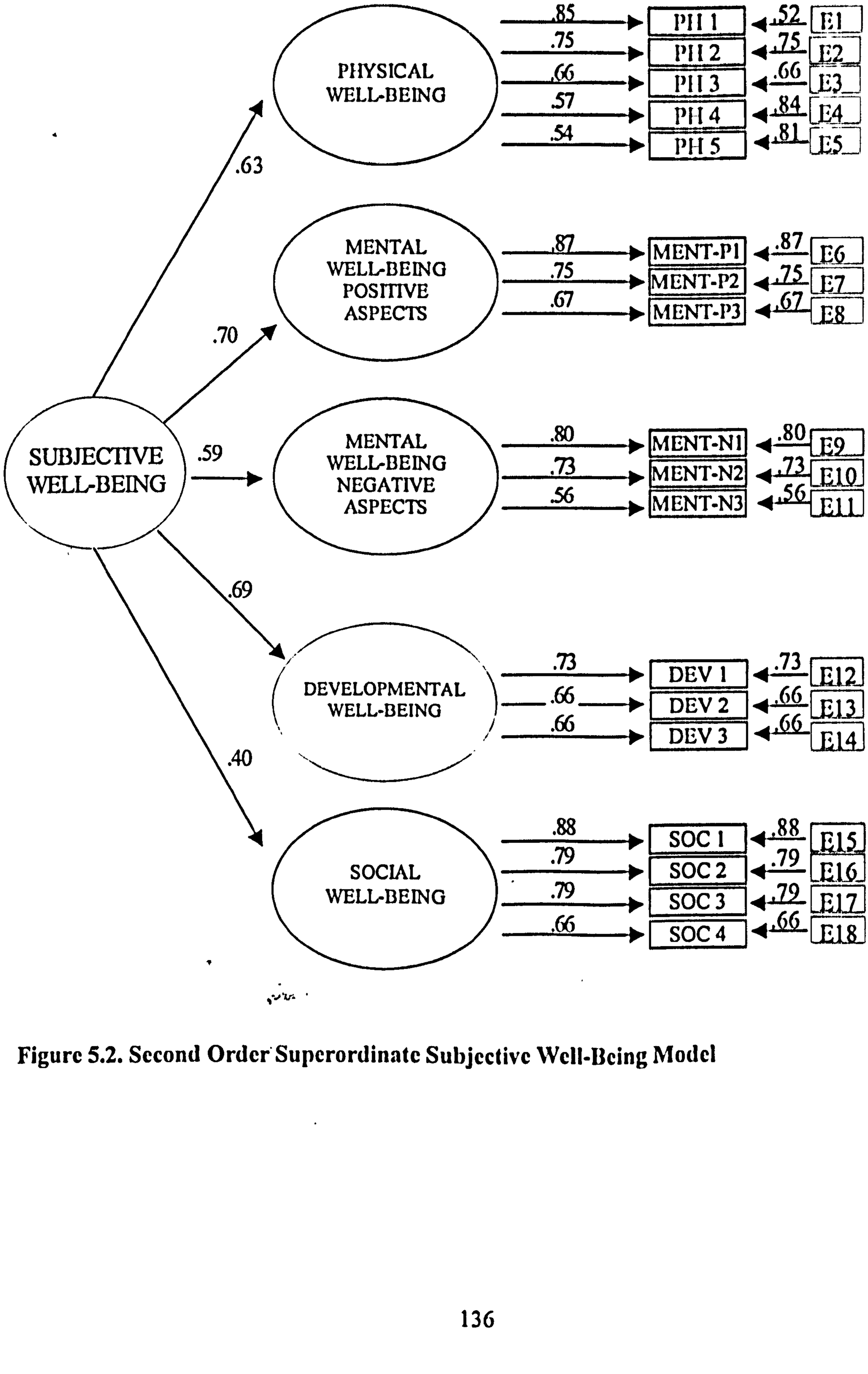


Figure 5.2. Second Order Superordinate Subjective Well-Being Model

5.3.2.5. Convergent validity and social desirability

To examine the convergent validity of the Ageing-Well Profile[version3], the subscales and the entire instrument were correlated with the Bachman Revision of Rosenberg's Self-Esteem Scale [RSE-B], and the Physical Self Perception Profile [PSPP] clinical version (Table 5.15). Finally, the subscales and the entire instrument were correlated with the Marlow-Crowne Social Desirability Scale in order to investigate whether there was a social desirability response bias in participants' responses.

Table 5.15. Correlations Between the subscales of the Ageing-Well Profile[version3] and the RSE-B, PSPP, and Social Desirability Scales

Ageing-Well Profile[version3]	RSE-B	PSPP					Social Desirability
		Sport	Condition	Body	Health ——— Function	Physical Self Worth	
Developmental Well-being/ *Independence*	.33**	.09	.38**	.29**	.48**	.36**	-.13
Physical Well-Being	.33**	.08	.12**	.23**	.66**	.52**	.05
Mental Well-Being/ *Positive aspects*	.49**	.05	.18**	.18**	.33**	.40**	-.03
Mental Well-Being/ *Negative aspects*	.46**	.00	.03	.20**	.28**	.28**	-.08
Social Well-Being	.36**	.01	.16**	.12*	.23**	.38**	.14
Ageing-Well Profile[version3]	.54**					.52**	-.01

**Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

As physical self-perceptions and feelings of control and competence have been related with older adults' well-being in many studies (Diener et al., 1999; McAuley, Blissmer, Katula, Duncan, & Mihalko, 2000; Schulz & Heckhausen, 1996), convergent validity was expected in terms of positive correlations between the Ageing-Well Profile and the two measures.

The correlation between the Bachman Revision of Rosenberg's Self-Esteem Scale and each of the subscales of the Ageing-Well Profile[version2] was moderate supporting the

belief that the RSE-B may be more appropriate for use in older adults than the original scale (Ranzijn et al., 1998). The concepts of positive self-regard and usefulness/competence correlated with all subscales and particularly with the Mental Well-being subscales as it was expected. First, positive aspects express the extent to which older adults have positive self-perceptions and are in good mood and second, negative aspects express the extent to which older adults have difficulties in maintain their mental alertness and deal with lack of worthiness.

The Physical Well-being subscale and the Health/Function subscale of the PSPP correlated strongly and that is justified by the fact that both measures refer to physical aspects of older adults' well-being. The PSPP Sport subscale did not correlate with any of the AWP susbcales as expected. Finally, the Physical Self-Worth subscale correlated with all the subscales and the summed score of the Ageing-Well Profile and with the Health/Function subscale are the only subscales that had moderate correlation with all the AWP subscales.

These results confirm also the conclusion of Study 1 where the lack of strong correlation of the Physical Well-Being subscale with the Self-Esteem Scale and the Satisfaction with Life Scale was explained by the fact that those scales refer to global constructs whereas the PSPP examines specific elements of physical self-perceptions. Finally, the scores of the subscales and the entire AWP were not significantly correlated with social desirability supporting the notion that controlling for a social desirability bias does little to improve the validity of well-being scales (Kozma & Stones, 1987).

5.3. Study 3. Convergent validity

The aim of this study was to further explore the convergent validity of the Ageing-Well Profile with a measure specifically designed for older adults.

5.3.1. Method

Sample. Participants in this study were 58 females and 54 males (mean age=66.6, SD=5.1). All the 112 participants were retired, members of the University of Bristol 50+ activity groups and 75% were participating at least once per week in a variety of organised physical activities (Table 5.16).

Table 5.16. The demographic characteristics of the participants

Characteristics	Percentage %
Marital Status	
Married	87.5
Widowed	10.7
Single/Divorced	1.8
Highest education attended	
Secondary	52.7
Further education	40.2
University	7.1
Health Conditions (last 6 months)	
0	57.1
1	25.0
2	16.1
3-4	1.8
Participation in organised physical activities	
<1 day/week	25.0
1 day/week	33.9
2 days/week	23.2
3 days/week	12.5
4+ days/week	5.4

Data Collection

A). The Ageing-Well Profile [final version] (Appendix III-2).

B). The Philadelphia Geriatric Center Morale Scale [PGCMS] (Lawton, 1975). The PGCMS is a self- or interviewer-administered questionnaire developed for use with older adults. The original scale has 22 items and the revised form has 17 items mostly dichotomous coded (Morris & Sherwood, 1975). The PGCMS was developed on the basis of the assumption that morale is a generalised feeling of well-being with diverse specific indicators that form three main dimensions: agitation, lonely/dissatisfaction and attitudes towards own ageing. These dimensions express "freedom from distressing symptoms, satisfaction with self, feeling of syntony between self and environment, and ability to strive appropriately while still accepting the inevitable". The theoretical assumptions regarding the structure of morale and the extensive use of PGCMS in gerontological research led to the use of the PGCMS for the validation of the new instrument. Moderate correlations were expected between the dimensions of the PGCMS and the subcales of the AWP. Also the overall score of the PGCMS was expected to have stronger correlation with the subscales of the AWP because it presents a general description of well-being.

Procedures. The University of Bristol offers a variety of 50+ activities (line dancing, swimming, activity mornings). After a presentation of the scope of this study, 200 questionnaires were given to the fitness instructors of these groups in order to distribute them to participants in their classes. The returned questionnaires were 112 (response rate = 56%).

Data analysis

In order to examine the convergent validity of the Ageing-Well Profile, bivariate correlations were computed between the subscales of the new instrument and the subscales of the Philadelphia Geriatric Center Morale Scale.

5.3.2. Results

The correlation between the subscales of the Philadelphia Geriatric Center Morale Scale and the subscales of the Ageing-Well Profile[version3] ranged from lack of any correlation (.00) to moderate correlation (.41). The general well-being expressed in the sum score had the strongest correlation with the AWP subscales as expected. Although higher correlations were expected as the PGCMS is an instrument designed for older adults, these results do not support a relationship between the PGCMS and the Ageing-Well Profile. Several reasons could be identified:

First, the PGCSM actually measures morale which according to Lawton (Lawton, 1972) is a generalised feeling of well-being with diverse specific indicators. Therefore, although the concept of multidimensionality is common in both instruments, the Ageing-Well Profile perceives subjective well-being not only as a feeling state but as a combination of cognitive evaluations and emotional responses.

Second, the three-factor structure of the PGCMS was not clear in this study and it explained only the 50% of the variance. This could justify therefore the lack of correlation between the subscales of the two instruments and the strong correlation between the sum-score of the PGCMS and the subscales of the Ageing-Well Profile.

Third, the PGCMS has thirteen negative-worded items whereas the majority of the Ageing-Well Profile items are positive-worded. Finally, the Ageing-Well Profile refers to a time-period of four weeks whereas the PGCMS has a time-reference that ranges from "today" to "one year".

Table 5.17. Correlations Between PGCMS and Ageing-Well Profile[version3]

Ageing-Well Profile[version3]	PGCMS			
Subscales	**Agitation**	**Dissatisfaction**	**Attitude toward Ageing**	**Sum Score**
Developmental Well-being/ *Independence*	-.11	.25**	.28**	.39**
Physical Well-Being	.00	.41**	.14	.49**
Mental Well-Being/ *Positive aspects*	.05	.26**	.29**	.51**
Mental Well-Being/ *Negative aspects*	.02	.22*	.09	.35**
Social Well-Being	.20*	.39**	-.07	.27*

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

5.4. Study 4. Test-retest reliability

The aim of this study was to evaluate the reliability of the Ageing-Well Profile by administering the questionnaire at two different points in time and seeing the degree of variation that occurs.

5.4.1. Method

Sample. Participants in this study were 26 female and 5 male (mean age=67.61, SD=8.3). All the 31 participants were retired, members of a 50+ line dancing group and all of them were participating at least once per week in a variety of organised physical activities (Table 5.18).

Table 5.18. The demographic characteristics of the participants

Characteristics	Percentage %
Marital Status	
Married	64.5
Widowed	12.9
Single/Divorced	22.6
Highest education attended	
Secondary	25.8
Further education	41.9
University	32.3
Health Conditions (last 6 months)	
0	41.9
1	38.8
2	16.1
3-4	3.2
Participation in activities/hobbies	
1 day/week	3.2
2 days/week	12.9
3 days/week	9.7
4+ days/week	74.2
Participation in organised physical activities	
1 day/week	25.8
2 days/week	41.9
3 days/week	16.1
4+ days/week	16.1

Data Collection

The final 18-item version of the Ageing-Well Profile was used to examine the consistency of the new instrument (Appendix III-2). Coded copies of the Ageing-Well

Profile were prepared in order to be able to examine the individual differences of the participants.

Procedures. The University of Bristol offers a variety of 50+ activities (line dancing, swimming, activity mornings). After a presentation of the scope of this study, 45 coded questionnaires were given to the members of the University of Bristol 50+ line dancing group before the class. At the end of the class, a second coded copy was given to the members together with a self-addressed envelope and participants were asked to fill-in the questionnaire and post it back after one week. The returned questionnaires were 31 (response rate = 69%).

Data analysis

The Pearson product-moment correlation coefficient was used to measure the test-retest reliability of the Ageing-Well Profiile. However, the Pearson correlation coefficient measures the strength of co-variability and not the exact value agreement between two measurements and as a result it might be misleadingly high. Furthermore, the experience from the first testing influences responses in the second testing and that makes the correlation between testings higher (Nunnally, 1978). Therefore, the intraclass correlation coefficient was also used as it is often the preferred statistical index for the exact agreement between two measurement variables (Shrout & Fleiss, 1979).

5.4.2. Results

Reliability for the individual subscales and the Ageing-Well Profile was high ($p<.01$) (Table 5.19).

Table 5.19. Test-retest reliability

Subscales	Pearson r
Developmental Well-being	.75
Physical Well-being	.85
Self-Perceptions	.81
Self-maintenance	.80
Social Well-being	.76
The Ageing-Well Profile	.94

The interrater reliability was determined using a two-way mixed effects model average measure reliability (type 3,2) intraclass correlation coefficients [ICC]. The mixed model was used to present the inferences that were confined to the particular set of raters used in the measurement process. Furthermore, agreement was defined in terms of absolute agreement because the systematic differences among levels of ratings were considered appropriate for this study (Yaffee, 1998). Finally, the ICC estimate for the reliability of the combination of the two ratings is presented: Test-retest reliability estimates were high (R=.86-.91) with 95% confidence intervals [CI] rating from .71-.93 for developmental well-being, .80-.95 for physical well-being, .78-.94 for self-maintenance, .77-.94 for self-perceptions, .72-.93 for social well-being (Table 5.20).

The instrument appears to be consistent in a one-week test-retest administration. However, it should be stressed that as respondents took the second copy of the instrument after the end of the class and knowing the scope of this study they may responded to the questions sooner that the 7-days interval, trying to achieve better results. Therefore, more studies of test-retest reliability are needed with two separate administrations of the instruments and larger samples.

Table 5.20. Intraclass correlation

Subscales	ICC (3, 2)
Developmental Well-being	.86
Physical Well-Being	.91
Self-perceptions	.89
Self-maintenance	.89
Social Well-Being	.87
The Ageing-Well Profile	.95

Moreover, although the responses in this instrument are expected to be based in cognitive evaluations, some influence from emotional states is also expected. Finally, further studies should employ one-and two-week intervals between the test-retest administration of the instrument. However, it should be noted that different reliability coefficients may appear in groups of older people who do not participate in physical

activities or any form of activity than for those who have started some new activities which aim to influence their levels of well-being.

CHAPTER 6

DISCUSSION AND IMPLICATIONS

6.1. Introduction

The increased use of the term *successful ageing* as a guiding theme in gerontological research stresses the change in perceptions regarding the concept of ageing. Old age is no longer seen as an undesirable phase of human life but as a stage in the lifecourse with its own advantages and losses. Currently, research interest has been placed on the identification of the elements of successful ageing and the development of criteria of what should constitute 'success' in the later years of life.

Although these attempts demonstrate the need to explore the paths of later life and learn more about ageing persons for the provision of better support and services for them, an important issue remains unclear. Who sets the criteria of the 'success' and by doing so do research findings facilitate the presence of an authentic old age, or do these findings result in the development of predetermined blueprints that promote a socially defined unauthentic self that older people should demonstrate? Therefore, although the objective elements of successful ageing have been researched extensively, increased interest is placed upon the presentation of older people's quality in life based on their own words and using their own frames of reference. By this approach it becomes more evident that ageing is a very individualised and differentiated process with regard to mental, behavioural, and social outcome variables (Baltes & Baltes, 1990).

This research was based in the constructionism's assumptions that:

> All knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context (Crotty, 1998)

This ontological approach tries to avoid the creation of a conformistic view for what one must achieve to age successfully and attempts to address the meaning that older people bring to the term of well-being in later life. It should be stressed, however, that this research is an attempt to represent as accurate as possible the views of a particular group of active older people. Therefore, the main aim is to offer a small contribution to the construction of the bigger picture of what constitutes well-being in the later years of life.

Well-being is one of the few psychological terms that have been used both in everyday life and in scientific research. Current research stresses the importance of physical activity to the well-being of older adults (World Health Organisation, 1997). In some studies, well-being is presented as a general concept without information on the special characteristics that it might have for the older persons. In other studies it is presented as a multidimensional construct however, various concepts have been used to describe its multidimensionality with no clear view of what are the most important dimensions in the later years of life. Therefore, both approaches carry several implications such as:

1. The inadequate knowledge regarding the important elements of well-being in later years of life leads to the inability to demonstrate the magnitude of contribution of physical activity to the well-being of older people
2. The broad descriptions and the inconsistencies in the definition of well-being of older people result in the use of inadequate measures that are either not appropriate for use with older people or they measure various specific constructs under the umbrella of the well-being term.

Current research may capture parts of the meaning of subjective well-being in older people but the issue of how we can capture the bigger picture of a superordinate concept of subjective well-being remains unresolved. Therefore, more research is needed in the exploration of the meaning of well-being, the ways it is related with physical activity and the ways that the contribution of physical activity to the maintenance or enhancement of well-being in later years of life can be measured.

The aim of this research was to explore the dimensions of subjective well-being of older adults and based on the identified elements relevant to the physical activity experience of older people (Phase I), to develop a multidimensional subjective well-being profile, specific for changes initiated by physical activity participation (Phases II and III). The results of Phases I, II, and III will be discussed in turn focusing on both the qualitative and quantitative aspects of this research. The discussion will continue with the

limitations of this research and it will conclude with the implications for future research and practice.

There are no simple questions, nor simple answers regarding human behaviour and its complicated nature. Therefore, this research should be viewed only as an attempt to shed some light in this particular area of interest and to generate some new questions which will further our knowledge regarding the relationship between physical activity and subjective well-being in the later years of life.

6.2. Developing an exercise-specific measure of subjective well-being

This thesis used a combination of qualitative and quantitative methods in order to report the richness of the subjective experience of older adults and the psychometric integrity of the new instrument.

In human science, as in life, the best way to fully understand what a person means is to get as close to their position as possible (Hendricks, 1995), a notion that recently has received increased recognition in physical activity and ageing research. What is also widely accepted is that there is no such thing as value-free research (Murphy & Longino, 1992). Researchers cannot entirely free themselves of their own preconceptions and views. Especially in this thesis, the researcher aimed to explore the characteristics of "the elderly", a predefined group perceived to have a wide range of physical and social problems. The adoption of qualitative methods enabled the researcher to deal with a number of personal stereotypes, get closer to older people and realise that ageing is not something negative as long as people are willing and able to make the most out of their life. For the researcher an important 'lesson' from this thesis was that there is always a meaning and purpose in life and no matter how old a person is, there are always opportunities for fulfillment and personal development. The possible consequence of the lack of this knowledge would be the restricted view on the dimensions of well-being in later years of life and the subsequent restricted choice of items and subscales for the development of the Ageing-Well Profile. That in turn could lead to the development of an instrument which would be based in the common view

that in later years of life well-being is simply the absence of negative symptoms, a view strongly criticised in the current literature.

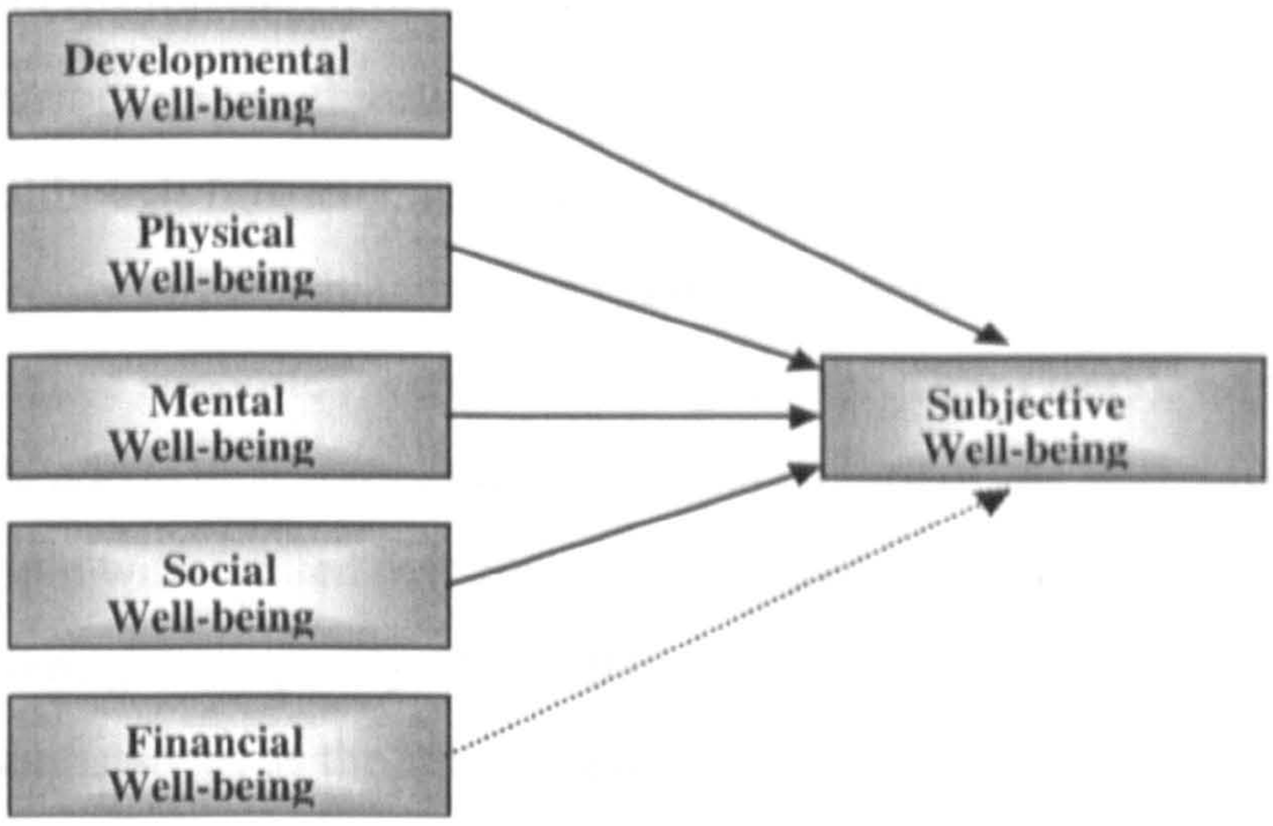
6.2.1. Determining the dimensions of subjective well-being

Most of the evidence supporting the positive effect of physical activity on aspects of well-being of older adults irrespective of how it has been conceptualised (Biddle & Faulkner, in press) has primarily been located within the quantitative paradigm and revealed little to further our understanding of the ways in which physical activity makes a difference to older adults. This is hardly surprising, as it is unable to take advantage of the subjective knowledge about the lived experience that is revealed by personal account.

The Phase I study was thought to be suited to a qualitative approach as it aimed to find out "what" subjective well-being means to older adults and "how" physical activity might enhance their levels of well-being (Creswell, 1998). Furthermore, the qualitative methods were appropriate for this study, which ascribing to the interpretive/constructionist ontology of multiple realities, attempted to gain an understanding of the perceptions of a range of individuals rather than trying to uncover the one "truth" about their experiences (Mertens, 1998).

Five main dimensions (Figure 6.1.) emerged from the interviewees' responses with high correspondence to those emerging in the ageing literature (Bowling et al., 2001; Farquhar, 1995). What the findings clearly state is that well-being is not just a general feeling or a general concept but it is a multidimensional construct with distinct dimensions including both emotional responses and cognitive judgements (Diener et al., 1999, Kunzman et al., 2000). These broad dimensions appear to exist in some form throughout the adult lifespan but have characteristics that are unique to later life that can feature retirement, bereavement, loss of function and independence. The qualitative approach enabled a part of that uniqueness to be documented so, the features of these dimensions reflect older adults' perceptions and their own experiences.

Figure 6.1. The hypothesized dimensions of subjective well-being



The emerged dimensions support that successful ageing is more than just survival and explicitly state that well-being in older adults is not simply the absence of disease or negative symptomology.

Respondents stressed the importance of developmental well-being and the need to adjust to changes brought with old age (retirement, bereavement) and to expand their abilities and further develop themselves. Rowe and Kahn (1997) reported that engagement with life is one of the important aspects of successful ageing and the emergence of this dimension supports their belief. The interviewees saw themselves to be far distanced from the passive traditional image of old age and 'moving onwards and forwards' appears to describe the lifestyle of these older active adults.

Offering feelings of achievement and success is one way that physical activity contributes to developmental well-being of older people. Greater exposure to physical activity participation appears to improve perceptions of personal capabilities and this in turn, leads to positive changes in well-being (McAuley & Rudolph, 1995). Furthermore, physical activity may provide a substitute for lost roles (retirement) and a set of goals and a sense of commitment, which are particularly important for a structured and meaningful daily life in later years of life.

Financial well-being is the dimension that does not seem to be influenced by participation in physical activities and is the dimension that appears to have the lowest contribution to subjective well-being. Generalising from these findings requires caution as although financial and housing status was not assessed in detail in this study, the majority of participants came from professional backgrounds before retirement. This could be supported with the findings of Farquhar (1995), who reported that older people with adequate resources did not relate quality of life with financial situation. However, people with limited resources reported that material circumstances were important for lowering their quality of life. Interesting is that these people ranked material circumstances as the last thing that can increase their life quality. That supports the perceptions of the respondents in this study who reported the importance of having comfortable housing and subsistence but they stressed that accumulation of material wealth is beyond their purpose and their definition of subjective well-being.

It would be interesting in future studies to further explore this dimension in older adults with low socioeconomic status. That could help to see how financial status influences the subjective well-being of those older adults, the possible mechanisms with which some older people manage to sustain high levels of well-being despite the absence of adequate resources and finally the relationship with participation in physical activities, if any.

The least surprising finding was the emergence of physical well-being and its strong relationship with subjective well-being in older adults. Good health is one of the most important elements of subjective well-being and this was apparent in every response. Although respondents covered a broad spectrum of health status from completely healthy and active older people to people with multiple health conditions, health was mentioned as a strong factor of well-being from everyone.

Doctor's recommendations are an important motive for the enrolment in exercise programmes, however, some respondents stressed that experiencing the benefits of

physical activities was essential for them to really believe and accept that exercise was important for their well-being. This implies that experiencing health gains may be critical for some individuals and that programmes need to be attractive to ensure that there is persistence to enable health gains to be experienced.

Functionality and mobility are necessary features for the accomplishment of both basic and instrumental activities of daily living and therefore physical activity contributes in subjective well-being in two ways. Directly, through the compression of morbidity and the alleviation of symptoms of various diseases, and indirectly through the maintenance of the ability to participate in everyday activities and maintain involvement with life.

The findings regarding the importance of health are supported with those of other studies (Bowling et al., 2001). However, respondents in this study ranked health as the most important element, whereas in other studies, health comes second or third in importance after family and social life. The topic of this study might have influenced the responses as talking about physical activity is directly connected with health. Therefore, the level of importance of health in respondents' well-being should be evaluated with this notion in mind.

Mental well-being has often been operationalised as the absence of psychological distress however, the emergence of the mental well-being dimension extends beyond the absence of negative states and includes also positive ones.

Religion, either as an internal personal behaviour or as a social activity, contributes to mental well-being of some older adults. Moreover, the church appears to be an institutional setting in which older adults can interact, find social support and make friendships (Ellison et al., 1989). The important role that church plays in older adults' life, makes it a potential target for organised programmes promoting a healthier and more active lifestyle.

Better cognitive function through improved concentration and focus, increased levels of happiness, enjoyment and a more positive attitude in general, and alleviation of negative symptoms such as stress and tension were perceived to be important outcomes from participation in physical activities. Depression was not mentioned and that might be due to the high levels of subjective well-being that these older adults reported and/or the general active lifestyle that they have. Interesting would be the exploration of perceptions of older adults with low levels of well-being in order to examine whether these people would report depressive symptoms and whether they could identify a possible contribution of physical activity to the alleviation of those symptoms.

Increasing evidence stress that improvements in physical fitness do not appear necessary for the "feeling good" outcome to emerge as experimental research has repeatedly failed to identify links between changes in fitness and improvements in measures of mental well-being (McAuley & Rudolph, 1995). The levels of physical fitness were not assessed in this study and therefore judgements regarding the relationship between fitness and mental well-being cannot be made. However, the qualitative data clearly indicated that the beneficial effects of physical activity might accrue from mechanisms such as sense of accomplishment and control and sociability that might operate effectively even in the absence of functional changes.

Both family roles (parent-partner) are an invaluable source of well-being for the participants in this study. Being what Aristotle called "the social animal" respondents reported the need to belong, to feel connected with others in close relationships, showing that the need for intimate attachments to other human beings is strong throughout life (Myers, 1999). The participants stressed the devastating consequences of bereavement especially when there is luck of sufficient social network contacts. This compares well with the findings of Connides and Davies (1990), who reported that older adults who have friends are known to meet various developmental challenges such as widowhood, with better outcomes than individuals who do not have friends.

Engagement in social activities helps respondents to be active members of the community and to contribute to society. Participation in physical activities offers a reason for getting out and about, and the opportunity to avoid isolation and expanding their social network. That helps older adults to deal with the increased losses that occur in the later years of life as when a person's identity stands on several legs, it more easily holds up under the loss of any one of them (Myers, 1999). Physical impairment may disrupt the usual norms of social relationships and prohibit older adults from feeling "needed" by others and from engaging in reciprocal exchanges. Therefore, participation in physical activities enables them to avoid deterioration and maintain the necessary levels of function and fitness in order to be able to contribute to the social fabric of the communities in which they live.

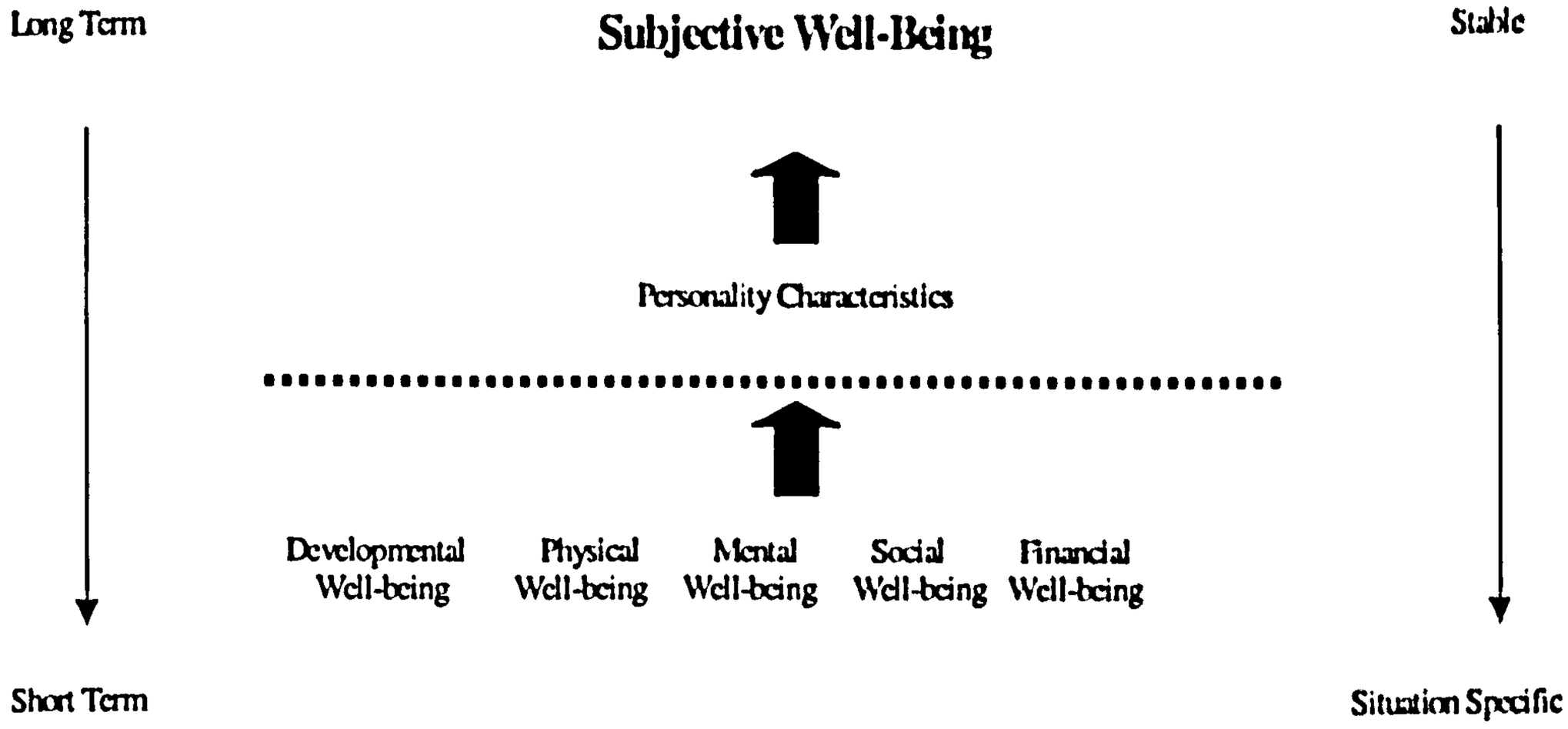
Human ageing involves physical, psychological, social and institutional dimensions that interact with each other (Baltes & Lang, 1997). The notion of this "structural ensemble" is very important in the effort to understand and describe the parameters of older adults' subjective well-being. One of the most important outcomes of this qualitative study is that it revealed this "structural ensemble" through the interdependence and interrelatedness of the emerged dimensions of subjective well-being. The notion of *healthy body and healthy mind* and their interdependence is encapsulated in the words of the participants and therefore these dimensions should be viewed as having permeable and shifting boundaries, influencing each other and the general levels of subjective well-being.

In an attempt to address the question of whether subjective well-being is a relatively transitory and easily influenced construct or a combination of relatively global and stable constructs, this study presents a different point. It supports the multidimensionality of subjective well-being which appears to consist of distinct dimensions that are interrelated and with the exception of financial well-being, they can be influenced by participation in physical activities. However, the degree to which older adults need to fulfil these dimensions in order to enjoy a balanced, happy and rewarding life depends on the importance that older adults individually place on these dimensions

and therefore, it is not easy to determine. It appears however that at least the participants in this study can enjoy quality in their life with less than the "complete" well-being that is suggested by the definition of the World Health Organisation (World Health Organisation, 1947).

Furthermore, this study did not explore the role of personality constructs which have consistently presented strong relationship with subjective well-being (DeNeve & Cooper, 1998; Diener & Lucas, 1999). Therefore, it should be more appropriate instead of asking whether subjective well-being is stable or not, to ask what are those elements that are stable resulting in the temporal stability of subjective well-being (Diener & Lucas, 1999), and what are those elements that are not stable and contribute to the day-to-day quality of life. A possible structure of subjective well-being could present it as a hierarchical construct, which is stable in the apex of the hierarchy but situation specific in the base (Figure 6.2.). Although this is speculative at this point, the findings of this study do support that subjective well-being consists of specific elements that help older persons enjoy a better life and which are influenced by participation in physical activities. However, further theoretical and psychometric developments could shed more light in the structure of subjective well-being and in the ways that the contribution of physical activity to subjective well-being of older people could be evaluated.

Figure 6.2. Stability of Subjective Well-being



6.2.2 Psychometric development of the Ageing-Well Profile

Most disciplines have based their measures on expert rather than lay opinions and this is also the case in measures in the physical activity and ageing research. Therefore, there is little data on how much relevance these measurement scales have to older people's lives.

Among the existing well-being instruments in physical activity and ageing research, only one instrument has used a qualitative approach for the generation of items in an attempt to reflect the perceptions of older adults (Myers et al., 1999). That supports Sell and Nagpal (1992) who stressed that quantitative instruments almost always lack a "thorough conceptual mapping process" before items are phrased and that the role of qualitative research is usually a complementary one to quantitative data but not the basis for quantitative research.

The impetus behind the development of the Ageing-Well Profile stems from the identified need for measures that can present adequate conceptual reasoning and are sensitive to the characteristics of older adults and the properties of the physical activity

environment (McAuley, 2001; McAuley & Courneya, 1994; McAuley & Rudolph, 1995).

Data from 777 older adults presented in Phase II and III were subjected to exploratory and confirmatory analyses and supported the development and preliminary validation of a five-factor measure designed to capture changes in older adults' subjective well-being initiated by participation in physical activities (Table 6.1.). Using an inductive approach the development of the five subscales and the item-generation were based on the hypothesised dimensions of subjective well-being and the relevant and salient content identified in the qualitative work of Phase I and the literature review. The subscales did not appear susceptible to social desirability as they did not correlate with the Marlow-Crowne Social Desirability Scale (Reynolds, 1982) supporting the notion that controlling for a social desirability bias does little to improve the validity of well-being scales (Kozma & Stones, 1987). Furthermore, they were stable when the test-retest reliability was tested over one-week period. In addition the internal consistency and unidimensionality of each subscale have proven stable and high across three independent samples, which encourages confidence in the properties of the new instrument.

Table 6.1. Item-reduction of Ageing-Well Profile

Phases	Studies	Items	AWP^{versions}	Sample
Phase II	Study 1	80 items		34
		↓		
	Study 2	49 items	AWP^{version1}	148
		↓		
Phase III	Study 1	36 items	AWP^{version2}	154
		↓		
	Study 2	31 items	AWP^{version3}	298
		↓		
	a. EFA	25 items		
		↓		
	b. CFA	18 items		
		↓		
	Studies 3+4	18 items	AWP^{finalversion}	143

The psychometric analysis of the Ageing-Well Profile [AWP] provides evidence for its content validity (Table 6.2.). Based on older adults' views and perceptions and developed collaboratively with older adults, the AWP consists of items that reflect the important elements of well-being in later years of life and therefore is a measure relevant to the experiences of older people.

Physical Well-being consists of health, fitness and functionality and expresses the extent to which older adults feel that they have good physical health and a body that is fit and working well. This content was consistent through the psychometric analysis of the AWP.

Social Well-being consist of social activity, contribution and social support and expresses the extent to which older adults enjoy a socially active life. The psychometric analysis supported this structure. Having friends and supportive social network and being able to contribute to the well-being of other people is important in later years of life and current studies support that physical activity can enhance the social well-being of older people. Although family was found to be one of the most important elements of well-being in older adults, this subscale did not include any items referring specifically to either the spouse or the children as it was thought that these items could be irrelevant and more importantly disturbing to people who had lost their spouse or did not have family. General items regarding social network and availability of contact and support were found to be more appropriate and more relevant to be influenced from participation in physical activities.

Although the argued Mental and Developmental Well-being dimensions were distinct, the statistical analysis and the content of the items led to a restructure of the components of these dimensions.

First, the Developmental Well-being dimension consists of items that express the extent to which older adults do not rely on others and maintain independence and autonomy in the way they lead their everyday life. Second, the Mental Well-being dimension has two

components: a) Positive aspects express the extent to which older adults have positive self-perceptions and are in good mood and satisfied with their life, b) Negative aspects express the extent to which older adults have difficulties in mental alertness and feelings of low worthiness. Although the degree of independence between positive and negative affect is still debated, Diener et al. (1999) stressed that the two constructs are moderately inversely correlated but clearly separable. Diener also stated that although positive and negative affect are not strictly independent in many measurement situations, they show enough unique variation and differing patterns of correlation with other variables and as a result they should be assessed separately (Diener, 1994). In this study, mental well-being appears to have two independent components, positive and negative aspects. However, there is need for another data collection to examine the content of this subscale in comparison with the developmental well-being subscale, and also to examine whether the two components remain separate, or whether they form one general mental well-being factor.

Finally, the decision for the exclusion of the financial well-being subscale was both statistically driven (it resulted in an ill-fitting model in CFA) and theoretically based (it didn't present a direct relationship with participation in physical activities in Phase I study). Therefore, its contribution to the Ageing-Well Profile was thought not to be significant because this subscale could not be sensitive in well-being changes resulting from activity participation. However, financial well-being was developed for use as a control/comparison subscale because retired people's financial conditions are not likely to change in a short time period as a response to participation in physical activities. Therefore, in future research this subscale could be used as a reference scale in order to cross-validate the responses of older participants in the administration of the Ageing-Well Profile before and after intervention programmes.

Table 6.2. Comparison of hypothesised dimensions and dimensions derived empirically

Hypothesised dimensions of Subjective Well-being [Phase I]	Empirically derived dimensions of Ageing-Well Profile [PhaseII]	Empirically derived dimensions of Ageing-Well Profile [Phase III]	Final dimensions of Ageing-Well Profile [Phase III]
Physical Well-being *Health-Fitness-Functionality*	Physical Well-being *Health-Fitness-Functionality*	Physical Well-being *Health-Fitness-Functionality*	Physical Well-being *Health-Fitness-Functionality*
Social Well-being *Social activity-Contribution-Social Support*	Social Well-being *Social activity-Contribution-Social Support*	Social Well-being *Social activity-Contribution-Social Support*	Social Well-being *Social activity-Contribution-Social Support*
Financial Well-being *Financial Independence* *Personal Possessions*	Financial Well-being *Financial Independence* *Personal Possessions*	Financial Well-being *Financial Independence* *Personal Possessions*	
Mental Well-being *Mental alertness-Positive & Negative affect-Self-perceptions*	Mental Well-being *Mental alertness-Negative affect*	Mental Well-being/ Positive aspects *Personal development-Self-perceptions*	Mental Well-being/ Positive aspects *Personal development-Self-perceptions*
Developmental Well-being *Personal development-Adjustment-Independence*	Developmental Well-being 1 *Personal development-Self-perceptions*	Mental Well-being/ Negative aspects *Mental alertness-Negative feelings*	Mental Well-being/ Negative aspects *Mental alertness-Worthiness*
	Developmental Well-being 2 *Independence*	Developmental Well-being *Independence*	Developmental Well-being *Independence*

From a validity perspective, the present data provide evidence for the factorial and convergent validity of the Ageing-Well Profile. Confirmatory factor analysis provided adequate construct validity to support the hypothesised five-factor structure that emerged from the exploratory factor analysis. From the perspective of convergent validity the Ageing-Well Profile presented positive results (Table 6. 3). Convergent validity was expected between the chosen measures and the AWP subscales that represent similar constructs.

Trying to establish convergent validity was a difficult task as there are not many instruments with content similar to that of all the dimensions of the new instrument. The Satisfaction With Life Scale (Diener, 1984), the Self-Esteem Scale (Rosenberg, 1965) and the Bachman version of the Self-Esteem Scale (Bachman, 1970) were used because their concepts are important elements of subjective well-being (Diener et al., 1999).

The Self-Esteem Scale correlated moderately with the subscales of the Ageing-Well Profile^{version2} with the exception of Physical Well-being. The Developmental Well-being/self perceptions and the Mental Well-being are close in meaning with the Self-Esteem Scale and as expected, these subscales presented the strongest correlations with the Self-Esteem Scale.

The Satisfaction with Life Scale had also moderate correlation with all the subscales except the Physical Well-being subscale. This scale focuses on enduring aspects of subjective well-being (DeNeve & Cooper, 1998) and therefore the moderate correlation with the AWP subscales was expected. The lack of significant correlation between the Physical Well-being subscale with both the Self-Esteem Scale and the Life with Satisfaction Scale could be explained by the fact that the participants in this study did not experience health conditions that could affect their satisfaction with life or their self-esteem. Therefore, they did not connect physical and mental aspects of well-being directly. Although a moderate correlation was expected, their reported high levels of well-being possibly did not allow enough variance, however, this must be confirmed in further studies with groups of people with various levels of well-being.

Further validation studies with measures that include subscales relevant to physical aspects of well-being were required and therefore the Physical Self-Perceptions Profile and the Bachman Revision of Rosenberg's Self-Esteem Scale, which includes items referring to usefulness/competence, were chosen.

The Bachman Revision of Rosenberg's Self-Esteem Scale correlated moderately with all the subscales of the Ageing-Well Profile[version2] and particularly with the Mental Well-being subscales as expected. That supports the identified relationship between feelings of control and competence and older adults' well-being in several studies (Diener et al., 1999; McAuley, Blissmer, Katula, Duncan, et al., 2000; Schulz & Heckhausen, 1996) and also the belief that the RSE-B may be more appropriate for use in older adults than the original scale (Ranzijn et al., 1998).

The Health/Function subscale of the PSPP correlated strongly with the Physical Well-being subscale as both measures refer to physical aspects of older adults' well-being. Maintenance of health and functionality are necessary for autonomy and independence in the later years of life and that justifies the moderate correlation between the PSPP Health/Function subscale with the Developmental Well-being subscale. Furthermore, the more global concept of the Physical Self-Worth subscale correlated

Table 6.3. Correlations between the Ageing-Well Profile and the SES, SWLS, RSE-B, PSPP, PGCMS measures

Ageing-Well Profile[version2]	SES	SWLS	Ageing-Well Profile[version3]	RSE-B	PSPP					PGCMS			
					Sport	Physical Condition	Body	Health function	Physical Self Worth	Agitation	Dissatisfaction	Attitude Ageing	Sum Score
Physical Well-Being	.16	.12	Physical Well-Being	.33**	.09	.38**	.29**	.66**	.52**	-.11	.25**	.28**	.49**
Social Well-being	.25**	.27**	Social Well-being	.36**	.08	.12**	.23**	.23**	.38**	.00	.41**	.14	.27*
Developmental *Well-being*/ Personal development-self perceptions	.54**	.40**	Mental Well-Being/ *Positive aspects*	.49**	.05	.18**	.18**	.33**	.40**	.05	.26**	.29**	.51**
Mental Well-Being/ Negative aspects	.43**	.33**	Mental Well-being/ *Negative aspects*	.46**	.00	.03*	.20**	.28**	.28**	.02	.22*	.09	.35**
Developmental Well-being/ *Independence*	.25**	.32**	Developmental Well-being/ *Independence*	.33**	.01	.16**	.12*	.48**	.36**	.20*	.39**	-.07	.39**
Ageing-Well Profile [version2]	.50**	.41**	Ageing-Well Profile [version3]	.54**					.52**				.54**

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

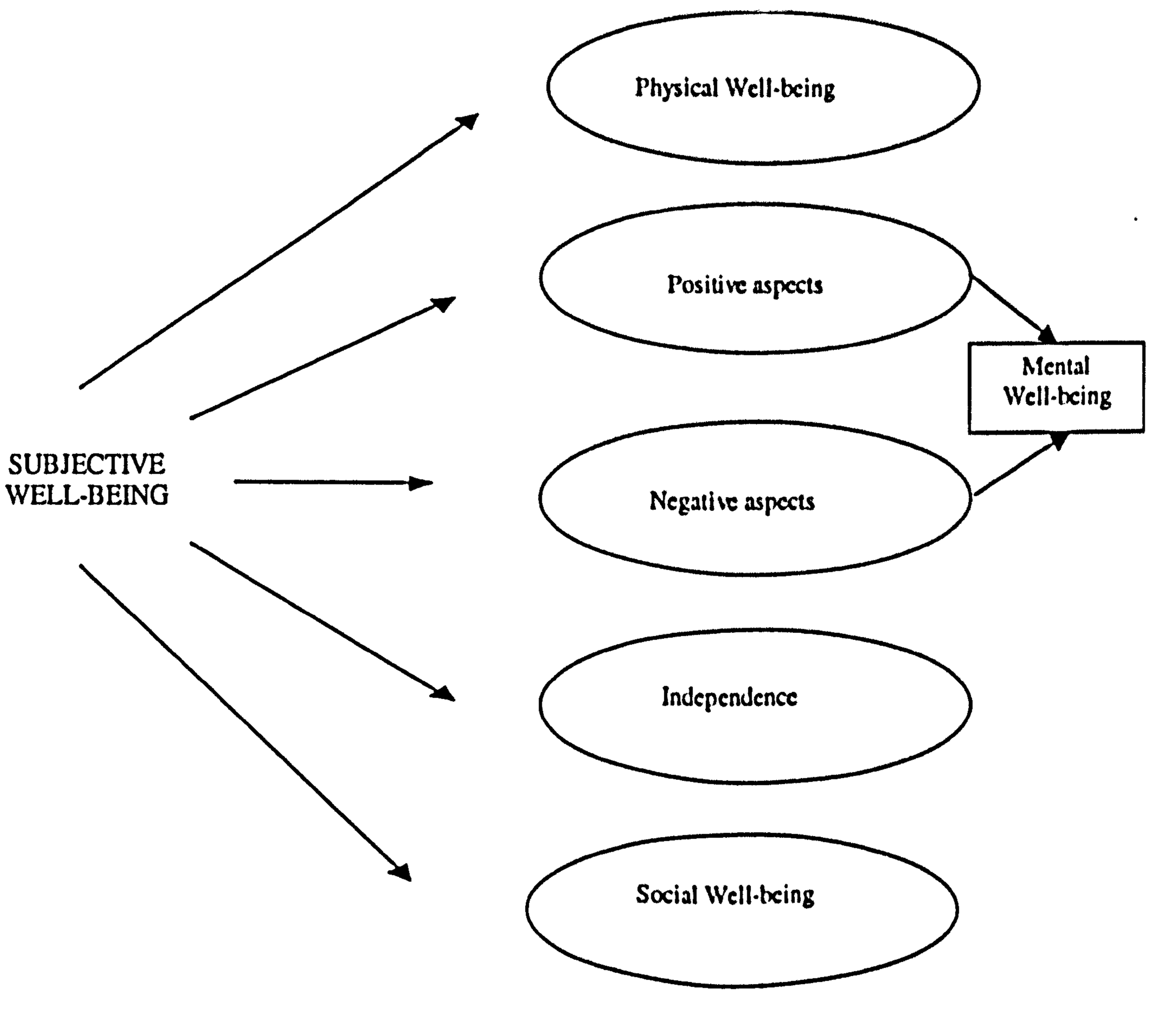
moderately with all the subscales and the sum score of the Ageing-Well Profile justifying the importance of this construct to the perceptions of subjective well-being in older adults.

The final study for the convergent validity of the AWP was with the Philadelphia Geriatric Center Morale Scale. Surprisingly, the correlation between the subscales of the PGCMS and the subscales of the Ageing-Well Profile Profile[version3] ranged from total lack of any correlation (.00) to moderate correlation (.41). Higher correlation was expected as the PGCMS is an instrument designed for older adults, however these results do not support a relationship between the PGCMS and the Ageing-Well Profile.

Although the concept of multidimensionality is common in both instruments, the Ageing-Well Profile perceives subjective well-being not only as a feeling state but as a combination of cognitive evaluations and emotional responses. The three-factor structure of the PGCMS was not clear in this study and it explained only 50% of the total variance justifying the lack of correlation between the subscales of the two instruments and the moderate correlation between the sum-score of the PGCMS and the subscales of the Ageing-Well Profile. Finally, the differences in the time reference and the wording of the items could explain the weak correlation between the two instruments.

In conclusion, it appears that the convergence of the Ageing-Well Profile and the selected self-report measures is ample to suggest that these measures contain substantial amounts of common variance, which point to a coherent phenomenon. However, the common variance is modest enough to support a possible hierarchical structure of subjective well-being, and to indicate that these measures also capture non-overlapping aspects of subjective well-being, which need to be separately measured.

Figure 6.3. Superordinate structure of subjective well-being



6.2.3. Conclusions

The development of the Ageing-Well Profile was based on the definition of subjective well-being as

> A broad concept comprising a wide range of distinct dimensions which evaluated by the individuals lead them to a phenomenological, global expression of the quality of their state of existence

The increased acceptance of the multidimensionality of subjective well-being (Diener et al., 1999; Kunzman et al., 2000) necessitates a profile approach to instrument design so that separate subscales assess every dimension. The Ageing-Well Profile supports the notion that subjective well-being is a superordinate construct that is underpinned by at least 5 distinct dimensions presenting physical well-being, positive and negative aspects of mental well-being, independence and social well-being (Figure 6.3.).

Subjective well-being could be regarded as a hierarchical construct that is stable in the apex of the hierarchy but situation-specific in the base. Although this structure is speculative at this point, it looks attractive because it infers a path by which regular participation in physical activities might modify the more enduring and global construct of subjective well-being. These dimensions may be more sensitive to change from participation in physical activities than the constructs of life satisfaction, positive and negative affect which are relatively global and changes over time are quite small (McAuley, 2001). Therefore, the evaluation of these dimensions could offer more accurate information regarding the contribution of physical activity to the subjective well-being of older adults. That, in turn, could lead to the development of activity programmes that enhance the elements of those dimensions, and could provide an effective way of increasing the subjective well-being and the adherence of older people to physical activity participation.

The qualitative data presented in Phase I gave a vivid impression of what older people's well-being was like. The quantitative data presented in Phase II and III largely confirmed the identified dimensions of older adults' subjective well-being and the high

levels of well-being of the active older participants in these studies. The qualitative data enabled the interpretation of the quantitative data with more insight and provided the confidence and security that the content included in the instrument is relevant to the older people's experience. That became more important in the later stages of the Ageing-Well Profile development when the need for a short measure led to the reduction of the items. Psychometric methods helped to reduce the initial 48-item scale to an 18-item scale. However, the identified elements of well-being in the qualitative study were constantly used as a guide in order to make sure that the appropriate content was identified in the subscales of the new instrument.

The Ageing-Well Profile would have been quite different without the use of both qualitative and quantitative methods and it might have lost the ability to capture a broad range of the older adults' life experience. Although the full development of this measure requires several further studies, the qualitative and quantitative data resulted in a new, promising instrument which could be useful in the evaluation of the contribution of physical activity participation to the subjective well-being of older adults.

More and strong evidence is needed for the establishment of physical activity as a key element in health services research and as a priority in health promotion and intervention strategies designed for older adults. This thesis demonstrated that physical activity could make a difference in older adults' life and presented a new instrument that could be used to measure the contribution of physical activity to several aspects of older adults' subjective well-being. However, a number of issues emerged from the Phase I, II, and III studies and they should be taken into account when the findings of this research are evaluated.

6.3. Limitations of Phase I, II, and III studies

In a series of studies the Ageing-Well Profile demonstrated good psychometric properties and provided initial evidence for being a promising instrument. However, the development and initial validation of the new instrument is based in studies with active community-dwelling older adults.

In Phase I study, participants were chosen from a wide range of settings because they could provide rich experiential information about the contribution of physical activity to subjective well-being. However, they remain a selected volunteer group of regularly active older adults who report high levels of well-being and are in the young –old and old age groups. Furthermore, these people have good education level and enjoy financial stability. The perceptions of older people with low socioeconomic status, who usually have the lowest participation in health-related behaviours and comprise a highly inaccessible group, could provide important information for the characteristics of subjective well-being in later years of life. Furthermore, all participants live in the South West of England. Culture is an important factor in the structure of well-being perceptions (Diener et al., 1999) therefore, although the responses of the participants in this study appear to be similar to those of older adults living in other regions in UK (Bowling et al., 2001), a comparison with the perceptions of older persons living in different countries is an issue that needs further examination.

In Phases II and III a variety of settings (community fitness centres and swimming pools, university settings, the University of 3rd Age network) and geographical areas (Southwest England, Scotland) were chosen in order to increase the validity of the new instrument. However, the Ageing-Well Profile should not be blindly administered to groups of frail or institutionalised older adults. Pilot studies including a) the framework of Phase I study in order to examine possible similarities and differences in the views of frail or institutionalised older people and b) the administration of the new instrument in order to examine whether the factor structure holds together, will provide essential evidence regarding the appropriateness of the Ageing-Well Profile for these groups of older people.

Furthermore, in Phases II and III the majority of the participants enjoyed good health and subsequent high levels of well-being as 50-70% did not report any health conditions and 23-37% participated in organised physical activities at least once per week. This might be a possible explanation for the positively skewed distribution and might be

interpreted as an accurate reflection of the sample's subjective well-being. However, further studies with different samples (sedentary people, people with health problems) are required in order to examine the ability of the Ageing-Well Profile to discriminate between groups of older adults with different characteristics and also to examine the susceptibility of the items to "ceiling" or "flooring" effects.

The 73.6% of the total sample participated in Phase II and III studies are females. This percentage partially represents the higher proportion of women in the older adults population which has been acknowledged by statements such as "aging is predominantly a women's issue" (McPherson, 1994; p.332) and partially indicates that only a small percentage of men participate in organised physical activities. Based on the qualitative work which did not report differences in the perceptions of well-being between male and female respondents, it is expected that the Ageing-Well Profile will present similar properties with male samples. However, the small number of male participants did not allow separate analyses for both gender and therefore, further validation of the Ageing Well-Profile with male samples is required.

Finally, the confirmatory analysis presented here was based on the factor structure derived from the exploratory factor analysis and that causes limitations in the generalisability of these findings. Therefore, further confirmatory analyses of the 31-item Ageing-Well Profile [version 3] in independent samples are needed in order to confirm the superordinate factor structure of the Ageing-Well Profile.

The available data support the development and preliminary validation of the Ageing-Well Profile. However, designing and developing instruments constitutes a complex and lengthy process (Fayers & Machin, 2000) and as a result, more supportive evidence is required for the psychometric integrity and the full development of the Ageing-Well Profile. The major purpose of the Ageing-Well Profile is to be responsive to change as a result of exercising based on pre- and post- comparisons of individuals beginning exercise programmes or research projects, a characteristic that was not explored in this thesis. The fact that the Ageing-Well Profile was developed specifically for this age

group may help this measure to be more sensitive to changes initiated by their participation in physical activity programmes. However, the issue of responsiveness to change needs to be addressed in future studies with various groups of older people and different modes of exercise.

6.4. Implications for research and practice

The Ageing Well-Profile represents a starting point for the measurement of the contribution of regular participation in physical activities to enhanced levels of subjective well-being and it appears to be a promising tool in an area where adequate measures of older adults' well-being are much in need. Specifically, the Ageing-Well Profile could be useful to:

- Exercise psychologists who investigate the effect that physical activity has on older adults' well-being and who might try to establish causal relationships
- Researchers who a) examine the effects of specific physical activity intervention programmes on several aspects of older adults' well-being, b) collect baseline data for epidemiological studies
- Exercise specialists who need a short and easy screening tool in order to identify the needs of the participants and design appropriate activity programmes

The identification of important dimensions of older adults' subjective well-being and the initial psychometric properties that this instrument has demonstrated so far raise a number of important implications for both future research and practice.

6.4.1 Future research

The need for future research could be identified in three main areas:

A. The need to improve our understanding of the effect of physical activity in older people's subjective well-being and the mechanisms involved

The superordinate structure of subjective well-being that emerged in this thesis indicates that subjective well-being could be hierarchically organised with a stable apex and a

situation-specific base. Physical activity could affect directly some specific elements in the base and indirectly the general and more stable concept of subjective well-being. Although this thesis reported elements that can be influenced by participation in physical activity, more research is needed in order to fully explore all the possible factors that contribute to the evaluation of well-being by the individual:

- What is the role of personality and how characteristics like neuroticism or extraversion influence participation in physical activities (base) and the evaluation of well-being (apex)? Studies with a combination of personality, well-being and physical activity measures could shed more light in the ways that personality characteristics interact with levels of well-being and participation in physical activities.

- How do individual characteristics (self-perceptions, genetic factors, socio-economic status) interact with perceptions of well-being and levels of physical activity participation? Studies comparing individual characteristics and reported levels of well-being and physical activity participation could provide some common paths through which these characteristics influence perceptions of well-being. The examination of the importance of physical activity in these paths and the identification of those characteristics that can be influenced by participation in physical activities could help in the development of effective exercise promotion strategies for older people.

The richness of the qualitative data presented here illustrated the value and the opportunities offered by a qualitative approach suggesting the need for more qualitative studies using various techniques. Further qualitative research might be launched with sedentary older adults to determine whether the identified dimensions are potent and how these people cover their well-being needs in the absence of physical activity. Further research is also needed with institutionalised older adults and people with low socioeconomic status who are likely to have different needs and priorities. There is need, therefore, to identify the attitudes and beliefs regarding physical activity of this

highly heterogeneous age group who conventionally is called 'older adults', and to explore the key dimensions of life involvement that contribute to their subjective well-being.

B). The need to provide further evidence for the psychometric integrity of the Ageing-Well Profile

Several studies are required for further validation and full development of the Ageing-Well Profile:

- Administration of the Ageing-Well Profile to the oldest-old groups of older adults or to institutionalised people may require further modifications for the establishment of good psychometric properties.

- Administration of the Ageing-Well Profile to sedentary or non-physically active groups of older adults in order to examine the ability of the new instrument to discriminate between inactive and active as well as high active and low active people.

- Administration of the Ageing-Well Profile to people who do not enjoy good health or high socio-economic status to examine its susceptibility to "ceiling" or "flooring" effects.

- Although gender differences in the dimensions of subjective well-being could be probably expected only in the level of importance and not in the actual content of the identified subscales, validation of the instrument with male samples is required.

- Administration of the Ageing-Well Profile to groups of older people in other countries with different cultures requires further adaptation and cross-cultural validation.

- Evidence is also required that scores on the subscales of the Ageing-Well Profile are responsive to change as result of participating in physical activities on pre- and post-

comparisons of individuals beginning exercise programmes. Groups of sedentary older adults or people with low baseline scores would be expected to present significant improvement in their scores. For ongoing classes, number of months in the programme is expected to correlate with the AWP scores.

C.) The need to understand the changes in the Ageing-Well Profile scores

- Objective measurement of physical activity and fitness levels alongside the evaluation of the AWP subscales could identify any links between changes in physical fitness and improvement in perceptions of well-being. The relationship between fitness levels and the individual subscales could provide useful information regarding the possible mechanisms that operate in the presence or not of functional changes offering older adults the "feeling good" effect and the motivation for sustained participation even in the absence of functional changes.

- The examination of the incremental effects of various types of physical activity and modes of participation (individual, group-based) on the Ageing-Well Profile scores is also required. This will determine whether the level of change in the individual subscales of the instrument can be attributed to a particular type or mode of physical activity.

- Further studies are also needed in order to understand what do higher scores of subjective well-being mean in relation to mental illness such as depression. Although participants in this research did not report depressive symptoms, in UK at any one time, almost 10-15% of the population aged 65 and over will have depression. Does increase in the AWP scores relate with reports of decrease in depressive symptoms? In addition, the effect of changes in the specific AWP dimensions on reports of depressive symptoms requires further examination.

- Finally, there is need to examine what increments in AWP scores mean in practical terms. Do older adults perform better in their activities of daily life and furthermore in leisure and social activities? Do they report changes in the level of help they need

on a daily basis? The identification of the increments in AWP scores that are required to bring these changes in older people's life could help in evaluating intervention programmes in a more meaningful way.

6.4.2. Practical Implications

The increased interest in the contribution of physical activity to successful ageing is evident in formal policy documents of a range of organisations and institutions (Department of Health, 2001; Health Education Authority, 1997, The Robert Wood Johnson Foundation, 2001). Scientific evidence increasingly indicates that physical activity offers one of the greatest opportunities to extend years of active independent life, reduce disability and improve the quality of life of older people (ACSM, 1998; Biddle & Faulkner, in press; World Health Organisation, 1997). Although the evidence is clear, older adults remain the most sedentary segment of the entire population with negative implications at both the individual and societal level. The urgent need to address this issue is evident in policy documents in the US (The Robert Wood Johnson Foundation, 2001) and the UK (Health Education Authority, 2000).

What is also stressed is that there has been inadequate translation of research findings into intervention strategies that are practical, and that can be incorporated into on-going home and community settings. Furthermore, there is minimal market research to define the perceptions, beliefs and concerns of older persons about physical activity and ageing (The Robert Wood Johnson Foundation, 2001).

This research clearly demonstrated that successful ageing is a lot more than simply avoiding disease and disability. In order to overcome the complex barriers that impede the promotional efforts to increase and maintain physical activity among older adults, the promotion efforts should be based in the finding that 'ageing-well' is about development, personal control and maintenance of physical, mental and social function. Although a common goal in physical activity promotion strategies and intervention programmes is the enhancement of older adults' well-being, the concept of well-being is

not well-defined and more importantly, most of the existing definitions are not based in the older adults' own perceptions. As a result,

- it is not clear what are the expected outcomes of these efforts
- measuring the effectiveness of these efforts is problematic as it is not clear what must be measured and what are the appropriate measurement tools to do so
- it is also not clear whether what is measured is what is important for older adults' well-being

Based on the perceptions and the own words of older adults, this research stressed that subjective well-being is a multidimensional construct with dimensions that present specific characteristics in the later years of life. Being aware of this multidimensionality is important for:

- Setting strategic directions towards the improvement of older adults' quality of life by targeting specific domains and establishing specific outcomes from participation in physical activities
- Educating exercise specialists who work with older adults on the important elements of well-being for them
- Evaluating existing and designing new and attractive activity programmes, tailored to the needs and characteristics of older people
- Deciding what should be measured and selecting the appropriate measurement tools that can give accurate and specific information

The information from this study suggests some early pointers for the design of successful exercise programmes for older adults. The active older adults in this study reported that physical activity had contributed in many ways to their well-being. Although the focus of the study was not directly on their motives for physical activity, it is reasonable to assume that the well-being benefits that they experienced motivate them to continue their participation in physical activity programmes. This suggests that activity programmes should be designed to maximise opportunities for participants to experience:

- personal achievement, success and an improved sense of personal control
- improved functional capacity, strength and mobility
- positive self-perceptions and mood
- improved mental alertness and vigour
- Reduced feelings of stress, loneliness and isolation
- a sense of belonging and social confidence

Presenting positive initial psychometric properties and subject to further validation studies, the Ageing Well-Profile indicates that it is a promising tool for use in the ageing and physical activity field for both policy and practical purposes:

- The Ageing-Well Profile could be used for determining the effectiveness of home-based and community-based interventions aiming in the enhancement of subjective well-being of older persons and for comparing findings from different studies in order to better develop and disseminate best-practice guidelines.

- It could also be used to evaluate the effect that specific modes of activity have on the dimensions of older adults' well-being and provide information on whether particular activities have greater effect on specific dimensions of subjective well-being. This information could be important in the decision-making regarding the investment by health authorities in the design and delivery of future activity intervention strategies.

- The Ageing-Well Profile could also be used as a screening tool for group or individual counseling and as an adjunctive tool for tracking people at risk in primary care.

- Finally, the exercise specialists could use the Ageing-Well Profile to gain more information for the participants in their groups in order to design specific programmes to meet their needs and to monitor the effectiveness of their programme by measuring the changes in the Ageing-Well Profile scores.

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APPENDICES

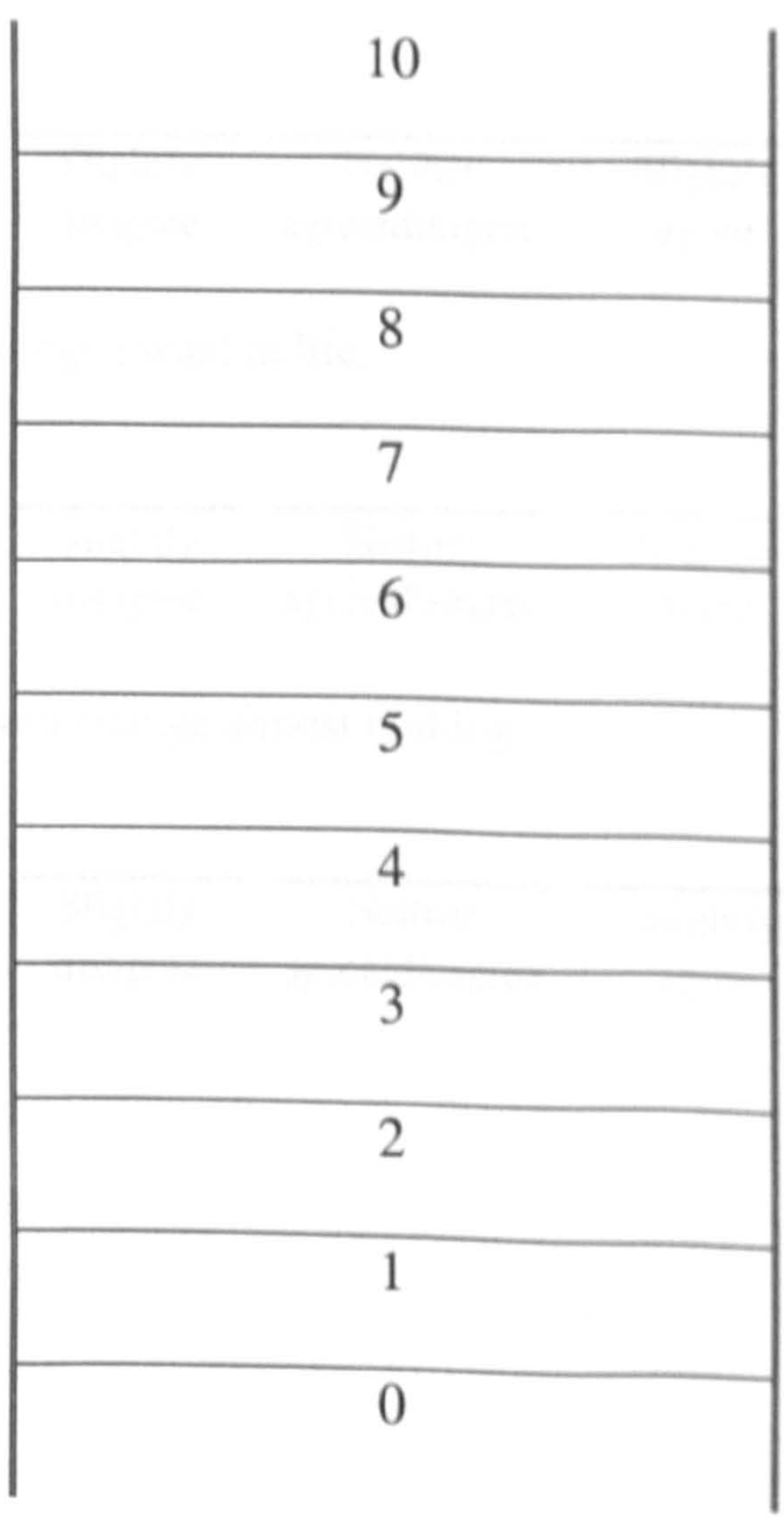
PHASE I

Appendix I-1

Date of Birth:
Gender:
Family status:
Educational Status:
Previous professional occupation:

Cantril's Self-Anchoring Ladder Scale (Cantril, 1967)

Here is a picture of a ladder. The top represents the best possible life for you and the bottom represents the worst possible life for you. Where on the ladder do you personally stand at the present time?



The Satisfaction With Life Scale (Diener, 1985)

Below are five statements with which you may agree or disagree. Please indicate your agreement with each item by placing a ✔ on the appropriate line.

1. In most ways my life is close to my ideal.

Strongly disagree	Disagree	Slightly disagree	Neither agree/disagree	Slightly agree	Agree	Strongly agree

2. The conditions of my life are excellent.

Strongly disagree	Disagree	Slightly disagree	Neither agree/disagree	Slightly agree	Agree	Strongly agree

3. I am satisfied with my life.

Strongly disagree	Disagree	Slightly disagree	Neither agree/disagree	Slightly agree	Agree	Strongly agree

4. So far I have got the important things I want in life.

Strongly disagree	Disagree	Slightly disagree	Neither agree/disagree	Slightly agree	Agree	Strongly agree

5. If I could live my life over, I would change almost nothing.

Strongly disagree	Disagree	Slightly disagree	Neither agree/disagree	Slightly agree	Agree	Strongly agree

Appendix I-2

Interview Guide

A. DEMOGRAPHIC QUESTIONS

- Age, Gender, Family status
- Educational status, Previous professional occupation

B. INTRODUCTORY TASKS

- 'Ṡelf-Anchoring Ladder Scale'
- 'Satisfaction with life Scale'

Cognitive evaluation of ones' own life satisfaction

C. EXPLORATION OF SUBJECTIVE WELL-BEING

1. Which are the things that you think are important for your well-being? Why?
2. If you could choose the most important one what would you choose? Why?
3. Which are those elements in your life that make you feel happy?
4. Which are those elements in your life that you dislike?
5. How do you believe you could be more satisfied from your life?
6. Are there some elements that you would like to change? Which are those and why do you want to change them?
7. What well-being means to you? If you were asked to describe the term well-being which will be the definition according to your point of view and your experiences?

D. EXPERIENCE FROM PARTICIPATION IN PHYSICAL ACTIVITIES

1. What counts as physical activity to you? Is walking, gardening, housework...a physical activity for you?
2. Do you believe that physical activity is important?
3. How important it is for your well-being? In what way?
4. Have you noticed changes in your body because of the physical activity? (Pains, disorders, blood pressure, vigour, illness, strength, flexibility, fatigue, weight control,...)
5. Have you noticed changes in your mood? (Stress, pleasure, worried, upset, self-esteem, sadness, depression...).
6. Are there any changes in cognitive function? (Memory, control over the way of thinking, feeling, talking and acting....).
7. Are there any changes in your everyday activities? (Wake up fresh-better sleep, energy, vitality exhaustion, accomplish faster and better the ADL, reducing risk of injury/accident).
8. Have you noticed changes in your social life? (Feeling of worth, less isolation and loneliness, more friends...).

Appendix I-3

7th Interview: Woman (70). Heart fit-Clifton sports centre. 23/06/99

R: I lost my husband two years ago from cancer. For those nearly two years I have not been doing anything but sitting still and eating too much. It was a comfort eating chocolates and I felt very fat and unfit. So when I came to Exeter I joined a practice and I told him I was not sleeping and I was getting palpitations at night you see with my heart so he said why do not you join Clifton leisure centre. There is the heart fit campaign and it is much cheaper rather than going to a health center so I said I would go and give it a try and that was 6 weeks ago. The instructor took me in and she gave me an extremely good health check. When she took me to the machine room I thought that I could not do it. It was too complicated, but I settle in certain time and each week it was better. Yesterday I think it was the best day because I had the complete control of what I was doing. I go there once a week because it takes so long to come back, so today I walked from here, I walked to town and all the way back and I do something everyday. And I try to get fit again.

I: Is exercise important to you?

R: Oh yes!

I: Why is that?

R: Because during the time I was staying in bed I felt when I got up my knees were stiff, I had a problem with my back for many years everything seemed to be not working properly. And in six weeks today when I walked to town I felt great. But that is a very short time. I still need to lose another 10-12 pounds because I also have had a very bad back. I had two back operations so I am determined to lose the extra weight, to get my legs feel better.

I: So exercise helps you to control weight?

R: Yes as well. I mean I have a fairly good diet apart when I was eating chocolates that is because I was stressed. When you are alone, we were married for forty-eight years, so half of my life is gone. I am not yet used to be alone but because when I look in this little house there are no memories of him and I can cope better. I need to keep doing exercise because I had bronchitis so when I first came here I was trying to walk and I was just stopped. But now I do not have to stop and I am pleased with myself.

I: How does it feel?

R: Great! Exercise helps me controlling my weight, helps the aching of my legs, I feel stronger and the tummy is always a problem isn't it?

I: What about your daily activities? Do you feel that exercise help you in the housework?

R: You are not pushing yourself to the limit when you are dusting or vacuum cleaning. I adore gardening and it is better because you are using your arms and your

legs but you know you really need to push yourself and if I do exercise I go quickly and I can feel my heart beating. Yes, it is very important I think. When I look at some of friends- I also play bowling-it is not hard work but you walk up and down, you are bending down and some of my friends maybe ten years younger, they can not get it done very well because they do not do anymore exercise and just bowling is not enough. I think it keeps you fit, it keeps you young if you are feeling good.

I: What about your mood?

R: When you come away from Clifton you are high, it makes you feel high. I am a sunshine person so the weather affects my mood very much. In the winter time I try not to get depressed but if you feel fit, when you do not feel fit you tend to get worse because you sit and think ' I feel miserable' and then you eat something wrong, you go for the sweets and the cakes and then you feel worse after that so feeling fit does affect your mood because you do not want to get up in the morning when you know you are fat and overweight do you? It has happened to me. All the winter I was staying with my daughter. I had no interest in life at all. But you see, selling your home and losing your husband are the two worst things that can happen to your life isn't it really?

I: Has exercise helped you to overcome depression?

R: Yes! It is really not easy being on your own when you had a macho man. But we are this older generation where I did all the minor things and my husband did all the financial, the car and the gardening and I miss it terribly. So when he was ill, I had to drive and he was hitting the stick on the floor telling what to do. So my confidence was really down.

I: And now?

R: Now I feel better. I drive everywhere. Before I would feel so nervous and whatever, I was a mess. But now I have become more young person and I think that exercise has helped me to do that. The instructors were so helpful. I mean I hated in the beginning because I was not used to be with men in a working place like that. But now I just ignore them because I have more confidence so I just get on with it but the first hour seemed an eternity. I feel sorry about people that they do not persevere with it because after the first four weeks you feel that you have more control. I feel a lot better and I should continue with my twenty weeks and stay long after.

I: What about the social aspects of exercise?

R: Each week you tend to meet someone different. I met a woman, I told her that I like bowling and she phones someone that gave me my first lesson. I mean, I wouldn't have gone on that without someone introducing me. This gentleman was waiting with his wife and they were very kind. They gave me the lesson and I did not pay for that. But that was because I met this woman in the club you see! And apparently they go on trips they go together and I look forward on that. I have a lot of friends in Majorca and I miss them very much. As you know coming from Greece the whole atmosphere in warm countries is different. So I need to go and find people that I can really be happy

with you know and I think that at Clifton exercise class I find the people that I like to be with.

I: It is good to see that exercise helps you both physically and mentally.

R: Yes! Mentally I feel quite different when I think back in January. My daughter was leaving me all the leaflets but I was not interested. I was living in the past you see, I was thinking of Majorca and what we were doing on certain days and strange enough now I do not do that anymore! I did not want to come back but I could live to Majorca without Phil.

I: If you could describe wellbeing what does it mean to you?

R: Well, money comes to it of course. You need enough to live on, you need your family around you. I am very lucky, I have a very good family but they do not actually live with me. You also need friends of your own age. You do not want to find that you are living alone of course! I think you need to feel fit because if you do not feel fit everything you do you do not enjoy it. If you have aches and pains and you are not well, you can not do the things you want to do. I have felt that way in the last two years.

I: So which are the things that you find important for your well-being?

R: I think I am quite content at the moment because I have this bungalow absolutely changed, as I wanted and it is going to be warm in the winter, I am going to have a nice garden. I looked to apartments but because we had a big garden in Majorca, I need to go out in the fresh air. Here is ideal. I can walk down the quay, I could also cycle. That's what is good for me. My well-being is being able to walk or cycle or when friends come we could walk outside in the nice atmosphere. I need to see the trees, the birds. It is very important to me!

I: Which are the important things in your life?

R: I think to be able to walk out in the fresh air, friends are very important, car is not so important because I can walk to Exeter. We had never had a lot of money so it is not important. As long as a pay the bills I am happy and having my family around when I need them. That's important.

I: Which are the things that make you happy?

R: Music, I love to hear music of all sorts. I sing, I go to church I like to go there, it is a happy. Church, lovely atmosphere. I think being busy is very important, having things to do that you find that you like to do. Not having time on your hands and do not know what to do. I have been through that and I did not know what to do about that. Having good health is very important. Probably is the most important. To be in good health. I do not wish for anything else at the moment. When Phil retired we went to Majorca. We had ten happy years that a lot of people do not have. We were very happy.

Appendix I-4

Physical activity and Developmental Well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
1	you are doing something and achieving something. There are targets in this exercise. So when you tackle anything at all, you can tackle it or you can attempt to tackle it doing it so exercise has immeasurable positive elements to do it.	achievement	personal development	developmental well-being
	I want to achieve, my aim now is to get back on my judo mat and instruct children again and coach.	goals	personal development	developmental well-being
	They get better, they are improving with exercise workouts and things like that, I mean I have taken them easy.	everyday activities	independence	developmental well-being
	I am back in doing things	ability to do things	independence	developmental well-being
	not necessarily bending and twisting because I can not but I have been doing things out and I make myself do that.	ability to do things	independence	developmental well-being
	I found my self able to do a few more things and it comes sharply 'oh I managed that!' and that gives you a better quality	ability to do things	independence	developmental well-being
3	I do my own housework, I do my own hoover and cleaning up, bed, cooking	everyday activities	independence	developmental well-being
	not important but I like to keep myself nibble, and basically I want to be able to walk, and do things.	ability to do things	independence	developmental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
5				
	If you stop you vegetate. When you work you are active but when you retire you have to find a way to keep yourself busy.	vegetate	maintenance	developmental well-being
	So you use exercise and activity as a replacement for work? Yes, of course.	replacement for work	personal development	developmental well-being
	we say if you do not use it you lose it. make yourself do these things because otherwise if you do not use it you lose it.	being active	maintenance	developmental well-being
	I am doing more.	ability to do things	independence	developmental well-being
	You can not go out just sit, sit, sit.	ability to do things	independence	developmental well-being
	If you stop you vegetate. When you work you are active but when you retire you have to find a way to keep yourself busy. Since I retired I am always active from early in the morning until six o'clock in the evening and that is the only way to keep going.	keep being busy	maintenance	developmental well-being
	that gives me horror. Absolute horror. Being on a wheelchair, in a nursing home. I hate that. That's one reason I go to the exercise. To keep my legs strong so I can stand on my two feet.	dependence	independence	developmental well-being
	yes. Doing more things around the house is very important. I am always asking myself have I done enough things.	everyday activities	independence	developmental well-being
	it helps you to do the things that you want to do	ability to do things	independence	developmental well-being
6				
	It is easy to become sedentary when you get older if you do not make an effort.	being active	maintenance	developmental well-being
	I do not mean only my body. I mean everything. You do need to keep, you do need to get back in doing things	being active	maintenance	developmental well-being
	yes it is important to do something.	being active	maintenance	developmental well-being
7				
	I was living in the past you see, I was thinking of Majorca and what we were doing on certain days and strange enough now I do not do that anymore!	interest in life	personal development	developmental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
8				
	yes we look forward for the Monday evenings, we have got somewhere to go.	purpose	maintenance	developmental well-being
	As you get older activity is get less.	being active	maintenance	developmental well-being
9				
	Yes, but I have always been a dancer more or less since I was a child. My mother used to dance so I was going with her.	habit	maintenance	developmental well-being
10				
	You have to remember what the steps are and you have to make them with the beat and this is challenging.	challenge	personal development	developmental well-being
	not so important now that we do not work but we are doing something every day.	being active	maintenance	developmental well-being
11				
	yes it is a big change. I had never been the one for housework and now I do it! I even do the ironing. I have a friend who retired six months before me and he still can not take it. So I am telling him 'come down here and you will feel much better. I am getting used to it now!	cope	personal development	developmental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	I did have nothing to do!	being active	maintenance	developmental well-being
	yes! And I have to keep fit for my sons. They are fit.	goals	personal development	developmental well-being
	You have to be a creature of habit otherwise you are lost. At least that is for me.	habit	maintenance	developmental well-being
	Exercise gives you something to do. Tuesday morning exercise, Friday morning exercise. It is like going to work. You have to be a creature of habit otherwise you are lost. At least that is for me.	goals	personal development	developmental well-being
	Exercise gives you something to do. Tuesday morning exercise, Friday morning exercise. It is like going to work.	replacement for work	personal development	developmental well-being
12				
	oh yes! You can bend and stretch with no problem. Step on a chair and hang something up.	everyday activities	independence	developmental well-being
	Oh yes! It keeps me going! I mean sometimes on the Wednesday morning I think 'oh! I do not want to go' but then I say 'you must go' 'make yourself go'.	being active	maintenance	developmental well-being
	you say I have been active today!	being active	maintenance	developmental well-being
	I could quite easily one time have said 'I do not want to bother when I retired. But it does make a difference when you wake up and you have to do things that you enjoy.	being active	maintenance	developmental well-being
	and I think that badminton and activity helps. I think you can very easily lie down	being active	maintenance	developmental well-being
	If we gave up it could only be a matter of time we could never get back again because we keep it going.	keep being busy	maintenance	developmental well-being
	oh I am retired now, you know, I do not do anything shut the door and wait for the end!	being active	maintenance	developmental well-being
13				
	I do like to keep active.	being active	maintenance	developmental well-being
	I keep active with every way. Because it is filling your time.	being active	maintenance	developmental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
14				
	last week I have done something that I could not do for many years. I managed to move furniture and clean the kitchen and the bedroom. So I decorated everything. And I am happy about that.	achievement	personal development	developmental well-being
	When you go to the class you may feel a little bit tired afterwards but you have succeeded it, you have done it.	achievement	personal development	developmental well-being
	Try to go a little bit further, try things a little bit more difficult. If you do not achieve it does not matter, but try. It is again a state of mind.	challenge	personal development	developmental well-being
	And apart from that it helps older people to meet other people, having something to look forward to.	purpose	personal development	developmental well-being
	also when you were used to do something that you can not do it anymore you miss it. So you try to find ways to replace it. Up to a point exercise put things together.	replacement for work	personal development	developmental well-being
	I mean if you have been successful and you finally find that you are old and you do not have anything to be successful at it is very difficult. It is a challenge.	challenge	personal development	developmental well-being
	For example after my injury I started doing exercise and it was an effort and a goal at the same time.	goals	personal development	developmental well-being
	And it gives you something to look forward to.	purpose	personal development	developmental well-being
	You use the muscles that help you to get up from the chair, carry your shopping.	everyday activities	independence	developmental well-being
	I have a big house so there is always something to do. And life is to full.	being active	maintenance	developmental well-being
15				
	Generally to keep me going on	keep being busy	maintenance	developmental well-being
	It is something that I am used to do now.	habit	maintenance	developmental well-being
17				
	because you can soon find yourself sitting on a chair all day long and not getting up. So you have got to keep busy I think.	keep being busy	maintenance	developmental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
18	Does exercise has the same effect? yes because you take something out. You feel better because you have made a little bit more.	achievement	personal development	developmental well-being
	I perform better. I bend better in the garden. I can walk the dog better. I did a sponsored walk a couple of weeks ago. I really enjoyed that. I did 7 miles.	everyday activities	independence	developmental well-being
	I would go mad if I did not get out of my house.	freedom	independence	developmental well-being
	Now I am in the average and I aim higher.	goals	personal development	developmental well-being
	Because it gives me a purpose. I look in the garden and I think what else I could do, what was good and what was bad every year.	purpose	personal development	developmental well-being
20				
	again it is the sense of achievement. I know that having done this activity for an hour I have achieved something, which I have never achieved before.	achievement	personal development	developmental well-being
	It is a mean to an end. I am trying to improve this	a mean to an end	personal development	developmental well-being
	So the fulfillment is also the same in physical activity? oh yes! I think so.	fulfilment	personal development	developmental well-being
	And pushing yourself just a little bit further.	achievement	personal development	developmental well-being
	M anybody who is doing creative work no matter what you are doing-you can play an instrument or growing flowers-it is the feeling of fulfilment when you see that you have achieved a quality just a little bit better than you though that you could achieve.	fulfilment	personal development	developmental well-being
	I am doing everything a little bit better. Is the same you see? Just doing everything just a little bit better.	achievement	personal development	developmental well-being

Appendix I-5

Financial Well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Higher Order Theme*	*Dimensions*
1				
	I do not need lots of material things, I have home cars and television but I do not specifically need them. I prefer enjoying doing other things..	not material things	personal possessions	financial well-being
3				
	home	home	personal possessions	financial well-being
4				
	I would like to have a nice pension, which I have not got	financial security	financial independence	financial well-being
	I dislike worrying about, money not having enough.	financial security	financial independence	financial well-being
	having enough money.	financial security	financial independence	financial well-being
5				
	we would like more money. The pension every year with the inflation does not give you a lot of money	financial security	financial independence	financial well-being
	for me it is three meals a day and enough money. That's all.	financial security	financial independence	financial well-being
6				

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Higher Order Theme*	*Dimensions*
	home that's about	home	personal possessions	financial well-being
7				
	We had never had a lot of money so it is not important. As long as a pay the bills I am happy	financial security	financial independence	financial well-being
	well, money comes to it of course. You need enough to live on	financial security	financial independence	financial well-being
8				
	I think we are lucky as far as money concerns, we both got better pensions, we do not have much money, but we have enough for our place, car, doing the things we want to do, we can not fly to Australia if we want to but it does not matter, we have got enough, enough to make us happy.	financial security	financial independence	financial well-being
9				
	house and my family I suppose. I think that you make the best of what you have got. I have a nice house I suppose!	home	personal possessions	financial well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Higher Order Theme*	*Dimensions*
	I would like a garden. There is a garden here but it is a common garden and I do not like it!	garden	personal possessions	financial well-being
10				
	we do not live an extravagance life- we live a fairly ordinary life and we can afford to do that.	financial security	financial independence	financial well-being
	good pension also.	financial security	financial independence	financial well-being
11				
	Some things have changed. I have to cut back on quite few things. Pension is rather good, not brilliant. I have to watch the pennies some times.	financial security	financial independence	financial well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Higher Order Theme*	*Dimensions*
12	I do not have much money because someone bought our house in 1980 and he did not pay us. . And we do not have much money now apart from the fact that the house is ours. So we do not go on holidays at all but I am not complaining. I have a nice garden and I am thankful for what I have got.	financial security	financial independence	financial well-being
	I have a decent home, warm and comfortable	home	personal possessions	financial well-being
13				
	My house is always clean.	home	personal possessions	financial well-being
	And financially I am not too badly off. I had a good job, I have a reasonable pension.	financial security	financial independence	financial well-being
	to have a reasonable home.	home	personal possessions	financial well-being
15				
	because we were very fortunate! We had no financial worries.	financial security	financial independence	financial well-being
16				
	I don't mention money because I am reasonably comfortable.	financial security	financial independence	financial well-being
17				
	All now are concerned of making money. I think that is the main thing that I dislike.	concern of making money	financial independence	financial well-being
	position, income, good living conditions.	financial security	financial independence	financial well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Higher Order Theme*	*Dimensions*
19				
	we have never been in debt	financial security	financial independence	financial well-being
20				
	I do not like the stupidities I have practised in my own life meaning that I could be more financial secure.	financial security	financial independence	financial well-being
	I would like a better house.	home	personal possessions	financial well-being
	Not to have financial worries	financial security	financial independence	financial well-being

Appendix I-6

Physical activity and Physical Well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
1				
	it pumps a bit of adrenaline to the body	adrenaline	fitness	physical well-being
	the blood is flowing, the heart doing its job, the system feels lively	heart	health	physical well-being
	When you get set back, the fitter you are I thing when you get a problem the worse it hits you. If you are not fit anyway you never did very much in the first place.	prior fitness levels	fitness	physical well-being
	I was fit and for a person in my age group I was fit in my age group definitely.	being fit	fitness	physical well-being
	I was always regarding my self, to hold in my own, in my level wherever I was quite strong enough to do that, fit enough	prior fitness levels	fitness	physical well-being
	'you have to strengthen your body around the area of the injury because we can't do anything about it	strength	fitness	physical well-being
	Maybe not in the same intensity but I wouldn't have done it anyway, as I get older the intensity would have dropped. But that is a natural condition, this is not natural! So I am not gonna have it for a long time!	being active	fitness	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	Having always done exercise I never looked at it from the point of view of what it could do for me. Cause I was fit and I did not realise why I was so when you are fit you never look at it, you never thought that's the key. When you suddenly have reasons to set back then you know it is key.	being fit	fitness	physical well-being
	But the second aspect is that I want to get fit. I want to achieve, my aim now is to get back on my judo mat and instruct children again and coach.	being fit	fitness	physical well-being
2				
	And there are benefits for my health point of view.	health	health	physical well-being
3				
	Yes, I can walk because in the beginning I could not	walking	mobility	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	I was in the hospital and I had physiotherapy, and all that and I could do anything for 12 months.	ability to do things	mobility	physical well-being
	I could not, I was overweight, I am overweight now. I would like to lose some weight. so exercise helps you to control your weight? yes, yes	weight control	health	physical well-being
	not important but I like to keep myself nimble, and basically I want to be able to walk, and do things.	be nimble	fitness	physical well-being
	I was recommended but my heart doctor	prescription	health	physical well-being
	That what exercise is doing for me, keeping me nimble..	be nimble	fitness	physical well-being
4				
	Exercise is to slowdown the effects of arthritis. If I can slow things down and maintain my quality of life I would be happy.	disease	health	physical well-being
	I feel more pain sometimes but I believe that this is good	pain	fitness	physical well-being
	But of course my primary reason is to keep my body healthier.	health	health	physical well-being
	being fitter for longer. My condition progresses so I hope that it will slow down the effects of the disease I have.	disease	health	physical well-being
	If I do not have physical activity I have difficulties in sleeping. But if I have physical activity sleeping is better.	sleep	health	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	being fitter for longer.	being fit	fitness	physical well-being
5				
	my shoulders were very stiff but I feel better. Now I can push my arm further.	wider range of movement	fitness	physical well-being
	I can bend down easier	flexibility	fitness	physical well-being
	To keep my legs strong so I can stand on my two feet.	strength	fitness	physical well-being
	If you do not exercise you find that you feel pain, we all get pain but you just have to push yourself, make yourself do these things because otherwise if you do not use it you lose it.	pain	health	physical well-being
	My legs get stronger	strength	fitness	physical well-being
	So you have noticed more flexibility. yes!	flexibility	fitness	physical well-being
	I feel stronger and I enjoy doing the exercises. I think that helps.	strength	fitness	physical well-being
6				
	it is a small part of your life really but I am aware that I need to do something. But I did not needed it for the heart fit, I needed it for the mobility.	ability to do things	mobility	physical well-being
	I started going to classes and I realised that I could improve things that were wrong without having to have physiotherapy or medication	health	health	physical well-being
	When the children grow up you find easy ways of doing the housework and you do not actually use your body.	being active	fitness	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	just getting old. There is nothing you can do about that. I have put on weight and I do not like it. But there is not much to do about it. So I do not bother about it	weight control	health	physical well-being
	not really. I do not think that exercise makes much difference in weight. You put on muscles and you lose fat but you do not win. But muscle is better that fat. Probably it weighs more.	weight control	health	physical well-being
	but I notice if I miss it for more than three weeks, I start get very stiff	stiffness	fitness	physical well-being
	this is a low impact aerobic which is actually more difficult. If you do things quickly you can do them wrongly if you do things with more care you get more benefit. Gym isolates and it is good if you want to isolate some parts of your body. But if you want general mobility this is the sort of class you have to do. I try to keep mobile. But likely exercise seems to keep it going and also physical activity. But I do try to walk. Walking from the top of the garden down to the garden it is quite a long travel. So I try to keep up.	ability to do things	mobility	physical well-being
	Because I am possible prone to arthritis and if I do not exercise I get very stiff and I become more and more immobile. So I know I have to do things just to keep mobility. Because if I do not I have problems	disease	health	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	if I do not exercise I get very stiff.	stiffness	fitness	physical well-being
	it is about co-ordination and having to think. If your teacher changes the class you have to concentrate	Co-ordination	fitness	physical well-being
	but I realised when I first went to exercise class how much mobility I have lost over years. And that is when I start to realise that it is up to me to keep going. Because, otherwise if I just function in my normal life things will slowly start to contract.	mobility	mobility	physical well-being
7				
	I was not sleeping and I was getting palpitations at night you see with my heart	heart	health	physical well-being
	helps the aching of my legs, I feel stronger	strength	fitness	physical well-being
	feeling fit does affect your mood because you do not want to get up in the morning when you know you are fat and overweight do you? It has happened to me.	body image	self	physical well-being
	you are not pushing yourself to the limit when you are dusting or vacuum cleaning. I adore gardening and it is better because you are using your arms and your legs but you know you really need to push yourself and if I do exercise I go quickly and I can feel my heart beating. Yes, it is very important I think.	being active	fitness	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	! Exercise helps me controlling my weight,	weight control	health	physical well-being
	I had bronchitis so when I first came here I was trying to walk and I was just stopped. But now I do not have to stop and I am pleased with myself.	breathing	health	physical well-being
	I am determined to lose the extra weight, to get my legs feel better.	weight control	health	physical well-being
	I had a problem with my back for many years everything seemed to be not working properly.	low back pain	health	physical well-being
	I was not sleeping and I was getting palpitations at night you see with my heart	sleep	health	physical well-being
	during the time I was staying in bed I felt when I got up my knees were stiff	stiffness	fitness	physical well-being
8				
	Exercise, it very good for us because it is a form of gentle exercise	exercise	fitness	physical well-being
	I get exhausted!	exhaustion	fitness	physical well-being
	And the exercise also is very good to us. I mean, when we go to the doctor and he says go for walking when he asks what sort of exercise we do and we say dancing he says 'good, good, you keep dancing'.	exercise	fitness	physical well-being
9				
	Yes it keeps me a little bit supple. I mean easy to move.	supple	fitness	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	I take tablets for my heart and I can not take too much passion but it is all right.	heart	health	physical well-being
10				
	We used to walk but not very hard now. When I was younger I could walk fast but now I can not do it.	ageing	fitness	physical well-being
11				
	But my aim is to keep fit, loose, comfortable! Diabetes knocks you down sometimes. It was just when I started working so I have it for fifty years. But I will not let it get me down. Sometimes it beats me but not for long.	being fit	fitness	physical well-being
	I am not quite so breathless, generally I feel better, better well-being.	breathing	health	physical well-being
	I lost a little weight	weight control	health	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	very important because before I come to this centre I was not doing very much and therefore diabetes was deteriorating me.	disease	health	physical well-being
	Doctors told me to come here and start exercise. Exercise to me is important, it keeps me fit.	being fit	fitness	physical well-being
	I see people walking in the town and I do not want to be like that. And I do not want to grow a big belly that's all!	weight control	health	physical well-being
	to keep fit, to make myself do things so I am not continuously fall asleep which I was doing.	being fit	fitness	physical well-being
	To keep trim.	keep trim	fitness	physical well-being
	But my aim is to keep fit, loose.	comfort	fitness	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
12				
	meaning strength, breathing, stamina, bending down, all sorts of things.	stamina	health	physical well-being
	I do not do walking but I have quite a large garden to deal with. I am on the go all the time.	being active	fitness	physical well-being
	They have mobility problems not because they are older but because they have never been physically active.	being active	mobility	physical well-being
	I mean I have been playing badminton three years now and I am fitter now than I was twenty years ago.	being fit	fitness	physical well-being
	And since I started playing badminton my overall fitness has improved tremendously.	being fit	fitness	physical well-being
	meaning strength, breathing, stamina, bending down, all sorts of things.	breathing	health	physical well-being
	meaning strength, breathing, stamina, bending down, all sorts of things.	flexibility	fitness	physical well-being
	I loved dancing. I do what I can now but it is painful, it is hard and I can not really enjoy dancing now.	pain	health	physical well-being
	it keeps you supple	supple	fitness	physical well-being
	it keeps you mobile.	mobility	mobility	physical well-being
	You really have to keep going and that is what it makes me say I have to go. Because it is going to be twice as hard next week.	being fit	fitness	physical well-being
	no, it does seem to.. I am very careful with my weight but I can not lose any weight.	weight control	health	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	if you exercise you make the heart pump and therefore you assist the angina which it proved right.	heart	health	physical well-being
13				
	if you keep it up. If you leave it takes long to take it back	being active	fitness	physical well-being
	So it does overall give you a good stamina and fitness	being fit	fitness	physical well-being
	and because cycling gives you a better breath control.	breathing	health	physical well-being
	function and being active	function	health	physical well-being
	So I use exercise to keep myself fit.	being fit	fitness	physical well-being
	I probably have better stamina because of the cycling than a lot of youngsters..	stamina	health	physical well-being
14				
	Exercise has improved our fitness.	being fit	fitness	physical well-being
	It helps me to strengthen my muscles	strength	fitness	physical well-being
	and it keep me fitter.	being fit	fitness	physical well-being
	exercise is physical. Your blood is running, it keeps you alive.	be alive	health	physical well-being
	to walk straighter,	walking	fitness	physical well-being
15				

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	That is what exercise does. To keep me up, not to be stiff and hopefully to strengthen my heart.	stiffness	fitness	physical well-being
	well my main motive for doing exercise was that I was advised in the hospital. So it was for medical reasons. I was afraid for my health.	prescription	health	physical well-being
	I think I would have deteriorated much if I did not have the exercise.	deterioration	health	physical well-being
	first it keeps me fit and improve my fitness	being fit	fitness	physical well-being
	That is what exercise does. To keep me up, not to be stiff and hopefully to strengthen my heart.	heart	health	physical well-being
	well I do not if it because of exercise but also my wife has noticed that I get up in the morning more easily.	sleep	health	physical well-being
16				
	But, I had been away for two weeks and I had done anything. So when I come back and I went to swim my arms and legs were stiff. So it is better not to stop.	being active	fitness	physical well-being
	But, I had been away for two weeks and I had done anything. So when I come back and I went to swim my arms and legs were stiff. So it is better not to stop.	flexibility	fitness	physical well-being
17				
	just tiredness. Well, I enjoy that hour but I would say anything else.	tiredness	fitness	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	I try being active. I play golf, badminton, I have the garden, I hate walking and now I am in the heart fit program because my heart caused me some problems. I try to keep active. It is important.	being active	health	physical well-being
	You see, at 74 your body is running down fast. I mean some people are quite immobile at 74 and I can notice every year that my physical abilities are getting less. My legs and my limbs are aching more. And I am not sure that this program is necessarily going to help.	deterioration	health	physical well-being
	So health is the main motive for you. yes it is! This sort of exercise yes! I would not do it for pleasure! It is boring, monotonous.	health	health	physical well-being
	my doctor said that the side effect of them is the wasting muscles. That is why he sent me here to do something about that.	prescription	health	physical well-being
	I am not to keen to the physical side. My body doesn't seem to respond to. I get tired and my limbs ache. And the more I do it gets worse.	pain	fitness	physical well-being
	The object of these sessions is to build up my muscles because I found that I am as strong as I used to be. So the object is to build up stamina.	stamina	health	physical well-being
	it is just making me feel more tired. They tell me that there are gains but I do not know.	tiredness	fitness	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	The object of these sessions is to build up my muscles because I found that I am as strong as I used to be. So the object is to build up stamina.	strength	fitness	physical well-being
18				
	But it is a matter of strength and keeping supple really.	supple	fitness	physical well-being
	I was referred by the doctor because I had a problem in my ear that affects my balance and I fall over. I also have a very bad back problem. I can not do much about my back	prescription	health	physical well-being
	But it is a matter of strength and keeping supple really.	strength	fitness	physical well-being
19				
	for me the ideal is to sweat.	sweat	fitness	physical well-being
	We need it to keep on going. It helps to keep our joints loose. We must not give it up.	flexibility	fitness	physical well-being
	oh yes. But if we go to the other extreme, after a very hard badminton match the next day you are very stiff.	stiffness	fitness	physical well-being
	Because we have noticed that when we sit around too much we get bigger.	weight control	health	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
20				
	One thing that upsets me is when I see people in my age and they look like 8 months pregnant. I think how they allow themselves to come to this stage of overeating, inactivity, drinking. And I think that if I can avoid that I think it is an achievement.	weight control	health	physical well-being
	it maintains the physical flexibility,	flexibility	fitness	physical well-being
	So the flexibility and physical movement have been requirements for that activity. And that helps.	flexibility	fitness	physical well-being
	So my doctor thought that strengthening my muscles would help to avoid increasing the problem.	strength	fitness	physical well-being
	bend and stretch and so on is enough for me.	flexibility	fitness	physical well-being
	Just keeping mobile, be able to walk easily,	mobility	mobility	physical well-being
	It is very beneficial for breathing,	breathing	health	physical well-being
	And also lose some weight.	weight control	health	physical well-being
	the assessment revealed that I had to improve my heart condition. My doctor reassured me that the more of this activity the better for my heart condition.	heart	health	physical well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	! Exercise helps me controlling my weight,	weight control	health	physical well-being
	I had bronchitis so when I first came here I was trying to walk and I was just stopped. But now I do not have to stop and I am pleased with myself.	breathing	health	physical well-being
	I am determined to lose the extra weight, to get my legs feel better.	weight control	health	physical well-being
	I had a problem with my back for many years everything seemed to be not working properly.	low back pain	health	physical well-being
	I was not sleeping and I was getting palpitations at night you see with my heart	sleep	health	physical well-being
	during the time I was staying in bed I felt when I got up my knees were stiff	stiffness	fitness	physical well-being

Appendix I-7

Physical activity and Mental Well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
1				
	I can do things with much more positive attitude whether working in my computer at home, or wandering around the garden	positive attitude	positive affect	mental well-being
	Life looks better it gives you a positive attitude, and it makes you feel good about things that normally you think 'oh my lord'. You do not mourn 'oh god I am dying, you are not dying at all'. There is a lot of life to be lived and live it!	positive attitude	positive affect	mental well-being
	a better feeling about myself. I was too far down in the ladder and I had the fear that I have not got too much chance of improving life. Now I definitely, I feel better	self esteem	self	mental well-being
	a better feeling about myself. I was too far down in the ladder and I had the fear that I have not got too much chance of improving life. Now I definitely, I feel better.			

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	Before you were worrying, I was thinking 'I can not do it, it must hurt, that's painful, no I will not. That's a very defeating attitude, that you never gonna get over it and talking through to myself as well and with other people and say 'wake up, you are not in the wheelchair, you are not blind.	belief in self	self	mental well-being
	Initially I was thinking 'Oh poor old me' and I look back now and say 'wake up'. When it first happened I was saying I can't do this, I can't do that and you get an attitude, but of course you can.	belief in self	self	mental well-being
	it makes you feel good about things that normally you think 'oh my lord'.	think different	cognitive function	mental well-being
	it focuses your mind, and already the mind is focusing better, so you focus better on what you are doing, that improves quality of what you do	focus	cognitive function	mental well-being
	It must be that it makes you feel lively	feeling lively	positive affect	mental well-being
	but then you get a good work out, you think 'I am not too bad off, I am not really that bad off and it can be solved with a bit of hope and a bit of chatting with somebody I can get around this problem.	hope	positive affect	mental well-being
	I feel better altogether, about everything.	self satisfaction	self	mental well-being
2				
	I do not know how I would be able to adapt	adaptation	adjustment	mental well-being

	without exercise			
	it is that satisfaction now that the benefits are the participation, doing something you have always enjoyed doing and the satisfaction that you can still do it.	self satisfaction	self	mental well-being
	By using that, applying that particular thing you can deal with the difficulties	cope with problems	adjustment	mental well-being
	It just jumping on the bike and going out and forgetting something.	distraction	cognitive function	mental well-being
	I have always known what to do and exercise has always been an answer	way of life	way of living	mental well-being
	I mean that is a something that it can help to take the stress out if anything. It is of any kind just some physical activity	stress	negative affect	mental well-being
3				
	yes I think it is pleasure	pleasure	positive affect	mental well-being
4				
	Because I know that exercise is good for my condition. So that overcomes any extra pain I feel. It has an effect on my walking. And in my joints the pain is worse now but I know that this is necessary for my total wellbeing. So no gain without pain.	belief in exercise benefits	cognitive function	mental well-being
	But this is my first week without a break and I am quite happy about that and I am enjoying it.	enjoyment	positive affect	mental well-being
	I think you need a break	distraction	cognitive function	mental well-being
	I am happier when I come here than I would be if I stayed at home perhaps doing some office work.	better mood	positive affect	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	probably because when I leave here I go to town and happily walk around for a little while. And then go home. I think it is much a mental thing as a physical thing	positive attitude	positive affect	mental well-being
	it is probably more mental that physical changes. Meaning that I know what I am doing is good . But mentally I think it is good because I know it is for my physical well-being	belief in exercise benefits	cognitive function	mental well-being
	it is nice to meet other people. Because people help each other without realising it. Just a smile makes me feel better. So probably makes other people feel better as well	feel good	positive affect	mental well-being
5				
	exercise is therapeutic. We enjoy it very much.	enjoyment	positive affect	mental well-being
	exercise also helps you to use your brains	use of brain	cognitive function	mental well-being
	I feel better and also I like the company. I feel stronger and I enjoy doing the exercises. I think that helps.	better mood	positive affect	mental well-being
	I enjoy doing the exercises. I think that helps.	enjoyment	positive affect	mental well-being
	because you also exercise your mind. You have to think what to do, how you are going to do it. It is an activity that you use your head. In any activity you use your head.	think what and how to do it	cognitive function	mental well-being
	and that keeps you mentally active.	being active	cognitive function	mental well-being
	exercise is therapeutic	therapeutic	positive affect	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
6	the most important thing is that you have something to hold on to. It is a support	something to hold on	positive affect	mental well-being
	fun, it is more fun. It is not just rigid exercise, which is what you are doing in the gym. There is more going on.	enjoyment	positive affect	mental well-being
	it is about coordination and having to think.	think what and how to do it	cognitive function	mental well-being
	If your teacher changes the class you have to concentrate. If you do the same things and your teacher never changes the class you get into the habit of doing the exercises badly. Because if she changes it you have to thing how to do it.	concentration	cognitive function	mental well-being
	no, because I have always done exercise But I know that I really need to go especially when the weather is bad and I can not work in the garden. I would miss it dreadfully if I did not have it or I could not go.	way of life	way of living	mental well-being
	Exercise is important. I would have missed it if I did not have it. I would feel that something is missing.	way of life	way of living	mental well-being
	Because it is imposed. You are in the class and you have to do it.	obligation	cognitive function	mental well-being
	and mentally. It is a good discipline to exercise in a class situation rather on your own.	discipline	cognitive function	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
7				
	I feel a lot better and I should continue with my twenty weeks and stay long after.	better mood	positive affect	mental well-being
	But now I have become more young person and I think that exercise has helped me to do that	keep young	positive affect	mental well-being
	because after the first four weeks you feel that you have more control	self control	self	mental well-being
	And in six weeks today when I walked to town I felt great	better mood	positive affect	mental well-being
	But now I just ignore them because I have more confidence so I just get on with it but the first hour seemed an eternity	self confidence	self	mental well-being
	now I feel better. I drive everywhere. Before I would feel so nervous and whatever, I was a mess.	nervous	negative affect	mental well-being
	In the winter time I try not to get depressed but if you feel fit, when you do not feel fit you tend to get worse because you sit and think ' I feel miserable' and then you eat something wrong, you go fir the sweets and the cakes and then you feel worse after that	better mood	positive affect	mental well-being
	when you come away from Clifton you are high, it makes you feel high	better mood	positive affect	mental well-being
	I think it keeps you fit, it keeps you young if you are feeling good	better mood	positive affect	mental well-being
	I think it keeps you fit, it keeps you young if you are feeling good	keep young	positive affect	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	But now I do not have to stop and I am pleased with myself.	self satisfaction	self	mental well-being
8				
	We go there because it is a fun thing, we are helping.	enjoyment	positive affect	mental well-being
	You feel better for having been there, because you talk to people about different things	better mood	positive affect	mental well-being
	you learn something new but also being outside home, we got more interests..	information	cognitive function	mental well-being
	And it is not only the physical but also the mental side of it. You feel better for having been there, because you talk to people about different things, you learn something.	information	cognitive function	mental well-being
9				
	! I like going to the dancing. If you go twice a week you feel joy	enjoyment	positive affect	mental well-being
	I am learning new dances and it is good.	information	cognitive function	mental well-being
	So I think that as long as you go there and do things that you enjoy it is good for you.	enjoyment	positive affect	mental well-being
	Well it is good for me especially in our age because you get pressurised from that.	pressure	negative affect	mental well-being
10				
	When I retired I went to a yoga class because sometimes I found that I am worried. Through yoga I can relax.	worry	negative affect	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	What is important is that controlling your way, controlling your mind and how you are feeling, relaxation so all the tension is gone.	tension	negative affect	mental well-being
	I think it helps to keep your mind alert. I do certainly.	alertness	cognitive function	mental well-being
	Tai chi is not really dangerous. It is good, I find it good. It is about relaxing your mind.	relaxation	cognitive function	mental well-being
	The good thing in this exercise is that you are not pushed to do anything but just what you are comfortable with.	comfort	positive affect	mental well-being
	It is a sequence of steps that we have to repeat. So we can dance 4 dances in a row and this is good exercise for the mind. You have to remember what the steps are and you have to make them with the beat and this is challenging.	memory	cognitive function	mental well-being
	What is important is that controlling your way, controlling your mind and how you are feeling, relaxation so all the tension is gone.	self control	self	mental well-being
	When I retired I went to a yoga class because sometimes I found that I am worried. Through yoga I can relax.	relaxation	positive affect	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	Oh! What you gain from any physical activity. Enjoyment, competitiveness, beating	competitive	positive affect	mental well-being
	Oh! What you gain from any physical activity. Enjoyment	enjoyment	positive affect	mental well-being
11				
	well, my wife can tell you better that me. I am more forcible that I used to be. I push myself more. I used to sit back and let life pass without caring so much.	energy	positive affect	mental well-being
	no I use exercise to keep myself fit not too much for stressed. I am not stressed. I'm lucky. I just use exercise to keep myself feeling well.	feel good	positive affect	mental well-being
	And I feel stronger in mind.	mind	cognitive function	mental well-being
	generally I feel better, better wellbeing.	feel good	positive affect	mental well-being
	Yesterday for instance I walked about 5 miles. I was exhausted but it was enjoyable.	enjoyment	positive affect	mental well-being
	I suppose I feel fitter and I feel better for myself.	self esteem	self	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
12				
	you have to be very agile in mind.	mind	cognitive function	mental well-being
	mentally, you have to think.	think what and how to do it	cognitive function	mental well-being
	you say I have been active today!	self satisfaction	self	mental well-being
	I mean when you enjoy it like we do on Thursday morning you feel better for your self	self esteem	self	mental well-being
	and you come out and you smile to people and you say good morning. And the rest of the day is like this.	better mood	positive affect	mental well-being
	with badminton you have to be very quick. It is a very fast game and you have to be mentally alert and I think both of us could say nobody is gonna beat us	alertness	cognitive function	mental well-being
	satisfaction. You feel very satisfied with yourself.	self satisfaction	self	mental well-being
	You do not get sluggish. You get sluggish when you are sticking around.	sluggish	negative affect	mental well-being
	pleased with your self	self satisfaction	self	mental well-being
	oh yes when you play badminton you do not think of anything else.	distraction	cognitive function	mental well-being
	I think it does help, it sharpens your mind and especially with badminton you have to run and anticipate. You can not stop thinking. You certainly have to think.	think what and how to do it	cognitive function	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
13				
	I keep active with every way. Because it is filling your mind and time.	mind	cognitive function	mental well-being
	Because I can pace myself	pace one's self	self	mental well-being
	it keeps your mind clear.	mind	cognitive function	mental well-being
	is something that I enjoy.	enjoyment	positive affect	mental well-being
	Sports always played a big part of my life anyway.	way of life	way of living	mental well-being
	I have done for years so it is a way of life for me. So I just keep it up.	way of life	way of living	mental well-being
14				
	Actually when I have problems, after the class I find myself more able to solve them.	cope with problems	adjustment	mental well-being
	when you feel that you have done something to help yourself you feel better.	self satisfaction	self	mental well-being
	You have to behave as a grandmother but now grandmothers just say bye and go to the classes.	keep young	positive affect	mental well-being
	of course it does. Because it is good for your health. And your health influences your mind, and your mind influences your general health.	mind	cognitive function	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	going to exercise, looking nicely, presenting yourself is very important. It is very important that you always look nice	physical self	self	physical well-being
15				
	I think it is great! I enjoy it.	enjoyment	positive affect	mental well-being
	and my general wellbeing.	general wellbeing	positive affect	mental well-being
	I would have done it if I were in practice. But I have not been practice for some years now. So, I do not need that.	distraction	cognitive function	mental well-being
	I think I have. My memory is better that it was. I have not related with exercise but it has improved. And probably this is because I have been more physically active.	memory	cognitive function	mental well-being
	well I do not if it because of exercise but also my wife has noticed that I get up in the morning more easily and with better mood.	better mood	positive affect	mental well-being
16				
	because it makes me happy.	happy	positive affect	mental well-being
	I think that physical exercise also teaches mind	mind	cognitive function	mental well-being
	I enjoy all the activities because I meet all my friends, I am always laughing and joking with them.	enjoyment	positive affect	mental well-being
	well, it is an overall feeling of wellbeing.	general wellbeing	positive affect	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
17				
	just tiredness. Well, I enjoy that hour but I would say anything else.	enjoyment	positive affect	mental well-being
	and the skill of the game.	skills	cognitive function	mental well-being
	in gardening is the gardening itself. The pleasure of creating and the enjoyment of working with plants.	enjoyment	positive affect	mental well-being
	in gardening is the gardening itself. The pleasure of creating and the enjoyment of working with plants.	creativity	positive affect	mental well-being
	for pleasure and exercise. I would like to also go back to swimming.	pleasure	positive affect	mental well-being
	I think that if I do not see any improvements until the end of these 20 sessions I will certainly stop. Because I do not think that in my age it can do so many things about me.	belief in exercise benefits	cognitive function	mental well-being
18				
	I just feel better.	better mood	positive affect	mental well-being
	So activity is like a distraction for you? yes.	distraction	cognitive function	mental well-being
	I am not so stressed. Some of the stress went away, which is good	stress	negative affect	mental well-being
	I think it is the stress really, the stress	stress	negative affect	mental well-being
	With activity I feel better. So I get rid of my stress and my tension with the gardening.	better mood	positive affect	mental well-being
	The tension goes out, that is all I can say.	tension	negative affect	mental well-being
19				

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	and I generally enjoy it.	enjoyment	positive affect	mental well-being
	While I walk I think.	mind	cognitive function	mental well-being
	sometimes you do not feel to do sports, but then you get there and you feel better. So it is beneficial.	better mood	positive affect	mental well-being
	People say that physical activities are not relaxing. They believe that relaxing is to sit on a chair and watch television. But if you get sweaty up to your nose it is still relaxing.	relaxation	positive affect	mental well-being
	It clears your mind.	mind	cognitive function	mental well-being
	When I was working it was a relaxation.	relaxation	positive affect	mental well-being
	It is very important that it takes away the problems. After you look at the problem and you find a solution.	cope with problems	adjustment	mental well-being
	well, I think it would have an affect in my well-being really.	general wellbeing	positive affect	mental well-being
	So after work I was going to the club, shut off and coming back with clear mind.	mind	cognitive function	mental well-being
	exercise was a good destruction while you were working. Does it work the same way now that you are retired? W yes I think it does.	distraction	cognitive function	mental well-being
	You have good fun and nobody takes offence.	enjoyment	positive affect	mental well-being
	It is very important that it takes away the problems. After you look at the problem and you find a solution.	distraction	cognitive function	mental well-being
	With a good dressing room atmosphere you feel better in general.	dressing room talk	positive affect	mental well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	yes generally you feel better.	better mood	positive affect	mental well-being
20				
	and have the same level of enjoyment from this activity as I get.	enjoyment	positive affect	mental well-being
	So that's why for me the creative work is so important. It keeps you alive and active.	be alive	cognitive function	mental well-being
	it has a very calming quality	calming effect	positive affect	mental well-being
	and help to cope with the stresses of the workplace.	stress	negative affect	mental well-being
	And that activity calm you down	calming effect	positive affect	mental well-being
	quality of concentration on the inner being which is what is really all about.	concentration on inner being	positive affect	mental well-being
	it is most beneficial for flexibility but it has that other quality, the quality of contemplation	contemplation	positive affect	mental well-being
	But having achieved that I feel satisfaction.	self satisfaction	self	mental well-being
	It is the sort of activity that you feel nice when it ends.	better mood	positive affect	mental well-being
	there are similarities. I could say that I enjoy this.	enjoyment	positive affect	mental well-being
	I could say that I enjoy this. Because it is time that I could spend on my drawing board.	distraction	cognitive function	mental well-being

Appendix I-8

Physical activity and Social Well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
1	Yes, I have a lady friend I mean a proper friend and I have known her for thirty years. But all of the sudden I feel I want to do more.	meet people	social life	social well-being
2	! I mean sport is one of the big social pluses really. You are skiing and the social side of it, in the evenings when you all congregate and talk about the things that you have done in the day, whatever you are doing just socially having a drink or something like that.	meet people	social life	social well-being
3	I go swimming, there is my friend who comes with me you know.	meet people	social life	social well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
4				
	it is nice to meet other people. Because people help each other without realising it. Just a smile makes me feel better. So probably makes other people feel better as well.	meet people	social life	social well-being
5				
	it helps you to do the things that you want to do, visiting friends etc. without being fit you can not do any of these things. You can not go out just sit, sit, sit.	isolation	social life	social well-being
	yes it is a talking point	meet people	social life	social well-being
	and also I like the company. I feel stronger and I enjoy doing the exercises. I think that helps.	meet people	social life	social well-being
6				
	You are literally in the class but then everybody is gone. They are all busy	meet people	social life	social well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
7				
	each week you tend to meet someone different. I met a woman, I told her that I like bowling and she phones someone that gave me my first lesson. They gave me the lesson and I did not pay for that. But that was because I met this woman in the club you see! I need to go and find people that I can really be happy with you know and I think that at Clifton exercise class I find the people that I like to be with.	meet people	social life	social well-being
8				
	You meet people and that is great! We do things, help people, talk to them	meet people	social life	social well-being
	Not only the time you spend there, you learn something new but also being outside home,	activities in and outside home	environment	social well-being
	We meet a lot of people that normally go on Mondays, for one and a half to two hours, we meet a lot of people there, all nice people because they are all doing the same thing as we want to do.	meet people	social life	social well-being
9				
	No, dancing is the only one. For me it is exercise and meeting people and that is really.	meet people	social life	social well-being
	I mean I am quite happy and I do not need to go there to make me happy but it is a change of scenery,	change of scenery	environment	social well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	No not really because when people learn what they want to learn they just go off and we do not see them again. It is a shame really because they are so nice people.	friends	social life	social well-being
	Whatever sport is, I have different friends. Having been involved through all my life I have all my friends coming from there.	friends	social life	social well-being
	meting different people and this is important when usually you do not get out of the house.	meet people	social life	social well-being
10				
	You meet people with the same interest so you have a lot in common. Yes, you make some close friends.	meet people	social life	social well-being
11				
	well I meet people here and the man I am coming with in the morning, I used to know him some years ago. He comes to pick me up, I talk to a lot of different people.	meet people	social life	social well-being
12				
	we have nice time with chatting between. I mean I did not know Dorothy before she joins us on the Wednesday sessions.	meet people	social life	social well-being
	When you do not do this you do not meet other people. You could be cocooned in your home and do not meet anyone. I know people that they have done when they retired and that is it.	meet people	social life	social well-being
	I think that particularly with badminton we have a lot more of social activity.	meet people	social life	social well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
13				
	Most people I mix with are similar anyway.	people with the same interests	social life	social well-being
	apart from sports I like photography and I am a member of a photography club. I play tennis, badminton, hockey, I have been member of several clubs.	people with the same interests	social life	social well-being
	I especially enjoy mixing with other people in the fresh air. I do that also with photography.	activities in and outside home	environment	social well-being
	I have broadened my social life.	meet people	social life	social well-being
14				
	And apart from that it helps older people to meet other people, getting together, having something to look forward to, discussing various things that go wrong.	meet people	social life	social well-being
	However, there is a lady in our class, who unless she comes to the classes she does not see anybody. She is always alone.	meet people	social life	social well-being
	With exercise you have a different approach to people.	different approach to people	social life	social well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
15				
	I have met people in classes.. But people are from various walks of life, which is fun for me.	meet people	social life	social well-being
16				
	So going to club, going to do exercise has helped you to meet people? oh! Absolutely!	meet people	social life	social well-being
	I have a lot of friends in the club. I go there every Thursday and I play with a different group of friends and on Monday I swim and I have a different group of friends there and on Friday I have a different friend there to go for lunch if I want.	friends	social life	social well-being
	I enjoy all the activities because I meet all my friends, I am always laughing and joking with them.	meet people	social life	social well-being
	because I meet my friends.	meet people	social life	social well-being
17				
	In golf I enjoy the company	meet people	social life	social well-being
	I met them there. ! We meet regularly, we go for drink, for meals or whatever	friends	social life	social well-being
	I meet people of my own age, with my own views in life, which are not always according to youngsters' views in life.	people with the same interests	social life	social well-being
18				
	yes I know few people. But I do not meet them outside the gym.	meet people	social life	social well-being
	I enjoy coming here I enjoy company with people.	meet people	social life	social well-being

Interview Number	*Raw Data Theme*	*Lower Order Theme*	*Theme*	*Dimensions*
	yes, in the church, I organise meals in so often.	meet people	social life	social well-being
19				
	I was never one's man club. I always enjoy playing with other people. It s always a good feeling. It helps me mentally and physically.	team	social life	social well-being
	it is important for my social life, I meet friends and make friends in every sport	meet people	social life	social well-being
	I would miss the physical activity and what we call the dressing room talk. This social aspect is very good.	dressing room talk	social life	social well-being
	my social life was not related to work. Because I was working for the family for plenty of years.	friends	social life	social well-being

APPENDICES

PHASE II and III

Appendix II-1

University of Bristol
Department of Exercise & Health Sciences

The Ageing –Well Profile [version 1]

This questionnaire asks how you feel about your health, personal development, social life and other aspects of your well-being. There are no right or wrong answers. Just read the statements and choose the answer that represents you most. Your answer will be kept strictly confidential.

Remember! We are interested in your well-being during the **last two months.**

Example: **During the last two months:**	**Not at all true for me**				**Very true for me**
I have enjoyed good physical health	○	○	○	○	○

You should put a (✓) to the circle that best describes your feelings and thoughts about your health.
Please read every statement and (✓) the circle on the scale that represents you most.

Some information about you…

Please, **circle** the correct answer or **fill in** the space provided.

Gender: Male Female
Age: .....
Marital Status: Single Married Divorced Widowed
Previous Occupation: .....
Highest Education attended: Secondary Further education University

How often do you participate in an organised form of physical activity?

1 day/week	**2 days/week**	**3 days/week**	**2 days/month**	**3 days/month**
○	○	○	○	○

About your life...

During the last two months:	Not really true for me				Really true for me
I have been able to do everything I wanted to.	O	O	O	O	O
Getting older has not worried me much.	O	O	O	O	O
I have taken life as it comes.	O	O	O	O	O
I have found it difficult to find things to fill my time.	O	O	O	O	O
I have not coped very well with being older.	O	O	O	O	O
I have been able to adjust well to changes in my life.	O	O	O	O	O
I have managed on my own for most things I need.	O	O	O	O	O
My life has given me a sense of accomplishment.	O	O	O	O	O
I have felt that I have had very little control over my life.	O	O	O	O	O
Most of the things I have done were of interest to me.	O	O	O	O	O
I have felt that I have improved myself.	O	O	O	O	O
I have mostly achieved what I wanted to.	O	O	O	O	O
In every day life, I have not needed to rely too much on others.	O	O	O	O	O

About your health and fitness...

During the last two months:	Not really true for me				Really true for me
My life has been restricted because of physical problems.	O	O	O	O	O
I have usually woken up fresh and rested.	O	O	O	O	O
I have enjoyed good physical health.	O	O	O	O	O
My weight has been about right for someone my age.	O	O	O	O	O
My body has felt strong enough to do what I want to do.	O	O	O	O	O
On a day to day basis I have felt quite healthy.	O	O	O	O	O
I have not had many pains or much discomfort.	O	O	O	O	O
I have had good balance and co-ordination.	O	O	O	O	O
My body has felt stiff and it has limited what I can do.	O	O	O	O	O
I have been quite fit for my age.	O	O	O	O	O
I have had lots of stamina and endurance.	O	O	O	O	O
I have been able to keep going for longer than most people my age.	O	O	O	O	O

About your mental health...

During the last two months:	Not really true for me				Really true for me
I have felt secure and relaxed about my life.	O	O	O	O	O
There has been plenty of fun and laughter in my life.	O	O	O	O	O
I have had little belief in who I am or my worth.	O	O	O	O	O
I have had a fulfilling life.	O	O	O	O	O
I have easily become confused.	O	O	O	O	O
I have been more energetic and outgoing.	O	O	O	O	O
I have been at peace with myself and my life.	O	O	O	O	O
I have found it difficult to concentrate sometimes.	O	O	O	O	O
I have usually been pleased with how I look.	O	O	O	O	O
I have worried too much about most things in my life.	O	O	O	O	O
I have been able to think clearly.	O	O	O	O	O
I have had confidence in myself and my decisions.	O	O	O	O	O
I have found it difficult to remember things.	O	O	O	O	O

About your social life...

During the last two months:	Not really true for me				Really true for me
I have been able to get out and about and meet people more often.	O	O	O	O	O
I have been able to participate in activities in my local community.	O	O	O	O	O
I have been feeling less left out of things than I used to.	O	O	O	O	O
I have had people around who I can share my problems with.	O	O	O	O	O
I have had lots of friends who I want to spend time with.	O	O	O	O	O
I have quite often felt isolated or lonely.	O	O	O	O	O
I have felt that I have an important contribution to make.	O	O	O	O	O
I have spent a lot of my time with friends and acquaintances.	O	O	O	O	O
There have been people who are interested in my well-being.	O	O	O	O	O
I have been able to give support and friendship to other people.	O	O	O	O	O

Thank you for your help

Appendix II-2

U B H T
TEACHING CARE

The United Bristol Healthcare NHS Trust

UBHT Headquarters
Marlborough Street
Bristol BS1 3NU
Tel: 0117 928 3613
Fax: 0117 928 3724
Email: naaz.nathoo@ubht.swest.nhs.uk

30 October 2000

Miss A Stathi
PhD Student
Dept of Exercise & Health Science
University of Bristol
8 Woodland Road
Bristol BS8 1TN

Dear Miss Stathi

E4760 **Development of an instrument for measuring the subjective well-being of older adults**

Following receipt of the revised subject information sheet, and the advertisement to be used, I am pleased to advise that the above project was given approval by the Research Ethics Committee at their meeting held on 27 October 2000.

This approval also covers the amendment to include the group of patients undergoing rehabilitation programme at the BRI.

In accordance with Good Clinical Practice Guidelines of the European Community and the standard operating procedures required by NHS(E), the LREC is required to monitor research. The International Conference on Harmonisation Tripartite Guideline requires an annual, as well as end-of-study report. CONTINUED APPROVAL DEPENDS UPON RECEIPT OF THESE REPORTS.

Reminder: The title will be published in national and Trust registers. In the case of commercially sponsored research, this should not contain confidential information that you or any sponsors of this research would not wish published. If you think that this applies to your project, please contact this office within 30 days of the date of this letter so that this can be noted.

Investigators who undertake research within the Trust and subsequently leave the Trust are reminded that they must not take with them patient information unless it is anonymised such that individual patients cannot be identified without reference to the Trust.

Yours sincerely

J I Alexander
Chairman to the Research Ethics Committee

Appendix II-3

1. Exploratory Factor Analysis with Oblimin Rotation

Component Correlation Matrix

Components	1	2	3	4
1	1.000			
2	.316	1.000		
3	.267	.275	1.000	
4	.268	.248	.186	1000

Extraction Method: Principal Components Analysis
Rotation Method:Oblimin with Kaiser Normalisation

2. Initial Exploratory Factor analysis with varimax rotation

Total Variance

	Initial			Extraction Sums of Squared			Rotation Sums of Squared		
Component	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	16.02	32.70	32.70	16.02	32.70	32.70	7.70	15.72	15.72
2	3.18	6.50	39.20	3.18	6.50	39.20	6.36	12.98	28.70
3	2.75	5.61	44.82	2.75	5.61	44.82	5.87	11.99	40.69
4	2.00	4.09	48.91	2.00	4.09	48.91	4.01	8.22	48.91

Extraction Method: Principal Component

Rotated Component Matrix [a]

	Component			
	1	2	3	4
ph6	.78			
ph3	.76			
ph11	.76			
ph5	.74			
ph10	.74			
ph7	.73			
ph12	.65			
ph8	.64			
dev1	.60	.43		
ph1	.60			
ment6	.57			
ph9	.57			
dev5	.47			
ph4	.47			
dev10		.76		
dev7		.74		
dev8		.70		
dev6		.66		
dev3		.65		
dev11		.64		
dev9		.61		
dev12		.60		
ment4		.55		.52
ment1		.55		
dev13		.50		
dev2		.43	.41	
ment7		.40		.40
ment11		.40		
soc9			.77	
soc6			.75	
soc11			.69	
soc10			.66	
soc5			.58	
soc1			.56	
soc4			.54	
soc8			.52	
ment2		.42	.52	
soc2			.49	
ph2	.44		.46	
soc3				
ment8				.63
ment3				.57
ment12				.55
ment5				.51
ment10				.50
soc7				.48
dev4				.47
ment13				
ment9				

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Appendix II-4

RELIABILITY ANALYSIS FOR DEVELOPMENTAL WELL-BEING- (ALPHA)

Alpha = .85 Standardized item alpha = .86

	Scale Mean if item deleted	Scale variance if item deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
DEV3	31.40	49.34	.52	.38	.84
DEV6	31.72	45.42	.64	.53	.83
DEV5R	31.63	51.71	.28	.12	.86
DEV7	31.65	44.93	.65	.49	.83
DEV8	31.86	46.18	.71	.61	.82
DEV9R	31.72	46.36	.59	.42	.83
DEV10	31.60	45.99	.72	.60	.82
DEV11	31.89	47.71	.61	.52	.83
DEV13	31.64	48.17	.49	.36	.84

RELIABILITY ANALYSIS FOR PHYSICAL WELL-BEING- (ALPHA)

Alpha = .87 Standardized item alpha = .88

	Scale Mean if item deleted	Scale variance if item deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PH2	26.03	45.71	.61	.48	.86
PH4	26.23	45.71	.50	.34	.87
PH5	25.77	44.46	.71	.62	.85
PH6	25.42	44.70	.80	.76	.84
PH7	25.82	44.26	.70	.55	.85
PH12	25.77	45.01	.65	.53	.85
PH10	25.34	46.06	.74	.64	.85
PH9R	26.12	48.31	.43	.26	.88

RELIABILITY ANALYSIS FOR MENTAL WELL-BEING- (ALPHA)

Alpha = .71 Standardized item alpha = .71

	Scale Mean if item deleted	Scale variance if item deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
MENT8R	19.45	17.46	.41	.19	.68
MENT3R	19.14	16.71	.50	.29	.65
MENT12	19.01	18.24	.45	.23	.67
SOC7R	18.87	18.28	.37	.17	.69
MENT10R	19.38	16.98	.48	.28	.65
MENT5R	18.88	17.85	.42	.21	.67

RELIABILITY ANALYSIS FOR SOCIAL WELL-BEING- (ALPHA)

Alpha = .87 Standardized item alpha = .87

	Scale Mean if item deleted	Scale variance if item deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
SOC9	27.56	34.13	.73	.61	.84
SOC6	27.40	34.84	.70	.57	.84
SOC11	27.12	36.32	.74	.57	.84
SOC10	27.19	36.51	.66	.49	.85
SOC1	27.30	36.66	.60	.38	.85
MENT2	27.25	36.13	.65	.46	.85
SOC4	27.43	38.27	.42	.20	.87
SOC8	27.61	37.99	.51	.32	.86

Appendix III-1

1. The Self-Esteem Scale (Rosenberg, 1965)

In the following questions please circle the most appropriate response.

SA=Strongly Agree A=Agree D=Disagree SD= Strongly Disagree

1. On the whole, I am satisfied with myself.	**SA**	**A**	**D**	**SD**
2. At times I think I am no good at all.	**SA**	**A**	**D**	**SD**
3. I feel that I have a number of good qualities.	**SA**	**A**	**D**	**SD**
4. I am able to do things as well as most other people.	**SA**	**A**	**D**	**SD**
5. I feel that I do not have much to be proud of.	**SA**	**A**	**D**	**SD**
6. I certainly feel useless at times.	**SA**	**A**	**D**	**SD**
7. I feel that I am a person of worth, at least on an equal plane with others.	**SA**	**A**	**D**	**SD**
8. I wish I could have more respect for myself.	**SA**	**A**	**D**	**SD**
9. All in all, I am inclined to feel that I am a failure.	**SA**	**A**	**D**	**SD**
10. I take a positive attitude toward myself.	**SA**	**A**	**D**	**SD**

2. The Bachman Revision of Rosenberg's Self-Esteem Scale (Bachman, 1970)

In the following questions please circle the most appropriate response for you.

	Almost always true	Often true	Sometimes true	Not often true	Never true
1. I feel that I am a person of worth, at least on an equal plane with others.	☐	☐	☐	☐	☐
2. I feel that I have a number of good qualities.	☐	☐	☐	☐	☐
3. I am able to do things as well as most other people.	☐	☐	☐	☐	☐
4. I feel that I do not have much to be proud of.	☐	☐	☐	☐	☐
5. I take a positive attitude toward myself.	☐	☐	☐	☐	☐
6. I think I am no good at all.	☐	☐	☐	☐	☐
7. I am a useful person to have around.	☐	☐	☐	☐	☐
8. I feel I can't do anything right.	☐	☐	☐	☐	☐
9. When I do a job, I do it well.	☐	☐	☐	☐	☐
10. I feel that my life is not very useful.	☐	☐	☐	☐	☐

3. The Physical Self-Perceptions Profile (Clinical Short Version)

These are statements that allow people to describe themselves. First, decide which one of the two statements best describes you. Then, go to the side of the statement and put a *CROSS* if it is just "sort of true" or "really true" for *YOU*.

Please, do not put a CROSS on both sides!

Really True for Me	Sort of True for Me	EXAMPLE			Sort of True for Me	Really True for Me
☐	☐	Some people are very competitive	BUT	Others are not quite so competitive	☒	☐
☐	☐	Some people feel very alert and alive	BUT	Others feel listless and distracted	☐	☐
☐	☐	Some people feel that they occasionally need to rely on others to accomplish everyday tasks	BUT	Others feel that they never need assistance to accomplish everyday tasks	☐	☐
☐	☐	Some people feel that compared to most, their physical health is not so good	BUT	Others feel that compared to most, they have good physical health	☐	☐
☐	☐	Some people are confident in their ability to make it through day-to-day activities	BUT	Others feel less able to function in day-to-day activities	☐	☐
☐	☐	Some people feel confident in their ability to care for themselves	BUT	Others feel less confident about their physical ability to care for themselves	☐	☐
☐	☐	Physically some people are always free of aches and pains	BUT	For others, aches and pains occur quite frequently	☐	☐
☐	☐	Some people feel extremely satisfied with the kind of person they are physically	BUT	Others sometimes feel a little dissatisfied with their physical shelves	☐	☐
☐	☐	Some people feel they must visit the doctor often in order to be sure of their physical health	BUT	Others are physically healthy and rarely visit their doctor	☐	☐
☐	☐	Some people feel that they are not very good when it comes to playing sports	BUT	Others feel that they are really good at just about every sport	☐	☐
☐	☐	Some people feel that compared to most people their age, they have an attractive body	BUT	Others feel that compared to most people their age, their body is not so attractive	☐	☐

Really True for Me	Sort of True for Me				Sort of True for Me	Really True for Me
☐	☐	Some people feel that they are physically stronger than most people of their age and sex	BUT	Others feel that they lack physical strength compared to most others of their age and sex	☐	☐
☐	☐	Some people feel extremely proud of who they are and what they can do physically	BUT	Others are sometimes not quite so proud of who they are physically	☐	☐
☐	☐	Some people make certain they take part in some form of regular physical exercise	BUT	Others don't often manage to keep up regular physical exercise	☐	☐
☐	☐	When it comes to the physical side of themselves some people do not feel very confident	BUT	Others seem to have a real sense of confidence in the physical side of themselves	☐	☐
☐	☐	Some people feel that they are always one of the best when it comes to joining in sports activities	BUT	Others feel that they are not one of the best when it comes to joining sports activities	☐	☐
☐	☐	Some people tend to lack confidence when it comes to their physical strength	BUT	Others are extremely confident when it comes to their physical strength	☐	☐
☐	☐	Some people feel that they are sometimes admired because their physique or figure is considered attractive	BUT	Others rarely feel that they receive admiration for the way their body looks	☐	☐
☐	☐	Some people always have a really positive feeling about the physical side of themselves	BUT	Others sometimes do not feel positive about the physical side of themselves	☐	☐
☐	☐	Some people are sometimes a little slower than most when it comes to learning new skills in a sports situation	BUT	Others have always seemed to be among the quickest when it comes to learning new sports skills	☐	☐
☐	☐	Some people feel extremely confident about their ability to maintain regular exercise and physical condition	BUT	Others don't feel quite so confident about their ability to maintain regular exercise and physical condition	☐	☐
☐	☐	Some people feel that they are not as good as most at dealing with situations requiring physical strength	BUT	Others feel that they are among the best at dealing with situations which require physical strength	☐	☐

4. The Philadelphia Geriatric Center Morale Scale (Lawton, 1975)

Please read every statement and circle the answer that best describes you.

1.	*Things keep getting worse as I get older.*	Yes		No
2.	*I have as much energy as I did last year.*	Yes		No
3.	How much do you feel lonely?	Not much		A lot
4.	Little things bother me more this year.	Yes		No
5.	I see enough of my friends and relatives.	Yes		No
6.	As you get older you are less useful.	Yes		No
7.	I sometimes worry so much that I can't sleep.	Yes		No
8.	As I get older things are (……) than/as I thought they would be.	Better	Same	Worse
9.	I sometimes feel that life isn't worth living.	Yes		No
10.	I am as happy now as I was when I was younger.	Yes		No
11.	I have a lot to be sad about.	Yes		No
12.	I am afraid of a lot of things.	Yes		No
13.	I get angry more than I used to.	Yes		No
14.	Life is hard for me most of the time.	Yes		No
15.	How satisfied are you with your life today?	Satisfied		Not Satisfied
16.	I take things hard.	Yes		No
17.	I get upset easily.	Yes		No

Appendix III-2

University of Bristol
The Ageing-Well Profile [final version]

This questionnaire asks how you feel about several aspects of your well-being. There are no right or wrong answers. Just read the statements and choose the answer that best describes you. Your answer will be kept strictly confidential.

First, some information about you...

Please, (✓) the correct answer or fill in the space provided.

1. Gender: [Male] [Female]

2. Age: ..... [In years]

3. Marital Status: [Single] [Married] [Divorced/Separated] [Widowed]

4. Previous Occupation: .....

5. Highest Education attended: [Secondary] [Further education] [University]

6. Please list any health conditions that have made your daily life more difficult in the past 6 months:
   1)..... 3).....
   2)..... 4).....

7. How often do you participate in activities such as painting, writing, reading, gardening, music?

Never	Seldom	Once/week	Twice/week	3 days/week	4+ days/week
O	O	O	O	O	O

8. How often do you participate in organised physical activities (e.g. swimming, exercise classes, walking groups) to improve your health and fitness?

Never	Seldom	Once/week	Twice/week	3 days/week	4+ days/week
O	O	O	O	O	O

Remember! We are interested in your well-being during the <u>last month.</u>

	Example		
During the last month:	**Not really true for me**	**Sort of true for me**	**Really true for me**
I have enjoyed good physical health.	O	O	O

You should put a (✓) to the circle that best describes your feelings and thoughts about your health.
Please read every statement and (✓) fill one of the five circles in each line.

About your everyday life...

During the last month:	Not really true for me		Sort of true for me		Really true for me
I have managed to sort out all my needs by myself.	O	O	O	O	O
In every day life, I have not needed to rely on others.	O	O	O	O	O
I have been able to take good care of my self.	O	O	O	O	O

About your health and fitness...

During the last month:	Not really true for me		Sort of true for me		Really true for me
I have usually woken up fresh and rested.	O	O	O	O	O
My body has felt strong enough to do what I want to do.	O	O	O	O	O
On a day to day basis I have felt lively and healthy.	O	O	O	O	O
I have not had many pains or much discomfort.	O	O	O	O	O
My body has felt old and has limited what I can do.	O	O	O	O	O

About yourself...

During the last month:	Not really true for me		Sort of true for me		Really true for me
I have had some doubts about who I am or my worth.	O	O	O	O	O
I have been confused more easily than I used to be.	O	O	O	O	O
I have found it difficult to concentrate sometimes.	O	O	O	O	O
I have had complete confidence in myself and my decisions.	O	O	O	O	O
I have felt contented and happy with myself.	O	O	O	O	O
I have been in a good mood more often than not.	O	O	O	O	O

About your social life...

During the last month:	Not really true for me		Sort of true for me		Really true for me
I have had plenty of people to call on to share my problems with.	O	O	O	O	O
I have had lots of friends who I want to spend time with.	O	O	O	O	O
I have spent a lot of my time with friends and acquaintances.	O	O	O	O	O
I have been able to give support and friendship to other people.	O	O	O	O	O

List of Publications and Conference Presentations

REFEREED RESEARCH PUBLICATIONS IN ACADEMIC JOURNALS

In press: Stathi, A., Fox, K.R. & McKenna, J. Physical activity and dimensions of subjective well-being in older adults. *Journal of Aging and Physical Activity.*

In press: Stathi, A., & Fox, K.R. Physical activity and mental health in older adults: Current evidence and future perspectives, *Psychologia (Greek journal).*

CONFERENCE PROCEEDINGS

2001: Stathi, A. & Fox, K.R. The preliminary development of a self-assessment instrument to measure dimensions of subjective well-being in active older adults. In A. Papaioannou, M. Goudas, & Y. Theodorakis (Eds.), Proceedings of 10th World Congress of Sport Psychology (pp. 163-165). Skiathos, Greece.

2000: Stathi, A. & Fox, K.R. The contribution of physical and non-physical recreational activities to the subjective well-being of older adults. In European Group for Research into Elderly and Physical Activity (Ed.), Proceedings of 8th EGREPA International Conference in Ageing and Physical Activity, (pp. 103-104). Brussels, Belgium.

2000: Stathi, A. & Fox, K.R. The perceptions of older adults regarding the contribution of physical activity to their subjective well-being. In J. Avela, P. V. Komi, J. Komulainen (Eds.), Proceedings of 5th Annual Congress of the European College Of Sports Science, (pp. 704). Jyvaskula, Finland.

ACADEMIC SCHOLARSHIPS AND AWARDS

2001: Grant for participation in international conference by the **Bristol University Alumni Foundation.**

2000: Research scholarship by the **A. S. Onassis Public Foundation** for Ph.D. studies.

2000: Young Investigators Award for the research project:
"The perceptions of older adults regarding the contribution of physical activity to their subjective well-being".
5th Annual Congress of the European College Of Sports Science, Jyvaskula, Finland.

1995: Student scholarship by the **Greek State Scholarship Foundation,** for postgraduate studies.

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