

THE ADOPTION AND MAINTENANCE OF PHYSICAL ACTIVITY FOR MID-LIFE,  
SEDENTARY WOMEN

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### Student Declaration

“I, Felicity Anne Wendy Morris, declare that the PhD thesis entitled “The adoption and maintenance of physical activity for mid-life, sedentary women is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work”.

Signature

Date: Tuesday 11th March 2008

## Abstract

There is conclusive evidence that regular physical activity produces both physical and psychological benefits. People engaged in sedentary work who avoid physical activity, or have physical or psychological obstacles to being physically active, forgo the substantial benefits that being physically active provides. In Australia, many middle-aged women (45 to 59 years) are especially at risk of ill-health due to their physically inactive lifestyles. In this dissertation, I report on a mixed-method research approach that incorporated the LIFE: Live It Up (LLIU) intervention. Adopting a multi-theoretical perspective I drew on strategies from Transtheoretical Model, Social Cognitive Theory, the Theory of Planned Behaviour, and Self-Determination Theory.

In the first study, participants (71, sedentary, mid-life women) were assigned to either an adoption (3-hour workshop), maintenance (3-hour workshop plus extra maintenance session at 9 months) or control (usual activity) condition. Physical activity levels, psychological well-being, and moods were assessed (pre, post and at 4, 40 & 44 weeks) using the Scottish Physical Activity Questionnaire (SPAQ); the Medical Outcome Survey (MOS) Short Form, (SF36); and the Positive and Negative Affect Scale, (PANAS). Motivational messages (Treatment condition participants only) and reflective journals (all participants) tailored to conditions were delivered to participants across the intervention year.

Quantitative analyses for the LLIU intervention study involved a series of Analyses of Variance (ANOVA). High attrition, however, across conditions resulted in only 27 participants remaining in the study at 52 weeks. No significant differences were from applying ANOVA to the SPAQ data for physical activity levels. Applying ANOVA to the

vitality (SF-36 subscale) gain score data (SF-36) there was evidence of significant gains in vitality at 4 and 44 weeks for the treatment condition (TC) participants compared to the control condition. Feelings and emotions (mood) were measured with the PANAS (see appendix C). Applying ANOVA revealed positive affect was stable across the intervention for TC participants. Negative affect, however, was lowered at 52 weeks for TC participants. I interpreted all results cautiously, because of high attrition rates, particularly in the control condition, and a consequent loss in statistical power. Quantitative analyses for the LLIU intervention study involved a series of Analyses of Variance (ANOVA). High attrition, however, across conditions resulted in only 27 participants remaining in the study at 52 weeks. No significant differences were indicated from results of applying ANOVA to the SPAQ data for physical activity levels. Vitality, a construct assessing energy level and fatigue, was examined and applying ANOVA to the vitality (SF-36 subscale) gain score data (SF-36) showed evidence of significant gains in vitality at 4 and 44 weeks for the treatment condition (TC) participants compared to the control condition. Feelings and emotions were measured with the PANAS (see appendix C). Applying ANOVA revealed positive affect was stable across the intervention for TC participants. Negative affect, however, was lowered at 52 weeks for TC participants. I interpreted all results cautiously, because of high attrition rates, particularly in the control condition, and a consequent loss in statistical power.

Qualitative analysis of the ejournals indicated that participation in the LLIU and elements of the ejournal were motivational for physical activity response. TC participants' reported being encouraged through the workshops to focus on physical activity. Encouragement was associated with social aspects of the workshop, enjoyment, and the

kind of information provided. In addition, TC participants reported that lack of time, family demands, and energy depletion were considerable obstacles to physical activity participation.

In the second study, I conducted follow-up interviews with 11 of the intervention participants, between one and four months after their LLIU involvement ended. Using thematic content analysis I identified six themes expressed by the women within the treatment conditions. These were (i) commitment; (ii) change driving forces; (iii) positivity, “licence” to change, and guilt reduction; (iv) elements of choice, control, and capacity to follow through; (v) self-efficacy expectations; and (vi) social support issues. For instance, commitment involved participants in taking specific steps toward action and generated freedom from procrastination; change driving forces were internal and external with enjoyment greatly enhancing physical activity experiences; positivity led to a sense of licence to change, followed by guilt reduction.

An additional three case studies drilled down into issues that mid-life women typically face when attempting physical activity change. Findings highlighted the frustration associated with wanting to change, being caught in an attempt-fail cycle, and being assigned to control condition; how change can happen (adoption condition) even when family values are highly prioritised and illustrated how the confidence gained through the LLIU developed sustainable efficacy for exercise (maintenance condition). Identification of “double benefits” such as engaging in physical activity while encouraging children to be active can be motivational for sustainable physical activity. Guilt metaphorically paralysed physical activity changes. Strategic thinking assisted with recycling through stages of change. Autonomous behaviour change in control participants who remained in the study raised key

questions for future studies. In addition, my studies added to the evidence base that intervention research with sedentary participants requires additional strategies (e.g., over-recruitment, extra attention) to ensure sustained engagement.

In conclusion, high attrition in the first study reduced the veracity of quantitative evidence for the effectiveness of multi-theory approaches for increasing physical activity. Findings reported for the second study have considerably expanded the evidence base concerning the debilitating effects of guilt and the usefulness of strategic thinking on motivation for physical activity. In addition, this study represents additional evidence for motivation for physical activity change being strengthened through workshops and reflective journals. Longitudinal research is especially difficult with sedentary cohorts especially in the context of recruiting and maintaining participant samples.

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A ADOPTION CONDITION	XVII
ABS AUSTRALIAN BUREAU OF STATISTICS	XVII
ADLS ACTIVITIES OF DAILY LIVING	XVII
ADNFS ALLIED DUNBAR NATIONAL FITNESS SURVEY	XVII
AIHW AUSTRALIAN INSTITUTE OF HEALTH AND WELFARE	XVII
ANOVA ANALYSIS(SES) OF VARIANCE	XVII
BMI BODY MASS INDEX	XVII
CBT COGNITIVE BEHAVIOURAL THERAPY	XVII
CDC CENTRE FOR DISEASE CONTROL	XVII
CRD CHRONIC RESPIRATORY DISEASE	XVII
CVD CARDIOVASCULAR DISEASE	XVII
EJOURNAL ELECTRONICALLY DELIVERED REFLECTIVE JOURNAL	XVII
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M MAINTENANCE CONDITION	XVII
MBM MAINTENANCE BRIEFING MEETING	XVII
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NHL&BI NATIONAL HEART LUNG AND BLOOD INSTITUTE	XVII
PA PHYSICAL ACTIVITY	XVII
PANAS PHYSICAL AND NEGATIVE AFFECT SCALE	XVII
PAR POPULATION ATTRIBUTABLE RISK	XVII
PPAM PERCEIVED PHYSICAL ACTIVITY MEASURE	XVII
RP RESEARCHER PRESENTATION	XVII
SCT SOCIAL COGNITIVE THEORY	XVII

SET	SELF-EFFICACY THEORY	XVII
SECT	SOCIAL ECOLOGICAL THEORY	XVII
SDT	SELF-DETERMINATION THEORY	XVII
SPAQ	SCOTTISH PHYSICAL ACTIVITY QUESTIONNAIRE	XVII
TPB	THEORY OF PLANNED BEHAVIOUR	XVII
TRB	THEORY OF REASONED BEHAVIOUR	XVII
TTM	TRANSTHEORETICAL MODEL	XVII
USDHHS	UNITED STATES DEPARTMENT OF HEALTH AND HUMAN SERVICES	XVII
VP	VIDEO PRESENTATION	XVII
WHO	WORLD HEALTH ORGANISATION	XVII
WLC	WAITING LIST CONTROL	XVII
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## List of Abbreviations

A	Adoption Condition
ABS	Australian Bureau of Statistics
ADLs	Activities of Daily Living
ADNFS	Allied Dunbar National Fitness Survey
AIHW	Australian Institute of Health and Welfare
ANOVA	Analysis(es) of Variance
BMI	Body Mass Index
CBT	Cognitive Behavioural Therapy
CDC	Centre for Disease Control
CRD	Chronic Respiratory Disease
CVD	Cardiovascular Disease
EJOURNAL	Electronically delivered reflective journal
GD	Group Discussion
LLIU	LIFE: Live It Up (Lifestyle Initiatives For Everyone)
M	Maintenance Condition
MBM	Maintenance Briefing Meeting
MOS (SF-36)	Medical Outcomes Survey, Short Form
NHL&BI	National Heart Lung and Blood Institute
PA	Physical Activity
PANAS	Physical and Negative Affect Scale
PAR	Population Attributable Risk
PPAM	Perceived Physical Activity Measure
RP	Researcher Presentation
SCT	Social Cognitive Theory
SET	Self-efficacy Theory
SECT	Social Ecological Theory
SDT	Self-determination Theory
SPAQ	Scottish Physical Activity Questionnaire
TPB	Theory of Planned Behaviour
TRB	Theory of Reasoned Behaviour
TTM	Transtheoretical Model
USDHHS	United States Department of Health and Human Services
VP	Video Presentation
WHO	World Health Organisation
WLC	Waiting List Control

## CHAPTER 1: THESIS INTRODUCTION

Researchers have consistently reported strong evidence of the positive physical and psychological outcomes for people who engage in regular physical activity (e.g., Biddle & Mutrie, 2001; Buckworth & Dishman, 2002). According to Armstrong, Bauman, and Davies (2000) few people consistently incorporate physical activity into their lives and some (40% of Australian women 45-59 years) resist or avoid doing exercise despite the potential benefits (O'Brien-Cousins & Gillis, 2005). A paradox exists whereby people know about the potential benefits of physical activity and the health risks associated with inactivity and with obesity yet inactivity and obesity rates are consistently rising. When people attempt to change unhealthy behaviours such as low physical activity or sedentariness, multiple cycling and recycling through numerous unsuccessful attempts occurs frequently. Failed attempts to change can result in discouragement that further reduces motivation for physical activity (Biddle & Mutrie 2002). People are often drawn into sporadic attempts to change yet find their new levels of physical activity unsustainable. These attempts to change are unsustainable for many reasons including, lack of time, ill-health, and perceived psychosocial barriers, all of which affect motivation for physical activity. It is essential to identify how to increase motivation for people to increase and sustain physical activity levels. The need to identify effective motivators of physical activity adoption and maintenance is particularly urgent for women because they have been identified as most likely to become and remain physically inactive (Armstrong et al. 2000).

Researchers have examined how intrinsic and extrinsic motivation relates to exercise behaviours. Intrinsic motivation for particular tasks can drive someone towards particular behaviour. For example, solitary walking may fulfil someone's need for tranquility. In comparison, encouraging words from a personal trainer may provide external motivation for exercise.

The sedentary living problem continues. For over 20 years, health professionals and governments have urged people to be more physically active yet globally people are less physically active than ever (Yach, Leeder, Bell, & Kistnasamy, 2005). Due to economic and technological advances of the past century, people have become less physically active (McElroy, 2002). Moreover, people from urbanised and inland geographical locations, especially, have significantly reduced their activities of daily living (ADLs) such as not walking to shopping centres, and engaging in work that requires extended time seated. The combination of factors spanning economics, technology, urbanisation, and inland geographical location, have extended people's sedentary behaviour, greatly increasing their risks of developing chronic illness (McElroy, 2002). Nowadays a similar combination of factors adds to the difficulties associated with changing from being largely sedentary to incorporating and sustaining more physical activity. Participation statistics show that only 50% of people do sufficient physical activity to accrue health benefits clearly demonstrating the extent of sedentary behaviour (Armstrong, et al.).

Based on extensive research evidence of the positive effects physical activity can exert on physical and mental conditions, health professionals encourage people to engage in regular physical activity. For example, physical activity decreases the risk

of chronic illnesses (Cardiovascular Disease (CVD), type 2 Diabetes, Chronic Respiratory Disease (CRD)), obesity (Mcinnis, Franklin, & Rippe, 2003) and death (McElroy, 2002; Yach, et al., 2005). Yach et al. reported the staggering figure that physical inactivity-related diseases are associated with more than 50 percent of worldwide deaths.

Precise knowledge of the mechanisms for the effects of physical activity on well being remains elusive. The types, extent, and duration of physical activity sufficient to generate improved well being are also unclear. Despite this lack of clarity consensus is that physical activity enhances psychological well-being and in some instances ameliorates debilitating symptoms of mental ill-health, such as depression (McElroy, 2002 & Mutrie, 2002). Given that low physical activity levels are associated with health risks, it is important to understand what level of physical activity, or benchmark, is sufficient to accrue health benefits. The benchmark set by the US Surgeon General (1996) is 30 minutes of moderate physical activity, most days of the week or an accumulation of 150 minutes over 7 days.

Physical inactivity is a global issue. The stereotypical image of physical inactivity as only affecting western cultures, has diminished (Hodge, Dowse, Koki, Mavo, Alpers & Zimmet, 1995) to the extent that the effects of physical inactivity levels is a globally acknowledged health concern (Yach, et al.). Further evidence leading to the need for global concern about physical inactivity levels is drawn from population surveys (ADNFS, 1992; USDHHS, 1996; Armstrong et al. 2000) Population surveys have fed global concern about urbanisation and modernity. Major factors that have changed physical activity patterns include the spread and availability

of fast and energy dense foods combined with personal transportation requiring lower energy expenditure than walking or cycling, and technological advancements (Hodge, et al.). As population survey researchers have recorded, disease burdens and problems associated with physical inactivity affect men and women. Australian researchers (e.g., Bauman, Ford & Armstrong, 2001) have, however, indicated the population most at risk of remaining physically inactive, and therefore most at risk from the health perspective is mid-life, sedentary women. One factor specific to women's experience is the type of work they are most often engaged in. In particular, researchers have found that over the last 50 years domestic and workplace advancements have diminished women's physical activity levels substantially.

#### Physical Inactivity of Women

Women's work and convenience living heavily influences physical activity participation. Many researchers have indicated lack of time, low incomes, and cultural and societal expectations of women, are just some of the barriers faced by mid-life women when they attempt to change their physical activity levels (Johnson, Corrigan, Dubbert, & Gramling, 1990; Morris & Choi, 2005, O'Brien-Cousins, 1998). The type of work women do nowadays affects their physical activity levels. Women's engagement in occupations often requires them to be seated, resulting in sedentariness. Combining sedentariness with "convenience style living", where transport and home chores are highly automated, leaves little necessity for physical activity. Armstrong, et al. (2000) reported the prevalence of low physical activity levels in Australia with 18.2% of men and women in the age group 45 to 59 years, engaged in no physical activity prior to survey completion. These statistics do not

necessarily mean the remaining men and women in the population are sufficiently active. Armstrong et al. also reported that in the 50% of people who engaged in physical activity 31.9% were not sufficiently active. Combining these figures with the 18.2% indicates that half the population is either sedentary or insufficiently physically active. Furthermore, Armstrong, et al. strongly indicated that physical inactivity in Australia is highly prevalent. Armstrong et al. also identified middle-aged women (45 to 59 years), with the profiles including being less educated, or widowed, or obese, or who had children, as at risk of remaining physically inactive, or being less likely to participate in physical activity.

In contrast to Canadian women (CFLRI, 2000), Australian women's participation in physical activity dropped the most (1997-1999) among the middle-aged women and the well educated, making these priority categories for physical activity interventions in Australia. Although the less educated women were identified as at risk of remaining physically inactive, Armstrong et al. also found that participation in physical activity dropped the most in well educated middle-aged women. Overall, in company with the global community, Australian women struggle to achieve sufficient physical activity levels to accrue health benefits. Despite the knowledge of Australian women's low physical activity levels and their increased risk of chronic ill-health, and despite numerous medical, community, and individual attempts to increase physical activity, many women are still not active enough to accrue health benefits. Potential sources of motivation that would assist women to self-motivate for physical activity and attain sufficient physical activity for health benefits need identification and implementation.

### Motivation: A Major Issue for Effective Health Promotion

Many people are unable to adopt and maintain sufficient (i.e., enough physical activity to accrue health benefits) physical activity levels. As important as barriers are in obstructing change of physical activity levels self-motivation is also critical for increasing physical activity levels (Biddle & Mutrie, 2002). Finding ways of exerting and increasing self-motivation for physical activity represents a significant challenge for inactive people seeking change and for health and exercise professionals promoting and supporting healthy behaviours. To help meet this challenge researchers have explored when, why, and how “meaningful exercise behaviour” (Courneya, 2004, p. 506) occurs. In addition the association of social cognitive factors, personality, and social factors of exercise have been explored. Until quite recently, researchers tended to overlook environmental factors, associated with physical activity levels (Courneya, 2004). Courneya suggested that the direction of understanding physical activity change rests in the development of a transtheoretical, or grand theory approach to exercise behaviour. In addition to the known antecedents, there is a further layer of complexity whereby personal, population, and activity characteristics must be considered. In essence, interventions targeting self-motivation to increase physical activity levels must address multiple factors. Interventions need to also address the underlying theoretical factors of an intervention structure (e.g., factors attributed to psychological theory and their place at stages within an intervention). Participants will also have varying ill-health barriers, personal preferences for particular types of activity, and different limitations surrounding the

location of their physical activity, all of which may affect their motivation for physical activity (Courneya).

Motivation for physical activity has been explored largely in connection with exercise. One way to explore motivation is to adopt a theoretical approach. To synthesise the many existing theoretical approaches to physical activity Biddle and Mutrie explored the psychology of physical activity, and theories, in relation to determinants and outcomes of physical activity interventions. Biddle and Mutrie (2001) reported that prior to the year 2000 research adopting more complex, multidimensional studies combining theoretical approaches were relatively scarce. Also, there were few longitudinal studies, or studies conducted with sedentary people. There are predominantly four theories showing promise for physical activity interventions, and their application to physical activity has grown (Biddle & Mutrie). Biddle and Mutrie identified these four theories as self-efficacy theory (Bandura, 1997), the theory of planned behaviour (Ajzen, 1988), self-determination theory (Deci & Ryan, 1985), and the transtheoretical model (Prochaska, Norcross, & DiClemente, 1994).

Crombie, Irvine, Williams et al., (2004) and Lees, Clark, Nigg and Newman, (2005) have uncovered numerous reasons why people do not participate in physical activity, and revealed a number of factors that influence participation motivation. Yet the issue of how to best motivate the initiation and maintenance of physical activity remains largely unresolved. Previous physical activity motivation research has included testing unidimensional physical activity interventions as well as testing one theory against another (Biddle & Mutrie, 2001). Investigating the effectiveness of the

application of strategies to increase physical activity motivation drawn from a combination of psychological theories has not yet been systematically examined.

Because physical inactivity is a global health issue and because motivation for physical activity is elusive for many people, deeper exploration of physical activity motivation is urgently needed. In particular, it is essential to investigate motivation for the adoption and maintenance of physical activity. The purpose of the present research is to examine the application of a motivational intervention to increase physical activity in mid-life, sedentary women based on combining effective techniques from a number of major psychological theories. Furthermore, I explored the long-term perceptive experiences of mid-life women associated with their efforts to change physical activity behaviour, in response to motivational interventions.

## CHAPTER 2: LITERATURE REVIEW

In this chapter, I examine in the first section the range of benefits of physical activity (PA) for health and well-being. In the second section, I detail psychological theories of motivation and their application with physical activity. In the third section I discuss attitudes of mid-life women towards physical activity. In the fourth section I consider women's motivation for physical activity. The fifth section concludes the review with the rationale and aims for the ensuing studies. Presentation of the motivation interventions sections of this review is presented with research related to the general population followed by a specific focus on mid-life women. This focus on research with mid-life women reflects the two issues of women's elevated risk of ill-health from sedentariness and a gender bias in physical activity research (Armstrong, Bauman & Davies, 2000; Greenberger, 1998; & Erlichman, Kerbey, & James, 2002). The next two review sections are focussed on women's physical activity contexts and motivation because, when compared with men, mid-life women are more sedentary and without the health benefits of physical activity may become more vulnerable to functional and health declines (Armstrong, et al. 2000; O'Brien-Cousins, 1996). Physical activity, for the purpose of this research, is any bodily movement produced by skeletal muscles resulting in energy expenditure including sports and exercise, defined as planned, structured, and repetitive bodily movement done to improve or maintain physical fitness or health (Dishman, 2000).

### Physical and Mental Health Benefits of Physical Activity

Researchers have examined many physical, psychological, social, and environmental factors that impair or improve engagement in physical activity (e.g., Guthrie, Smith, Dennerstein, & Morse, 1995). A range of physical and mental health benefits are associated with physical activity. Moreover, researchers have examined the physical, psychological, social, and environmental factors that impair or improve engagement in physical activity. Researchers nowadays positively link physical activity to well-being (Biddle & Mutrie, 2001).

The positive effects of physical activity span generations although the nature of the benefits change according to age (Shephard, 1995). Shephard has demonstrated the positive effects physical activity has on attitudes and habit formation with children. Whereas, adults' participation in physical activity leads to improved work performance, lower anxiety, and mood lifting particularly in depressed adults. There is agreement arising from the large body of physical activity research that no matter how motivated or unmotivated one may feel towards physical activity, there are a range of important psychological, physical, and social benefits (Shephard; Biddle & Mutrie).

Before delving further into the health benefits derived from physical activity it must be noted that physical activity intervention research was gender biased in favour of males for many years (Kull, 2002). Gender biased research resulted in negligible data comparing male physical activity outcomes with female physical activity outcomes. Despite gender bias in the literature there is considerable agreement on the complex and changeable nature of physical activity (Buckworth, 2000; Sparling,

Owen, Lambert, & Haskell, 2000). Efforts to redress gender bias began in earnest in the early 2000s. Working to redress the balance in physical activity research Kull explored the relationships between physical activity, health status, and psychological well-being of women. Kull reported that most physical activity studies until 1997 compared physically active males with low level physically active males. The American College of Sport Medicine (1998) has also reported the lack of data comparing males with females, and data contrasting high active females with low active females.

Consensus has emerged from a plethora of research on health benefits of regular engagement in physical activity (Guthrie et al., 1995). The range of benefits accessible to active men and women are both physical and psychological (Biddle & Mutrie, 2001). Physical activity has provided positive outcomes, for people with a wide range of medical conditions, including diabetes, cardiovascular heart disease (CVD), depression, and obesity (Biddle & Mutrie). In addition, women suffering with breast cancer, menstrual symptoms, difficulties with reproductive functions, and osteoporosis have reported multiple benefits from engaging in physical activity (Choi & Mutrie, 1997; Choi & Salmon, 1995; Gutin & Casper, 1992; Simkin-Silverman, Wing, Boraz, & Kuller, 2003; Verloop, Rookus, van der Kooy, & Van Leeuwen, 2000). Researchers have reported the financial benefits that flow from physical activity for individuals and active communities (Pratt, Macera, & Wang, 2000; Shephard, 1995). For example, physically active individuals benefit financially, by remaining able to function independently for longer than their physically inactive counterparts, thus postponing the need for paid care (Shephard). Communities benefit

financially through reductions in indirect and direct health care costs associated with the poor health outcomes of low levels of physical activity (Pratt).

### Physical Benefits of Physical Activity

#### *Physical Activity and Cardiovascular Disease (CVD)*

In this section I describe Cardiovascular Disease (CVD), detail the prevalence of CVD and examine how physical activity can be used to reduce the risk of hypertension and treatment for hypertension. Cardiovascular disease (CVD) refers to a collection of ten diseases of the heart and blood vessels. Blood vessel disease includes arteriosclerosis and atherosclerosis that are serious vascular conditions where blood vessel walls are either hardened or narrowed by fatty deposits. Hypertension (i.e., high blood pressure) may lead to stroke and aneurysm yet may be delayed by treatment (Mayo, 2005). The first step to prevention of CVD and towards providing interventions that reduce the risk of developing a type of CVD, depends on the identification of risk factors.

CVD is globally prevalent and a major cause of death. The evidence from government mortality statistics from the United Kingdom (UK), in 2001 indicated that CVD accounted for 40% of all UK deaths (UK National Office of Statistics, 2002). The figures concerning deaths attributable to CVD are similarly alarming in Australia for both men and women. In 2005, the ABS reported 137 male deaths per 100,000 males and 81 per 100,000 females an improvement compared with 248 per 100,000 for males and 141 per 100,000 for females, in 1995 (ABS, 2005). Somewhat alarmingly by 2006 CVD was considered a primary cause of death of women (Murdoch, 2006). Australian mortality statistics attributed the deaths of 11,424

Australian women to cardiovascular disease between 2002 and 2004 (ABS, 2004).

These statistics, combined with the at risk statistics provided in chapter 1, point towards the imperative to help women strengthen motivation to become, and remain, physically active, while acknowledging the enormity of the problem for men and women.

*Risk factors and risk reduction for CVD.* The factors that increase the risk of men and women developing CVD can be categorised as biological, behavioural, or psychosocial (Krummel, et al., 2001). Biological risk factors for CVD include hypertension, cholesterol fluctuations, obesity, and diabetes. Behavioural risk factors include sedentary lifestyle, smoking tobacco, and poor diet, whereas, psychosocial risk factors include depression, lack of social support, and low socioeconomic status (Krummel et al.). Warburton, Nicol and Bredin's (2006) narrative review of the health benefits of physical activity, for men and women, indicated the greater the number of risk factors a person has the greater their risk becomes of developing CVD. Therefore, physical activity offers greater benefits in terms of risk reduction for people with multiple risk factors. Warburton et al. found that being physically active provided men with a greater than 50% reduction in risk for CVD. For physically inactive women, Warburton et al. found evidence for increased ill-health risk, whereby women doing less than one hour of exercise each week experienced a 52% increased risk of death from all causes as well as a 29% increase in cancer related deaths.

The types of physical activity effective for risk reduction may be categorised as intensive or moderate. Taylor, et al. (2004) explored what kind of physical activity

was effective in CVD risk reduction. They found that intensive endurance training provided reduced risk for CVD. Both young and old adults experienced reduced risk, however, the risk varied, according to the intensity of training undertaken, before, and during training programs (Taylor et al.). Problems with endurance training for risk reduction, however, are that for most people endurance training is arduous, time consuming, and difficult to maintain. A relevant question is whether lower intensity training is effective in CVD risk reduction. Lemaitre, et al., (1999) found that moderately intense physical activity such as walking also reduces the risk of CVD. Moderately intense activities have the advantage over endurance training because of sustainability over time compared to the vigorous-intensity required for endurance training. Lemaitre et al., gathered strong evidence for the effectiveness of moderate intensity physical activity in reducing the risk for death due to CVD. Their participants were 503 control participants and 333 cardiac arrest participants that were matched with the control participants for age and gender. They also found that even moderate-intensity exercise lowers sudden cardiac death risk. For instance, risk of cardiac events was assessed in people who performed high- or moderate-intensity activities measured as odds ratio. For people who worked in their gardens (i.e., at a moderate-intensity) for over one hour each week and for people who did any of the high-intensity activities, the odds ratios were 0.34 (95% confidence interval, 0.13 to 0.89) and 0.34 (95% confidence interval, 0.1 - 0.75) respectively. In addition, the odds ratio for participants who walked for exercise for more than 60 minutes each week was 0.27 (95% confidence interval 0.11 to 0.67). These results add to the established body of knowledge concerning the general benefits of walking, of various

intensity exercise, and the association between walking and the reduction in risk of cardiac events. Lemaitre's findings demonstrate the effectiveness of moderate-intensity physical activity, including walking, as an effective CVD risk reduction strategy.

*Physical activity as treatment for CVD.* Treatment of CVD using physical activity interventions often as part of cardiac rehabilitation programs has been successful, leading to wide acceptance of the efficacy of physical activity (Wanamethee & Shaper, 2001). A meta-analysis of targeted cardiac rehabilitation interventions using physical activity has provided evidence of a significant reduction in cardiac mortality for participants (Oldridge, Guyatt, Fischer et al., 1988). Researchers have examined the entrance rates, attendance figures, and attrition at cardiac rehabilitation centres (Ades, et al., 1992; Schuster and Waldron, 1991), yet there are few studies of women's participation or engagement with physical activity in cardiac rehabilitation settings (Toobert, Stryker, and Glasgow, 1998). Toobert et al's., review noted scant use of physical activity treatment interventions for women, following CVD, even though evidence supported physical activity treatment interventions' effectiveness for cardiac rehabilitation. Reviewing the available literature on women's CVD experiences, Toobert et al., found physical activity was effective for those women who engaged in cardiac rehabilitation. Overall, they were unable to draw definitive strong conclusions because of the lack of studies published, inconsistent findings, methodological and reporting issues. Another reason for the paucity of studies into women's cardiac rehabilitation experiences could be because women who experienced heart attacks tend to be referred for cardiac rehabilitation

less frequently than men (Oldridge et al.). Nevertheless, in one of the few studies into women's experiences with cardiac rehabilitation, Oldridge et al. specifically advocated physical activity to aid recovery after CVD. When the 17 participating women undertook a structured exercise program in the cardiac rehabilitation setting, the women reported improved functional capacity.

Despite the complexity involved in isolating intervention effects, and the scarcity of literature specifically related to women's experiences or barriers to engaging with physical activity in the cardiac rehabilitation settings, the research consensus is that for men and women diagnosed with cardiovascular disease, numerous health benefits can be derived from physical activity (Shepherd, 2005; Wanamethee & Shaper, 2001).

*Long-term effectiveness of physical activity for people with CVD.* Despite the identification of clear benefits of physical activity long-term strategies of changing physical activity levels have not been clearly established (Carels, Darby, Cacciapaglia, & Douglass, 2004; Krummel, et al.). Krummel et al. reviewed 19 treatment interventions aimed at increasing women's engagement in physical activity. These treatment interventions ranged in length from 6 weeks to 2 years. Interpretation of the interventions, however, was difficult because of confounding factors such as various modes of delivery, differing session frequencies, and a range of formats. What was clear from Krummel's review was that none of the nineteen studies were targeted to specific gender or stage of change. However, until the late 90s Prochaska et al., were still shaping the transtheoretical model with behaviour changes such as smoking and other health behaviours. Eleven of the studies were theory-based

strategies used to promote physical activity in women at risk of cardiovascular events were self-monitoring, goal setting, relapse prevention, incentives and contracts, feedback, boosters, support and encouragement. Krummel identified several information gaps in interventions aimed at encouraging increased physical activity in women. The information gaps included assessment tools that relate to women's lives, life stage issues, and measurements taken well after interventions were concluded. The recommendations of Krummel et al. included tailoring interventions to life stages, readiness to be physically active and using appropriate measurement tools to assess intervention effectiveness. Krummel et al. proposed that the lack of tools to measure unstructured physical activity in which women engage more often than men, for example dancing at home, affected their findings. Since publication of the Krummel et al. extensive review of men's and women's engagement in physical activity there have been few published studies aimed solely at the effectiveness of physical activity for women with cardiovascular disease. The absence of gender specific physical activity intervention studies perhaps reflects a gender bias toward the study of men's physical activity experiences. In addition to the absence of gender specific intervention studies, no researchers appeared to consider stages of change with respect to CVD (Prochaska, Norcross, & DiClemente, 1994).

Examination of the long-term effectiveness of physical activity for women at risk of cardiac events was undertaken by Carels, Darby, Cacciapaglia, and Douglass, (2004). Carels et al. 6-month lifestyle change intervention with postmenopausal, sedentary, obese, women, resulted in participants reporting increased physical activity. The intervention included 24 sessions based on LEARN, a weight

management program. The LEARN program included five components, exercise, lifestyle, attitudes, relationships and nutrition. The primary benefit resulting from an increase of 39.6% in physical activity was improved cardiovascular risk profiles in the short-term (at 2 months). In the longer term (the final four months) physical activity levels fell and once again the women's cardiovascular risk returned to higher levels. The outcomes of the physical activity component of the program indicate how difficult it is to increase and sustain women's motivation for physical activity even though active living is advocated.

#### *Physical Activity and Hypertension*

In this section I describe and detail the prevalence of hypertension and examine how physical activity can reduce hypertension risk and be used as a treatment. Hypertension is both an established risk factor for heart attacks, and is linked to cerebrovascular bleeds or strokes (National Heart Foundation of Australia, 1996).

Hypertension is characterised by high blood pressure readings at rest. Blood pressure is the force of circulating blood on the walls of the heart. The highest pressure is produced in the systolic phase as the heart contracts and pushes the blood outwards. The lowest blood pressure is produced in the diastolic phase and occurs as the heart relaxes between each contraction (WHO, 2007). While exertion largely raises heart rate, the long-term outcome of physical activity is muscle strengthening. Strong heart muscles lead to more effective pumping of blood through the heart and a lower resting heart rate.

Generally, hypertension is asymptomatic and diagnosis is purely by measurement, using, for example, a sphygmomanometer. Hypertension carries strong

risk for CVD (Warburton et al., 2006) and is exacerbated by physical inactivity. A consistently elevated blood pressure requires treatment to reduce the risk of stroke, ischemic heart disease, renal disease, and hypertensive disease. One problem faced by people who have these diseases is regularly feeling unwell leading to a cycle of low physical activity levels, the very thing that could help avert CVD, and sedentariness.

*Prevalence of hypertension.* Gelenijnse, Kok and Grobbee, (2004) examined the epidemiology of hypertension in people who were relatively inactive in Finland, Italy, Holland, the United Kingdom, and the United States of America (USA). Using meta-analysis of randomised trials published from 1996 - 2001, Gelenijnse et al. found that the population attributable risk (PAR) percentages were 5% to 13 % for physical inactivity. The highest PAR for hypertension was being overweight with a PAR ranging from 11% (Italy) to 25% (USA). In Australia, a 2001 national health survey of hypertension, with a sample of 16,290 males and females aged 25+, showed that 13.3% were diagnosed with hypertension (WHO, 2007). These studies confirm that in westernised societies being overweight and physically inactive are one major contributor to the development and maintenance of hypertension (Gelenijnse et al., 2004).

*Prevention of hypertension through physical activity.* In some instances it is possible to prevent hypertension. The American national guidelines for prevention and treatment of hypertension (NHL&BI, 2007) include regular aerobic exercise as well as sodium reduction, weight reduction, and dietary modification. This advice is based on research that has shown that hypertension can be controlled effectively with

physical activity interventions (Anspaugh, Hunter, & Dignan, 1996, Stevens et al., 2001).

*Treatment of hypertension through physical activity.* As well as being an effective risk reduction strategy, physical activity (interventions) has also been applied successfully to treat people diagnosed with hypertension. Hypertension treatment generally requires regular, long-term medication, encouragement to reduce weight, and engage in regular physical activity. For example, the trials of a hypertension program (Stevens et al., 2001) used physical activity to successfully reduce weight in men and women. Participants in the weight-loss intervention conditions received instructions to set the physical activity goal to “walk briskly for 30 to 45 minutes per day on 4 to 5 days a week.” These participants reported lowered blood pressure readings of 7 mm Hg diastolic, and 5 mm Hg systolic and were 21% less likely to develop hypertension compared with the control condition participants (Stevens et al).

Another physical activity intervention, for men and women, was specifically designed for treatment of hypertensive adults. Miller, et al. (2002) undertook the Diet, Exercise and Weight Loss Interventions Trial (DEW-IT) with 44 overweight, hypertensive adults 22-70 years of age. Part of this randomised controlled trial included a supervised moderate-intensity physical activity program across 9 weeks. Positive outcomes of this intervention included substantial reductions in blood pressure with improved blood pressure control, and a mean weight loss (excluding control group) of 4.9 kilos. All three of these outcomes were promising for the treatment of hypertension by physical activity showing how increased physical

activity in conjunction with dietary modifications is effective in lowering blood pressure and assisting weight loss.

Research studies of hypertensive women were few, but one, albeit cross-sectional, compared blood pressure of exercising and non-exercising women (Anspaugh, Hunter, & Dignan, 1996). Anspaugh et al. found that the exercising women were lighter and lower in body mass index than non-exercising women. Furthermore, blood pressure readings of the exercisers showed small, yet significant differences compared with the non-exercisers. People, who were non-exercisers, living sedentary lifestyles, often have hypertension that predisposes them towards type 2 diabetes (Anspaugh et al.). Many people with hypertension are heavier than non-hypertensive people and have concerns about elevated blood pressure while exercising. In the prescription of physical activity for heavy people body mass index (BMI) must be considered. BMI is a measurement based on a person's height to weight ratio. If a person's BMI is more than 30 they are more likely to experience elevated blood pressure during any physical exertion they undertake. Temporarily elevated blood pressure during physical activity can thus be problematic, even though the long-term outcomes of being physically active strengthen their heart muscle and, consequently, lower blood pressure in the long-term (WHO, 2007).

Overall, physical activity is an effective treatment for hypertension. Miller et al. (2002) specifically concluded from their studies that physical activity interventions provide hope for all who are overweight and hypertensive. It is particularly important for women to reduce their hypertension because when they are sedentary and hypertensive they also run the risk of developing obesity and metabolic syndrome.

*Physical Activity and Metabolic Syndrome*

In this section, I describe metabolic syndrome, discuss issues around the prevalence of the syndrome, and then examine how physical activity is employed in risk reduction and treatment. Metabolic syndrome is a cluster of symptoms, including the presence of central abdominal obesity, lipid metabolism fluctuations, high blood pressure, and diabetes. It is associated with sedentary living and hyper-caloric nutritional intake (Wagner, Brehm, & Sygush, 2004). Researchers have also established that physical fitness can be protective against metabolic syndrome (Whaley, Kampert, Kohl, & Blair, 1999)

*Prevalence of metabolic syndrome.* Being a relatively newly identified syndrome, global prevalence and precise estimates of prevalence are lacking (Whaley et al. 1999). Since 1998, in Germany, however, metabolic syndrome was reported to affect 25% of the adults over 40 (Wagner, et al., 2004). Similarly, in the US one in four adults has risk factors for the syndrome (Ford, Giles, & Dietz, 2002). With newly identified syndromes, such as metabolic syndrome, the importance of testing physical activity interventions as prevention and treatment becomes important. Testing physical the efficacy of physical activity interventions is paramount to better understanding the potential role of physical activity in ameliorating such conditions.

*Physical activity intervention as prevention for metabolic syndrome.* Despite the relatively recent emergence of this syndrome, there is already some evidence of the benefits of physical activity for prevention but definitive research remains unpublished (Wagner et al., 2004). For instance, to test the efficacy of a metabolic syndrome prevention program, Wagner et al. conducted a two year-long physical

activity intervention applied with a sedentary cohort of 159 men and women. Wagner et al. provided a seven-sequence intervention for regular (once a week), moderate level physical activity. The intervention involved 52 weekly, 90 minute sessions. Sessions comprised an introduction, game playing, moderate intensity walking, jogging, strength and flexibility exercises, relaxation, games to music, and providing physical activity related information. Follow-up data was collected one year and two year post intervention completion. As a result of the study physical activity improved the participants' health. At one year post intervention 85% of participants were still physically active. Two years after completion, a staggering three quarters of the participants reached their long-term goal of behavioural change. Three years after completion 76% of participants in the treatment conditions were still physically active. Wagner et al noted that participant attrition was problematic for their study. Wagner et al. suggested physical activity aimed at increasing fitness, rather than at weight loss, could be protective for metabolic syndrome. Wagner et al. also concluded physical activity was an effective means to enhance fitness, for overweight people, primarily because physical activity helped them avoid the risk of serious outcomes from low levels of physical activity. A secondary benefit of regular physical activity was in stabilising weight and avoiding further or increased obesity. Obesity, which can develop through low physical activity levels, is a major risk factor for CVD and diabetes, with excess fat being the primary determinant of type 2 diabetes (Hu, Manson, Stampfer, Colditz, Liu, Solomon & Willett, 2001).

*Physical Activity and Diabetes*

Diabetes is a growing problem adding to the burden of disease, with 4.9% of the Australian population currently diagnosed with type 2 diabetes (AIHW, 2006). Diabetes is a disease of the endocrine system, whereby insulin is either not produced, or not used efficiently. Symptoms can include thirst, excessive urination, sweating, poor wound healing, and sometimes collapse. Life expectancy research shows that, for moderately, and highly active people their life expectancy is significantly longer than sedentary diabetics. Thus, it is imperative to find ways to motivate the adoption and maintenance of physical activity so that diabetics may live well for longer (Jonker, Peeters, Laet, Mackenbach, Franco, and Nusselder, 2006).

*Physical activity intervention for prevention of diabetes.* Regarding physical activity as a prevention strategy for Diabetes researchers have determined its effectiveness particularly for late onset diabetes, that is, type 2 diabetes (Hu, Manson, Stampfer, Colditz, Liu, Solomon & Willett, 2001). Further need for preventing type 2 diabetes lies in the additional risk diabetes presents for CVD. In women of normal weight (BMI less than 25) in comparison to obese women (BMI more than 30) Hu et al., found diabetes was prevented by regular physical activity. The data underpinning this conclusion was drawn from a large (N = 84,941) study based in New England, with female nurses, from 1980 to 1996. Among the risk factors Hu et al. identified for the development of diabetes was low physical activity. When, the participants included 30 minutes of moderate to vigorous physical activity on a regular basis, they were at significantly less risk of developing diabetes (Hu et al.).

*Physical activity for treatment of diabetes.* Research has shown that, in addition to drug treatment, physical activity interventions for diabetes are beneficial because they improve glucose tolerance, in people whose tolerance is impaired, and promote sensitivity (Mensink, Feskens, Saris, De Bruin, & Blaak, 2003). Younis, Soran, and Farook (2004) found physical activity interventions reduced the incidence of diabetes by more than 50%.

#### *Physical Activity and Other Diseases*

Physical activity is also beneficial to people with other diseases, such as osteoporosis (Fukuharu, Sato, Ohsawa, Oshida, Kuriki, Shibata, et al., 2001; Yoshimura, 2005), cancer (Hoffman-Goetz & Husted, 1995; World Cancer Research Fund/ American Institute for Cancer research, 2007) and respiratory disease (Cheng, Macera, Addy, Wieland, & Blair, 2003; Jakicic, Marcus, Gallagher, Napolitano, & Lang, 2003). In osteoporosis, for example, physical activity intervention research provides evidence in both men and women, of reducing the risk of hip fractures from middle-age onwards (Fukuharu, et al., 2001; Yoshimura, 2005). Furthermore, researchers have demonstrated physical activity helped redress this problem. Specifically, where low bone density develops, threatening skeletal integrity, physical activity was associated with improvements in bone density (Drinkwater, 1994). Moreover, Ulrich, Georgiou, Gillis, and Snow (1999) reported that weight bearing physical activity maintained bone mineral density in pre-menopausal women. It is controversial though whether low bone density is preventable or ameliorated by physical activity in old age (Chesnut, 1993).

The demonstration of benefits of physical activity experienced by people with cancer is unclear. Multiple studies have been undertaken with cancer patients, many of these studies were epidemiological. Findings are inconclusive, however, for all types of cancer. In a review of 26 epidemiological studies on the effects of physical activity on cancer (i.e., colon, rectum, breast, prostate, and lung cancer) Hoffman-Goetz and Husted (1995) reported that increased physical activity decreased the incidence of colon cancer. Hoffman-Goetz et al. found several issues clouded their ability to state conclusively that physical activity was beneficial across all the studies. Problems in the 26 studies included, imprecise measurement of physical activity, the lack of control for confounding variables, and the lack of statistical power. While earlier studies were inconclusive about the levels of protection for cancer afforded to physically active people, later studies (2007) on the effects of physical activity on cancer surveyed by the World Cancer Research Fund and the American Institute for Cancer research. (2007) have though found convincing evidence that physical activity protects against cancers of the colon, breast and endometrium.

Cross-sectional and longitudinal studies of the benefits of physical activity for the prevention and treatment of respiratory disease have been applied with men and women. For example, Cheng, Macera, Addy, Wieland & Blair (2003) studied the impact of physical activity on respiratory disease in both a cross-sectional study (24,536 healthy people), and a 24 year-long longitudinal study of 5,707 healthy people (25 to 55 years of age). Cheng et al. showed that being physically active and a non-smoker led to higher cardiorespiratory fitness and function for both men and women. From the longitudinal study Cheng et al. found greater cardiorespiratory

fitness in those who remained or became physically active compared with the physically inactive participants.

Overall, researchers have provided clear evidence that multiple physical benefits originate from physical activity. The wide-ranging benefits of physical activity span risk reduction to treatment for illness and disease associated with, and including, CVD, hypertension, metabolic syndrome, diabetes, osteoporosis, cancer, and cardiorespiratory disease. So far, the physical benefits have been described, whereas in the next section of this literature review, I define and describe the nature and scope of psychological benefits associated with physical activity. Similarly to the physical benefits, psychological benefits are also wide-ranging. Researchers have explored the psychological benefits associated with physical activity for depression, anxiety, and stress related illnesses. Psychological improvements through increased physical activity are also highly influential for well-being, because, at any life stage our level of psychological function can strongly enhance quality of life.

### Psychological Benefits of Physical Activity

Strong evidence of the psychological benefits from physical activity stems from both epidemiological and intervention studies, particularly studies of well-being indicators, such as depression, anxiety, stress, enjoyment, and self-esteem (AIHW, 2004; Richardson, Faulkner, McDevitt, Skrinar, Hutchinson, & Piette, 2005).

Researchers have shown that physical activity ameliorates depression, anxiety, and mood (Acevedo & Ekkekakis, 2006; Moore et al., 1999; Paffenbarger, Wing, Hyde & Jung, 1983). Depression, anxiety, and stress, respond well to physical activity interventions with mild to moderately clinically depressed people reporting physical

activity's effectiveness in symptom reduction. In particular, symptom reduction occurs when physical activity is taken up as part of treatment. Similarly the research into physical activity for those who are anxious, or stressed, and women's mood at menopause show symptom reduction as a result of increased physical activity (Bodin & Martinsen, 2004; Sjosten, & Kivela, 2006; Sorensen, Anderssen, Hjermerman, Holme, & Ursin, 1997). Researchers have also shown that physical activity leads to enhanced cognitive function and sleep (Acevedo & Ekkekakis, 2006; Biddle, 1995; Biddle, Fox & Boutcher, 2000; Biddle & Mutrie, 2001; Bodin & Martinsen, 2004; Hays, 1999; Moore et al., 1999; Paffenbarger, et al, 1983).

#### *Physical Activity and Depression*

Depression (either clinical depression or depressed mood) affects an enormous number of people worldwide, with twice as many females reporting symptoms of depression than males (Craft, 2005). Research into the effects of physical activity on people who are depressed can be divided into physical activity relating to those experiencing non-clinical depression and those diagnosed with clinical depression. Qualitative data from depressed people led Benditt (2004) to elaborate on the effects of depression on physical activity and life in general (Benditt, 2004). Depression was considered a mental-illness that limits many peoples' capacity to be physically active. In addition, Benditt argued that the effects of depression can extend to limiting peoples' capacity to participate "in life itself" p. 2 (Benditt, 2004). During depressive episodes people often no longer enjoy doing previously enjoyable activities and often experience debilitating fatigue (O'Neal, Dunn, & Martinsen, 2000). Depression affects people differently, with overwhelming sadness, short temper, fluctuations in

appetite and sleep patterns, a sense of worthlessness, reduced pleasure from once enjoyed activities, fatigue, and psychomotor difficulties are commonly reported symptoms of depression (Craft, 2005).

*Prevalence of depression.* In the USA 9.5% of the adult population is estimated to suffer with depression and the risk of depression recurring has been calculated to be 50% to 90% (National Institute of Mental Health, 2001). The burden of health costs attributable to depression, in Australia, is considerable. Depression is the second major cause of ill-health for 7% of the population with the first major cause of ill-health being Ischemic heart disease, with a burden of 9.8% (AIHW, 2006). Depression was the most reported condition of mental illness (45%) among people diagnosed with mood problems, with females constituting the greater proportion. Depression also increases risks associated with being overweight, a condition that can, in turn, exacerbate depression (Berger, 2004). That is, there is a reciprocal relationship between being overweight and depression.

*Risk of developing depression.* The risks of developing depressive symptoms are different across life stages. In particular, for older people (defined as 65 years of age or over) Ried and Planas (2002) found that as self-reported health of women declined, and as age increased their depressive symptoms increased. Females were 50% more likely to report indicators of depression than males, however, females' depressive symptoms, increased at a slower pace than males symptoms.

Physical activity and depression can interact in several ways (Van Gool, Kempen, Pennix, Deeg, Beekman, & Van Eijk, 2003). Firstly, physical inactivity leading to depression independently of coping is one type of interaction. For instance,

someone may be psychologically coping well with a life of low-level physical activity, yet who may become depressed as a result of sedentariness. The second type of interaction, where depression leads to physical inactivity, is typified when women become depressed and subsequently lose their desire to be physically active. Van Gool, et al. also argued that sedentary living can be symptomatic of depression but sedentary living can also prompt depression. This type of interaction consequently limits motivation for physical activity or reduces self-efficacy for physical activity or exercise. Even if people had previously enjoyed physical activity before suffering depression they may find their self-efficacy for physical and psychological activities depleted.

Irrespective of the antecedents of a person's depression, building or re-establishing self-efficacy for physical activity can be an effective component of treatment for depression. Results from Bodin and Martinsen's (2004) physical activity intervention, that was designed to establish self-efficacy for physical activity, indicated that acute exercise (i.e., martial arts at low intensity) led to significant gains in self-efficacy compared with pedalling a stationary exercise bicycle. Surprisingly, the higher intensity physical activity of riding the stationary bicycle was not perceived by participants as requiring greater exertion than low intensity martial arts. With respect to depression, Bodin and Martinsen found positive affect was strongly associated, whereas negative affect was only weakly associated. Thus, with depressed people increasing positive affect may be more helpful for physical activity than decreasing negative affect. Increasing positive affect may help them initiate, or rejuvenate, their enjoyment of physical activity and to reduce their depression.

*Physical activity as treatment for depression.* The importance of finding ways to ameliorate depression has been evident in psychological research since the early 1900s (Landers, 2005; Martinsen, 2005). Reduced depression occurs, when exercise is applied as an intervention, with consistently large effects found in clinically depressed people (Landers). Taking the large number (16 plus) of depression focussed meta-analysis analyses as well as narrative reviews, Landers tested the hypothesis that exercise is as effective as or better than drugs or psychotherapy. Landers compared the effects of physical activity with effect sizes of cognitive therapy, behaviour therapy, cognitive-behavioural therapy, and drug treatments. For mild to moderate forms of clinical depression, exercise was anti-depressive when compared to those receiving no treatment, or only engaging in recreational activities or relaxation meditation (Landers; Martinsen). In addition, exercise was found to be as beneficial as psychotherapy, cognitive therapy, behavioural therapy, cognitive behavioural therapy, verbal therapy, and drug therapy. Moreover, Landers found that exercise and therapy for depression produced similar effect sizes. Landers, also found that exercise is an effective antidepressant for men and women and often, exercise, psychotherapy and sometimes the drug treatment combined, is even more effective in lowering depression scores, than exercise and therapy alone.

Craft's (2005) exploration of exercise as an antidepressant, and in particular the mechanisms triggered by exercise, focused on women. Using a quasi-experimental design study, Craft examined the depression scores of 19 women who self-selected into a 9-week exercise program or a control group. Applying measures of depression, coping self-efficacy, rumination, and distraction, taken at entry to the program, 3

weeks, then 9 weeks later, Craft found the exercisers reported greater self-efficacy for coping, in relation to their depressive symptoms rather than self-efficacy for engaging in exercise. One implication is that coping self-efficacy may be one of many mechanisms that influence depressive symptoms through exercise. Providing interventions where self-efficacy is generated in the form of mastery experiences and coping skills is a promising way to ameliorate symptoms of depression. Given the evidence of Landers (2005) and others that identifies for people with depression the value of combining physical activity with other therapies, I wonder why physical activity is not more widely applied as an antidepressant. Perhaps the effectiveness of physical activity as an antidepressant is overlooked because of doubts about how willingly people will undertake physical activity. There is evidence of particular benefits attributable to physical activity for sedentary people when implemented with more appealing lifestyle changes rather than delivered as structured exercise programs (Biddle 1995; Lowther, Mutrie, & Scott, 2002; Richardson, et al., 2005). For example, lifestyle changes would focus on physical activity associated with active living such as taking stairs instead of lifts and parking further away from shops.

Another promising research avenue seeks to identify the amount of physical activity required to provide relief from depression. Landers' (2005) sought to resolve this issue as did Dunn, Trivedi, Kampert, Clark, and Chambliss (2005). Dunn et al. subsequently took up the dose-response issue finding that where participants exercised individually on 3 to 5 occasions each week with the moderate calorie expenditure of 17.5 kilocal per kilogram of body weight (current physical activity

recommendation levels), they reduced their depression far more than those only expending 7 kilocalories per kilogram of body weight each week.

Although there is strong consensus among researchers about the utility of exercise as a treatment for depression, some methodological issues have been raised in the literature (Landers, 2005; Martinsen, 2005; O'Neal, Dunn, & Martinsen, 2000). Some researchers have criticised, for example, methods for testing the capacity of exercise to reduce depression because of lack of follow-up assessments after interventions, the lack of blind assessment, and lack of blind allocation to experimental conditions (Lawlor & Hopker, 2001). Another important methodological issue is the use of randomised controlled trials (RCT). Although RCTs are considered the gold standard in treatment research and research into drug effectiveness, they are limited in their application to exercise trials. This is primarily because there is no formally identified placebo for exercise that means exercise trial participants are aware of being in an exercising or non-exercising treatment condition (Martinsen, 2005). Researchers have attempted to overcome the non-exercising treatment condition problem while investigating clinical depression and its association with caloric expenditure. Dunn et al. and Martinsen used stretching and flexibility movements for their low intensity active treatment. Although the lack of placebo for exercise adds another layer of complexity to the research process, physical activity research continues.

Depression lethargy, for instance, was identified as especially important to overcome if depression symptoms are to be reduced. Psychologically, this can be achieved by identifying strong motivators. In men and women with symptoms of

depression and cardiovascular disease research has revealed several motivators (Rogerson & Morris, 2006). Having an exercise partner, whether a friend, spouse, or dog was found to be motivational. Similarly, perceiving physical activity as part of a treatment plan, and physical activity forming a purpose for being physically active such as supporting a friend, or going somewhere specific were good motivators for physical activity (Rogerson & Morris).

### *Physical Activity and Anxiety*

As for depression, the treatment of anxiety relies on finding appropriate motivators to change. The large amount of research that has been conducted on the effects of physical activity on state and trait anxiety provides strong evidence that where people are motivated to be physically active, involvement in physical activity reduces state and trait anxiety (Biddle & Mutrie, 2001). Anxiety, however, is often diagnosed alongside other psychological conditions, such as depression.

Psychological comorbidities add another issue for consideration when recruiting research participants (O'Connor, Raglin, & Martinsen, 2000). Another problem inherent in anxiety research is that anxiety is multidimensional. Accurate diagnosis of anxiety is crucial for a deeper understanding of the effects physical activity has on anxiety. Eleven anxiety disorders, including panic disorder and post traumatic stress disorder, can be diagnosed using the Diagnostic and Statistical Manual version 4 (American Psychiatric Association, 1994). Until the year 2000 most of the research into physical activity was about its effects on anxiety for participants with panic disorder. A large gap is left in understanding the effects of physical activity on the 10 other anxiety disorders listed in the diagnostic manual (O'Connor et al.). The genesis

of much research into physical activity of panic-disordered people grew from the assumption of Schwartz (1989) that people with panic disorder are less physically active than non-panic disordered people. The veracity of the belief that panic disorder leads to avoidance of physical activity is not yet clear from at least five studies of physical activity with panic disorder patients. Only a small number of patients took part in these studies (174 altogether), although the studies represent findings from a range of measures of physical activity, including motion sensors, questionnaires, and interviews. Researchers using the objective and self-report data took the position that not all panic disorder patients phobically avoid physical activity (O'Connor et al.). Self-report evidence of anxiety reduction through physical activity was limited, indicating only small effects. Results of psychophysiological measures (e.g., blood pressure, heart rate, skin conductance, electromyographic and central nervous system measures) provided evidence of moderate beneficial effects for ameliorating anxiety for acute physical activity (Crews & Landers, 1987). Compared with the moderate benefits indicated by physiological outcomes, subjective experiences following physical activity were of only small reductions in anxiety.

#### *Physical Activity and Stress*

Stress is another psychological factor that for some mid-life women leads to and is associated with reduced well-being and diminished psychological resources. Selye (1976 & 1982) conceptualised stress as both eustress and distress. Eustress is a level of stress considered optimal, and helpful for task performance of certain tasks. Selye proposed that eustress is the level of stress where a challenge is perceived rather than feeling overwhelmed. Distress, however, refers to the experience when a

person feels their capacity to cope with an event or situation is way below the required capacity they judge necessary to deal with the event or situation. Consequently task performance is significantly diminished or inhibited by stress. Either types of stress can be triggered by an individual's appraisal of a situation or event. Appraisals of events or situations vary according to people's previous beliefs about or experiences relating to similar events or situations. That is, potential stressors exist in the environment as well as in social interactions. Individual perceptions of a situation or event, are central to the stress a person experiences. Kull (2002) found stress was exacerbated by the cumulative effects of time on issues of demanding relationships, domestic violence, lower status work, poverty, weight issues, and competing roles. Cumulative stress leads to varying levels of discontent followed by re-evaluation of life circumstances. Furthermore, by measuring the physical activity and health status of 1,200 women, aged between 18 and 45 years Kull (2002) found that mental health levels were positively associated with physical activity. In addition, even low levels of physical activity were found to benefit women's mental health. In Kull's study, physically active women reported good mental health, higher psychological health status, and lower depressive symptoms in contrast to the women who reported low levels of activity.

For some women, physical activity has ameliorated their stress, whereas others have remained discontented, anxious, and stressed (McQuaide, 1998). Physical activity can effectively counteract or manage stress (Biddle & Mutrie, 2001; Hays, 1999). For example, Hays conducted a survey with 66 (34 males, 32 females) American-based therapists, who used exercise for stress management in several ways.

They used physical activity as a distraction from tension, as time out, to enhance creative problem-solving processes, to socialise, and as private time. Hays reported that the more stress or anxiety participants in this interaction study experienced, the more effective exercise was in moderating their stress.

### *Physical Activity and Mood*

Mood is also positively affected by physical activity, as shown by meta-analysis analyses, population surveys, and findings from experimental trials (Biddle & Mutrie, 2001). Biddle and Mutrie reported that researchers have reached the consensus that participation in physical activity is “consistently associated with positive mood and affect” (p. 201). They demonstrated that aerobic exercise had small to moderate effects on vigour, and small to moderate effects on fatigue and confusion. They reported clear support from the literature for the effectiveness of moderate levels of physical activity as an intervention to manage negative mood. Yet, they concluded that, with respect to the benefits of vigorous physical activity on mood, the available research findings were equivocal. Notably it was not clear that doing more intense or vigorous physical activity provided more benefits on mood or affect than moderate activity. Anecdotal evidence, from regularly active people highlighted the way physical activity provided time out from work, or distance from distress (Hays, 1999). Menopause, cognitive functioning, and improved sleep are also areas where physical activity has yielded positive psychological effects. (Biddle & Mutrie, 2001). Unquestionably, physical symptoms are present in menopause, affect cognitive function and influence sleep. A considerable level of psychological functioning, however, is also associated with these factors. To date the effects of

physical activity on cognitive functioning have been small but significant. In addition, physically active people fall asleep more easily, more deeply, and for longer periods of time (Biddle & Mutrie).

### *Physical Activity and Self-perceptions*

One very important motivational factor is self-perception, which encompasses both negative and positive aspects that influence our psychological well-being that may in turn affect people's motivation for active living. In particular, researchers have found that physically active people report positive self-perceptions attributed to physical activity more often than physically inactive people (Biddle & Mutrie, 2001). Psychological perceptions of self, whether positive or negative, also affect psychological functioning (McQuaide, 1998; Whaley & Redding, 2001). Self-schema were identified as the building blocks of future-oriented perceptions, and were considered the building blocks of "positive selves" in Whaley and Redding's exploration of self-schema. They defined self-schema as apt and most important descriptions of aspects of our selves, for instance, thinking of oneself as an active or sedentary person. Whaley and Redding asserted that people can have multiple self-schemas. Also, multiple self-schemas can be revealed simultaneously thereby reflecting both positive and negative beliefs, and systems of thinking about oneself. Whaley and Redding proposed that one of these beliefs is the concept of possible selves. Possible selves, also known as future-oriented self-perceptions, was a concept initially described by Markus and Nurius (1986). They defined possible selves as "self-knowledge structures describing how individuals think about their potential and their future. They are cognitive manifestations of anticipated goals, motives, fears,

and threats” (p. 954). For example, an application of the possible selves’ concept with exercise for 203 mid-life women within a university community setting resulted in Whaley’s (2003) finding that possible selves of body image separated non-exercisers from exercisers for hoped-for and feared selves. In addition, self-efficacy and outcome expectancy predicted who would be long-term exercisers. Although this study was cross-sectional, purposive sampling was used the value of the possible selves’ concept for predicting physical activity behaviour choice and change was evident. Whaley’s findings provided initial evidence of the utility of the possible selves concept as a blueprint for change in perceived competence for physical activity that Alfermann and Stoll (1997) explored.

Researchers examining both the physical and psychological effects of physical activity agree that the advantages associated with physical activity are extensive. It is also clear that people experienced various obstructions to engagement in physical activity. Some of the obstructions that were identified were having low self-efficacy for physical activity, being primarily sedentary at work, and ill-health. Consequently, many people are physically inactive or sedentary because the barriers they face led them to actively avoid physical activity, whereas others are physically inactive or sedentary because of the nature of their work, their physical afflictions, or psychological health burdens.

#### Conceptualising Sedentariness and Physical Inactivity

Meanings of the adjective “sedentary” encompass ideas of inactivity, being stationary, being seated, settled or non migratory, and being motionless (Merriam-Webster, 2007). People using the term sedentary may also be describing someone

who is idle or lazy. In physical activity research the word sedentariness is largely used to describe people who do a limited amount of physical activity (Cox, Burke, Beilin, Gove, Blanksby, & Puddey, 2001; Jakicic, Winters, Lang, & Wing, 1999; Nies, Hepworth, Wallston, & Kershaw, 2001). When a person is described as physically inactive it could mean that the person is being still, yet the term may also be applied as a general description of lifestyle. Thus the terms sedentary and physically inactive are both terms used to describe people who have only low physical activity in their lives (Moore, 1999). It should also be noted that the term physical inactivity is used to refer to a state of limited physical activity rather than absolute inactivity. Consistent with Cox et al. and Moore's definitions I have applied the terms sedentary or physical inactivity to refer to the tendency of a person to be engaged in a seated occupation, or disinclined to exercise respectively, rather than being completely physically inactive. In physical activity research, increasing and interchangeable use of the terms, sedentary and physically inactive, occurs, despite the fact that researchers have not reached consensus on the level of physical activity that constitutes sedentariness. Sedentariness and physical inactivity are more recent areas of research interest than physical activity partly contributing to the lack of consensus for these terms. In addition to the more recent attention paid to sedentariness, in their summary of literature about definitions in the body of physical activity research, Bennett, Winters-Stone, Nail, and Scherer, (2006) suggested published research should contain explicit descriptions of the cut off points used in their physical activity trials. In particular, Bennett et al. found inconsistency, and

ambiguity in definitions applied within the relatively small body of research testing theoretical models or applying physical activity interventions with sedentary cohorts.

Furthermore, with respect to lack of consensus researchers of physical activity generally agree about how to measure physical activity (using measures of frequency, duration, intensity, METs, VO<sub>2</sub> max, and pedometers). There is no clear consensus, however, on the measurement of physical inactivity because of the variability of definitions and quantification of sedentariness and physical inactivity, in the physical activity literature (Bennett, Winters-Stone, Nail, Scherer, 2006). Also, even within physical activity research generally there is continued debate concerning the best way to assess physical activity in complex life contexts (e.g., of women's life contexts) (Masse, Ainsworth, Tortolero, Levin, Fulton, Henderson, & Mayo, 1998). Inconsistency and ambiguity of physical activity and sedentary definitions have added a further layer of complexity to the interpretation of physical activity outcomes, as discussed in the next section.

### What Is Sedentary?

In physical activity research, sedentariness has been defined and operationalised in many different ways, adding complexity to the interpretations of research findings. In Table 2.1, I have documented the range of meanings and research operationalisations of the term sedentary that have been used in the physical activity intervention literature. Studies included in Table 2.1 were undertaken between 1991 and 2006, as trials with participants 45 years to 59 years. A comprehensive review of definitions used in physical activity interventions with adult participants was provided by Bennett et al., (2006). In some of the studies included in Table 2.1 definitions were

used that were equivocal or vague and other studies lacked any definition at all (Cooper et al., 2000; Moreau, et al., 2001). The absence of an operational definition is problematic because failing to state cut off points for sedentary physical activity levels of their participants makes it difficult to compare the efficacy of physical activity interventions (Cooper et al.). A 2006 comparison study of three physical activity interventions designed to increase walking (Nies & Partridge, 2006) illustrated again the use of an equivocal or vague definition of sedentariness when they reported their sedentary participants engaged in physical activity “very infrequently” (p. 341). A further example of a study that applied a vague definition of sedentariness, in a physical activity intervention with sedentary workers, defined sedentary participants as those who did no physical activity during their leisure time (Titze, Martin, Seiler, Stronegger, & Marti, 2001). Leisure time was not stipulated clearly, and therefore was open to interpretation by participants and researchers that could lead to anomalies in the physical activity intervention research.

Some exceptions to the ambiguous definition of sedentary were evident in several physical activity interventions designed to improve vigorous physical activity levels of Cox, et al., (2001) and Peterson, Yates, Atwood and Hertzog (2005). Cox et al. provided the first exception, quantifying sedentary as doing less than 20 minutes physical activity on two days per week for 6 months. The second exception was reported in the Women’s Activity Intervention (WAI). In the WAI, sedentary was quantified as less than 30 min per day of moderate intensity physical activity that could amount to as much as 210 minutes per week (Peterson et al.).

In physical activity intervention trials without age restrictions, there are other definitions of sedentary (Bennett et al., 2006). For example, from their review of 42 physical activity intervention trials implemented with adult participants, Bennett et al. established the range and type of definitions of sedentariness from the years 2000 to 2005. Bennett et al. reported rather conservative definitions as compared with the examples from physical activity interventions implemented with mid-life participants. Definitions ranged from less than 20 minutes per week to less than 150 minutes per week of physical activity. In addition, few of these trials reported the type of physical activity (i.e., workplace, household, or leisure), neither did they report the intensity of physical activity undertaken by their participants prior to the research trial. The range of physical activity levels in these intervention trials makes accurate interpretation of outcomes difficult.

The lack of clarity in clearly defining the term sedentary is further exacerbated in non-intervention research (see Table 2.2). The definitions here ranged from the rather vague statement such as “engaged in physical activity every once and a while” (Nies, Hepworth, Wallston, & Kershaw, 2001, p. 351) to the more specific, such as “those expending less than 10% of their daily energy expenditure in activities using four or more basal metabolism rate multiples” (Bernstein, Morabia, & Sloutskis, 1999, p. 862).

### Who Is Sedentary?

In the previous discussion about definitions of sedentariness or physical inactivity multiple definitions have been applied yet, there is no strong sense of who is sedentary. Having access to a temperate climate, leisure centres and gymnasia,

tertiary education, and in some areas the provision of free health promotion activities does not seem to help the majority of sedentary people to be active. For example, living in Australia does not inoculate people against the hazards of sedentary lifestyles, despite the worldwide reputation of Australians as physically active

Table 2.1

Examples of Operationalised Definitions of the Term Sedentary in Physical Activity Intervention Trials, Incorporating Mid-life, 45 to 59 Year Old Participants

Author(s)	Year	Mean Age Age Range & Gender	Title	Definition
Albright et al.	2000	51 (35 to 75) Both	The Activity Counselling Trial	Sedentary = Self-reported energy expended less than 35kcal/kg per day
Bock, Marcus, Pinto, & Forsyth	2001	44 (34 to 54) Female	Maintenance of physical activity following an individualized, motivationally tailored intervention.	Sedentary = engaging in less than 30 min/day of moderate intensity physical activity on less than 5 days/week and 2b engaging in vigorous exercise on less than 3 days/week for 20 min/day
Cox, Burke, et al.	2001	48 (40 to 65) Female	Long-term effects of exercise on blood pressure and lipids in healthy women aged 40-65 years: The Sedentary Women Exercise Adherence Trial (SWEAT)	Sedentary = engaging in less than 20 min x 2 days per week physical activity, regularly, in last 6 months
Cooper et al.	2000	47 (18 to 64) Male	Magnitude of blood pressure response to a programme of moderate intensity exercise	Sedentary = none given
Demark-Wahnefried, Clipp et al.	2003	59 (31 to 82) Both	Design of FRESH START: A Randomized Trial of Exercise and Diet among Cancer Survivors	Sedentary = less than 30 min moderate physical activity on 5 days a week

Author(s)	Year	Mean Age Age Range & Gender	Title	Definition
Dunn, Marcus, Kampert et al.	1999	46 (35 to 60) Both	Comparison of lifestyle and structured interventions to increase physical activity and cardiorespiratory fitness: a randomized trial	Sedentary = self reported physical activity of less than 20 min 3 times per week of exercise of less than 36 kcal/kg (men) and 34 kcal/kg (women) per day
Frank et al.	2005	60 (50 to 75) Female	Effects of exercise on metabolic risk variables	Sedentary = less than 60 min per week mod or vig intensity recreational physical activity + V02 measure.
Jakicic, Winters, Lang, & Wing	1999	36 (25 to 45) Female	Effects of intermittent exercise and use of home exercise equipment on adherence, weight loss, and fitness in overweight women.	Sedentary = reported themselves exercising less than 20 min. on less than 3 days/week for the previous 6 months
King, Baumann O'Sullivan, Wilcox & Castro	2002	63 (49 to 82) Female	Effects of moderate intensity exercise on physiological, behavioural, and emotional responses to family caregiving	Sedentary = doing less than 20 min on less than 3 days per during last 6 months

*Note. Both = <75% of one gender, Male = more than 75% male, Female = more than 75% female.*

Author	Year	Mean Age & Gender	Title	Definition
Marcus & Stanton	1993	34.6 Female	Evaluation and relapse prevention and reinforcement interventions to promote exercise adherence in sedentary females	Sedentary = involved in exercise less than 3 times per week over the last 3 months
McAuley, Courneya & Lettunich	1991	54 (45-64) Both	Effects of acute and long-term exercise on self-efficacy responses in sedentary, middle-aged males and females	Sedentary = no regular involvement in exercise or activity regimens in the previous 6 months.
Moreau, Degarmo, Langley, McMahan et al.	2001	54 (53-55) Female	Increasing daily walking lowers blood pressure in postmenopausal women	Sedentary = None given
Nies & Partridge	2006	45 (30-60) Female	Comparison of three interventions to increase walking in sedentary women	Sedentary = engaged in physical activity "very infrequently or not at all".
Peterson et al.,	2005	54 (35-64) Female	Effects of a physical activity intervention for women	Sedentary = less than 30 min per day of moderate intensity physical activity
Pinto, Clark, Maruyama & Feder	2003	52 (45-59 ) Female	Psychological and fitness changes associated with exercise participation among women with breast cancer	Sedentary = less than 20 min exercise on less than 3 days per week

Note. Both = <75% of one gender, Male = more than 75% male, Female = more than 75% female.

Table 2.2

## Examples of Definitions of the Term Sedentary for Physical Activity Non-Intervention Trials

Author	Date	Mean Age Range	Title	Definition
Bernstein, Morabia, & Sloutskis	1999	Not given (35 to 74)	Definition and prevalence of sedentarism in an urban population	Sedentarism = those expending less than 10% of their daily energy expenditure in activities using 4 or more basal metabolism rate multiples
Gilliat, Wimberley, Manore et al.	2001	Not given (35 to 50) female	Effects of habitual physical activity on the RMR and body compositions of women aged 35 – 50 years	Sedentary = exercise less than 2 hours/week and maintained this level for at least 5 years
Nies, Hepworth, Wallston, & Kershaw	2001	43 (30 to 60) female	Evaluation of an instrument for assessing behavioral change in sedentary women	Sedentary = engaged in physical activity “every once and a while” or “not engaged in any regular physical activity”
Paffenbarger, Wing, Hyde, et al.	1978	Not given (35 to 74) Male	Physical activity as an index of heart attack risk in college alumni	Sedentary = individuals expending fewer than 2000 kcal/week in performing nonoccupational activities rating 3.5 times the basal metabolism rate or more
Pasman & Thompson	1988	Not given Both	Body image and eating disturbance in obligatory weightlifters and sedentary individuals	Sedentary = no miles run per week No hours run/week No times and no hours weightlifting/week

*Note. Both = <75% of one gender, Male = more than 75% male, Female = more than 75% female*

sport participants. A reasonable assessment of physical inactivity requires calculations based on consensus of what constitutes sedentariness. In the absence of that consensus physical activity researchers have opted to apply the US Surgeon General's (1996) definition of what was sufficient activity to accrue health benefits. The concept of sufficient physical activity defined as being physically active enough to accrue health benefits was first advanced in the Report from the Centers for Disease Control and Prevention (CDC; Pate, Pratt, & Blair, 1995) then advanced by the US Surgeon General's Annual report (USDHSS, 1996).

In the CDC report Pate et al. proposed, that sufficient physical activity to accrue health benefits constituted over 30 minutes of moderate intensity activity each day, which may be accumulated in 10 minute blocks of time. Since this recommendation an expert panel convened to review relevant studies from physiologic, epidemiologic, and clinical scientific disciplines (Haskell, Lee, Pate, Powell, Blair, Franklin, et al., (2007). Haskell, et al. revised and clarified the recommendations particularly by specifying aerobic activity as endurance and clarifying the combination of physical activity recommended for health benefits and made the following recommendation:

To promote and maintain health, all healthy adults aged 18 to 65 years need moderate intensity aerobic (endurance) physical activity for a minimum of 30 min on five days each week or vigorous intensity aerobic physical activity for a minimum of 20 min on three days each week. [I(A)] Combinations of moderate- and vigorous-intensity activity can be performed to meet this recommendation. [II (B)] For example, a person can meet the recommendation by walking briskly for 30 min twice during the week and then jogging for 20 min on two other

days. Moderate intensity aerobic activity, which is generally equivalent to a brisk walk and noticeably accelerates the heart rate, can be accumulated toward the 30-min minimum by performing bouts each lasting 10 or more minutes. [I[B] Vigorous-intensity activity is exemplified by jogging, and causes rapid breathing and a substantial increase in heart rate. In addition, every adult should perform activities that maintain or increase muscular strength and endurance a minimum of two days each week [II(A)] Because of the dose-response relation between physical activity and health, persons who wish to further improve their personal fitness, reduce their risk for chronic diseases and disabilities or prevent unhealthy weight gain may benefit by exceeding the minimum recommended amounts of physical activity. (p. 116)

The elaboration by Haskell et al. has provided a valuable and positive step in clarifying how much, and what sort of physical activity is sufficient for health benefits. From the mid 1990s to the early 2000s, however, physical activity research focused on the simpler notion that sufficient physical activity to accrue health benefits was 30 minutes of physical activity on most days of the week that may be accrued in 10 minute blocks. Using the 1995/6 notion of sufficient activity to accrue health benefits led to the Stephenson et al. (2000) finding that almost half the population of Australia is sedentary, or does little physical activity or sport. Furthermore, Stephenson et al. calculated that, for every 1% gain in the proportion of the population who are sufficiently active, estimated savings in illness costs could be made of \$3.6 million per annum. These savings would come from direct reductions in

costs of health care for coronary heart disease (CHD), non-insulin dependent diabetes mellitus (NIDDM) and colon cancer.

Where we live has a bearing on physical activity levels that may affect economically-based statistics. Living in a rural area may mean being more sedentary than living in a coastal area. Intuitively people think living at a coastal location would result in people being more physically active. The research provides some confirmatory evidence for this belief. Bauman, Smith, Stoker, Bellew & Booth, 1999) examined the influence of geographical location on the physical activity participation in Australia for 16,178 men and women. Bauman et al. showed significant correlations between higher levels of physical activity and living near the coast. People living in coastal areas were 23% less likely to be sedentary and 27% more likely to be involved in levels of activity sufficient for health benefits. Consequently, rural based people require more health services (Bauman, Smith, Stoker, Bellew and Booth, 1999). In addition to geographical location, age is a factor influencing physical activity engagement, particularly for mid-life and older women.

As women age, they report that it becomes harder to be physically active, although they do feel better being active (O'Brien-Cousins & Gillis, 2005). Thus, mid-life and elderly women in Australia are particularly likely to be sedentary (Armstrong et al., 2000). Survey researchers reported 56% of women aged 65 to 75 years are not physically active enough to accrue health benefits. In Victoria, in 1998 12% of women were sedentary and 39% participated only in low levels of physical activity (Smith, Owen, Leslie, & Bauman, 1999). Mid-life and elderly women are

mainly sedentary, however, probably because staying physically inactive is much easier than initiating and sustaining a physically active life.

People report difficulty changing from being physically inactive to being physically active, and there is certainly strong evidence of the influence of location, age, and lifestyle factors that hinder attempts to change (Biddle & Mutrie, 2001). An increase in physical inactivity as people age and new technologies in workplaces and home (Biddle et al.) combine to make modification of sedentariness difficult. Difficulty in modification of sedentariness contributes to the global common disregard for exercise or physical activity as a whole by large sections of the population who according to Boreham (2006) “would rather lie on hot coals than be physically active” (p. 918). For example, pooled data from population surveys indicated that, during recreation time, 29.7% of people were sedentary (Owen & Bauman 1992). Moreover, sedentary Australians were most often older, had low income, were less educated, and women were often physically unable to exercise (Boreham). In addition, in New South Wales only 46.9% of women reported doing physical activity at a level where health benefits would accrue (US Surgeon General, 1996) whereas 67% of men reported sufficient physical activity performance to accrue health benefits (NSW Health Department, 1997).

#### Problems of Sedentariness

In addition to missing out on the protective factors of physically active living (e.g., reduced physical risks of developing NIDDM, CHD, colon cancer, obesity, metabolic syndrome, and obesity), there is a psychological climate of guilt from westernised culture, and also from many women’s health providers (Morris & Choi,

2005). Physical inactivity guilt may be traced or exacerbated by media and retail messages such as “just do it”, and stares or personal comments from other people when individuals are engaged in sedentary activities like eating or watching television (Morris & Choi, 2005). This guilty climate is also one whereby moral responsibility for health, and consequent costs of ill-health, are not only discussed, but also increasingly felt by people and explored by researchers (Nagi, 2005). In particular, women engaged in seated occupations (for instance, computer operators, switchboard attendants) frequently feel guilty about their physical inactivity (Morris & Choi, 2005).

Sedentary living may lead to depression and depression may lead to sedentariness (Van Gool et al., 2003). Irrespective of which antecedents lead to depression research shows that depression is associated with low physical activity. Knowing that depressed mood frequently occurred in later life, and was more prevalent in chronically-ill people, Van Gool et al. investigated whether depressed mood was associated with unhealthy lifestyles. Over six years, Van Gool et al. examined the links between physical inactivity and mood of 1,280 people in the Netherlands. Depression emerged in association with being sedentary, whether or not participants suffered from any disease at baseline. Van Gool and colleagues highlight the financial and personal costs of depression, while forwarding social support as a mitigating factor for physical activity. Social support that provides involvement in community physical activity may protect against the effects of the loss of a domestic caregiver. Nevertheless, people who are largely sedentary increase their risk of developing disease that could be ameliorated by physical activity. They also

experience greater physical and mental duress than the physically active (Van Gool et al.). Despite the known risks of physical inactivity the multiple health benefits of frequent physical activity are difficult for many women to accrue across adulthood, hence the psychological benefits are equally elusive for the many women who are sedentary (Krummel, et al., 2001).

### The Costs of Sedentary Living

In an increasingly sedentary world, there are a number of visible and hidden financial and personal costs particularly when a large proportion of women are still engaged in routinely sedentary occupations (e.g., administration, switchboard work, computer/console operation). Visible financial costs associated with an increasingly sedentary society are largely those associated with medical care or hospitalisation for health problems such as CVD, diabetes, hypertension, and obesity that could be ameliorated by physical activity. For instance, higher insurance premiums are visible financial costs of sedentary living. Conversely, anxiety and the possible stigma of requiring medical or special care at an earlier life stage than others, or guilt and sadness associated with having to rely on friends and families for personal care are less apparent personal costs of sedentary living.

There are more ageing people in most Western societies including Australian society than ever before, because of increased life expectancy based on medical and public health improvements. Initial studies of ageing explored how some people lived longer than others (Santrock, 1997). Recently, though, researchers and practitioners have pursued ways to ensure people not only live longer, but also “live well” for longer. Consequently, researchers who examine life expectancy, also examine the

quality of that life (McMurdo, 2000; World Health Organisation, 2000). Specifically, researchers have investigated the usefulness of physical activity as a resource for the aged (O'Brien & Vertinsky, 1991) and how, in general, lifespan physical activity affects health (Leslie, Fotheringham, Owen, & Bauman, 2001; Trost, Owen, Bauman, Sallis, and Brown, 2002), well-being (McAuley, Courneya, & Lettunich, 1991), and longevity (Erlichman, Kerbey, & James, 2002). Research on these benefits from physical activity has led to estimates that women aged over 60 years experience an average of 14 years of some form of disability sometimes culminating in a final year of increased disability (Shephard, 1995). Disability leads to growing dependence on others to maintain quality of life.

Diminishing quality of life is central to calendar longevity and quality-adjusted life expectancy (QALE). Researchers have found that regular physical activity ameliorates the negative effects of ageing-associated declines in health, through improved health, better physical function, and less disability (Shephard, 1995), although ageing does not directly cause disease (McMurdo, 2000). Specifically, Shephard asserted that physical activity alleviates a possible eight to ten years of partial disability and on average one year of increased dependency. The World Health Organisation is leading the global challenge to move away from treating women as "victims" and moving slowly towards an understanding of women as "independent actors" (McElmurry, Norr, & Spreen-Parker, 1993, p. 11) who amass knowledge, then change as an outcome of their particular experiences. In addition, McElmurry et al. stated that mid life and ageing women's needs arise as their life span increases. Consequently, the needs of mid-life and ageing women require particular attention

and exploration of physical and psychological links associated with ageing taking into account the context within which women are living. For everyone, the effects of physical activity on indirect and direct health care costs are inextricably linked with longevity and life expectancy, for instance, in terms of the indirect costs associated with quality adjusted years and cardiac health resulting from regular physical activity (Pratt, 2000). Thus, as sedentary living influences ageing the costs to individuals and to society escalate.

In summary research into the effects of sedentariness have focused on direct (e.g., through prevalence of obesity and comorbidities) and indirect (e.g., uneven geographical locations of physically inactive people) health costs associated with sedentary living. Direct health care costs of physical inactivity are considerable, across all ages (Pratt, 2000). Despite the relative stability in levels of inactivity in the 10 years prior to 1997, the number of people considered obese has increased. Pratt (2000) observed that in Australia the prevalence of obesity matched that of the US with direct and indirect cost estimates for obesity and heart disease in the region of \$100 billion dollars per year. Physical inactivity has been proposed as an easily modifiable risk factor. For example Snell and Mitchell (1999) pointed out “exercise is beneficial at any age, does not need to be strenuous or prolonged, includes activities at work and at home, and does not have to be done every day” (p. 9). Yet Australia still bears considerable health care costs attributed to physical inactivity. For governments, minimising the health costs associated with sedentary living is urgent. For people working towards changing their physical activity levels, the assumption

that it is easy to change physical activity levels in a sustainable way is a considerable obstacle to their progress.

### The Importance of Active Lifestyles

Successful engagement in regular physical activity depends primarily on the personal context (Johnson, 1995; Yoon, 1996). Longevity and age alone are poor indicators of physical activity engagement, because people may have a long life, with illness later in life. Understanding contextual issues of physical activity and finding ways to engage in regular physical activity is therefore important.

Researchers have explored multiple factors relating to sedentariness including reasons for low physical activity levels; avoidance of physical activity, determinants of physical activity, barriers to physical activity, beliefs about physical activity, and to a lesser degree physical activity triggers (Biddle & Nigg, 2000; Crombie, Irvine, Williams et al., 2004; Lees, Clark, Nigg, & Newman, 2005; Morris & Choi, 2005; & O'Brien-Cousins, 2001). Recently, researchers have become interested in environmental effects on physical activity (Bauman, Smith, Stoker, Bellew, & Booth, 1999; Fisher, Li, Michael, & Cleveland, 2004; King, Brach, Belle, et al., 2003; Michelson, 1994; Nies, Reisenberg, Chruscial, et al., 2003). Similarly, physical activity preferences have been identified (Wilcox, King, Brassington, & Ahn, 1999). Finally, the 10<sup>th</sup> Commonwealth Congress (Proceedings for the 10<sup>th</sup> Commonwealth International Scientific Congress, 1994) was dedicated to active living research. Surprisingly, despite all these efforts to find ways to encourage physical activity, there is very little understanding about how people change their thinking about being physically active, and how they change their attitudes towards routinely incorporating

a variety of activities in their lives. It is relatively easy to find physical active people to participate in more physical activity, however, research with sedentary participants is now required.

### Research with Sedentary Participants

Physical activity intervention research with sedentary people is scarce. In part this reflects motivation problems, recruitment issues and attrition difficulties. Sedentary participants are particularly difficult to keep motivated to participate in longitudinal studies. Nevertheless, Blair (2001) advocated the efficacy of studying people who are sedentary to explore and improve ways of helping them become more active. Blair argued it is not sensible to select those already committed to exercise to assess interventions for sedentary people. One example of research with a sedentary cohort is the study of Dunn, Marcus, Kampert, Garcia, Kohl, and Blair, (1999) comparing the benefits of interventions to increase physical activity in sedentary individuals. Dunn et al., found that participants who were encouraged to move from a sedentary lifestyle to one incorporating moderate intensity activity, were more likely to become regularly active than participants involved in a vigorous activity intervention. Dunn et al. proposed that the focus should be on developing interventions to stimulate increased physical activity levels in sedentary people. Thus, Dunn et al. argued that the selection criteria for participants to take part in studies in this area require an initial inactive lifestyle and goals should focus on small increases in physical activity.

Getting sedentary people to begin physical activity is a challenge, but keeping them active is even more difficult (Lowther, Mutrie, & Scott, 2001). Marcus and

Stanton (1993) demonstrated this difficulty in keeping sedentary people physically active with a sample of 120 female participants who attended exercise sessions away from their home. As the intervention for one treatment group, Marcus and Stanton used identification of non-adherence trigger situations with discussion of effective coping responses to those triggers. To encourage the second treatment group to keep up attendance they were given reinforcement (inclusion in an attendance lottery) and a plan to carry out, should relapse occur. Midway through the intervention, however, the attrition rate was 33% and leapt to 72% by the 18<sup>th</sup> and final week. Marcus and Stanton speculated that the sedentary and overweight nature of the participants severely affected the attrition rate. Marcus and Stanton also found that extra interventions to one of the treatment groups did not result in more regular attendance than the control group. Thus, while participant characteristics are held partially responsible for the ambiguity of intervention outcomes other potentially influential factors were not measured (e.g. convenience of classes, group cohesion, and strength of intervention) leaving the mystery of relapse prevention unsolved.

To summarise this review of sedentariness, physical activity research reflects multiple operational definitions of the term sedentary and different perceptions of physical inactivity. Many of these definitions and perceptions are vague and much of the research does not cite specific definitions. Measuring sedentariness or physical inactivity requires a concrete, global definition. Many physical activity researchers have favoured the US Surgeon General's definition of sufficient activity to accrue health benefits, however, this definition has now been updated. Mid-life women in particular are at risk of remaining sedentary. Psychological and physiological

problems arise through sedentary living, yet with the advent of modernisation, in society and in workplaces in particular, and new technologies, sedentary living is frequently required from women in their paid employment and in home duties. Society and individuals bear considerable visible and invisible costs of sedentary living. In response to increasing sedentary living researchers have initiated physical activity interventions with sedentary participants but have reported particular difficulties faced by this cohort when they consider being more physically active.

#### Conclusion of Benefits of Physical Activity and the Term Sedentariness

I have focussed on establishing that there are many health benefits for physically active people. Yet caution is needed in interpreting and generalising most of the physical activity research to women, because of its bias towards male physical activity experiences. Physical benefits for cardiovascular disease, hypertension, cardiorespiratory disease, diabetes (T2), low bone density, colon cancer, obesity and plasma lipids, and metabolic syndrome accrue from physical activity. There are also strong psychological benefits from physical activity such as decreased depression, anxiety, stress, increased sense of well-being, and mood, perceived competence and self-efficacy for physical activity. Even though there is a difference in the extent of the benefits of physical activity proposed by different researchers, there is broad a consensus that participation in physical activity underlies physical and psychological health benefits for people in mid and later life. With women and older people more likely to be physically inactive, it appears that having knowledge about the benefits of physical activity is inadequate for promotion of women's motivation for sufficient activity to accrue health benefits. Deeper understanding is needed of how to

encourage and support women in their motivation for physical activity. Research into motivation for physical activity began in the early 1950s and a strong literature base spanning multiple (mostly behavioural) theories has emerged in terms of developing an understanding of the complex psychological processes involved.

### Motivation for Physical Activity

In this section, I review a range of motivation theories as they apply to physical activity for men and women. The motivation theories that have been applied most successfully with physical activity are self-efficacy theory (SET; Bandura, 1997), the theory of reasoned action (TRA; Azjen & Fishbein, 1980) and the theory of planned behaviour (TPB; Azjen 1988) and the transtheoretical model (TTM; Prochaska, Norcross & DiClemente, 1994). In addition, self-determination theory (SDT; Deci & Ryan, 1985) has shown utility in physical activity research. I will describe and discuss these theories in-depth in relation to the central concepts, model-testing research, and physical activity interventions. Each review section begins with a description and discussion of the theoretical concepts, then an evaluation of research examining predictions from that theory. Each section concludes with a specific review of motivation-theory-based physical activity interventions for women, identifying specific techniques used within physical activity interventions.

The literature addressing theories of motivation shows many psychological theories have been applied to physical activity, and they often involve overlapping concepts, that makes organising them complex. Biddle and Nigg (2000) noted the theories most widely cited fit into four distinct categories: (i) competence-based theories, including self-efficacy theory; (ii) belief and attitude theories, including the

theory of reasoned action and the theory of planned behavior, the health behavior model (HBM; Becker, 1974, Becker, Haefner, Kasl, Kirscht, Maiman, & Rosenstock, 1977), and protection motivation theory (PMT; Rogers, 1983); (iii) control-based theories, such as self-determination theory, and locus of control (LOC; Rotter, 1966); and (iv) decision-making theories, encompassing the transtheoretical model. Thus, each of the theories discussed here in detail represents one of the categories identified by Biddle and Nigg. In the discussion section of each theory section I first address the research investigating the extent to which the theory works (model-testing). A discussion of the relevant intervention research for that theory ensues. Finally, the third part of each theory section clarifies, the main techniques applied in previous intervention research. Self-efficacy is the first theory under discussion.

### Self-efficacy Theory

In exercise motivation research, confidence is important for the adoption of physical activity as well as essential for performance generally (Biddle & Mutrie, 2001; Morris & Koehn, 2004). For example, self-confidence is essential for someone who has had a heart attack to undertake the physical activity needed for rehabilitation. Bandura (1977a) proposed that a more precise predictor of behaviour is self-efficacy that is a task-specific type of self-confidence. Self-efficacy Theory emerged from Bandura's (1977b) Social Learning Theory and his subsequent Social Cognitive Theory (1986). Social learning theory was used to challenge behaviourists' arguments that people learn by direct reinforcement of their own behaviour. Instead, Bandura argued that considerable learning occurs by observing and learning from other people's behaviour and seeing the consequences of their behaviour (Bandura, 1986).

In Bandura's Social Cognitive Theory, self-efficacy is a major influence on behaviour (Courneya, 2004; McAuley, Pena & Jerome, 2001; Morris & Koehn 2004). Bandura (2000) defined perceived self-efficacy as "beliefs in one's abilities to organise and execute courses of action required to produce given levels of attainment" (p. 300). There are two important aspects of this definition; first, it concerns beliefs about perceived capability to perform a behaviour rather than actual performance ability. Second, self-efficacy is about performance on specific tasks, and even specific levels within tasks, not general performance areas. To clarify then, confidence is about feeling able to meet the general challenges, whereas self-efficacy relates to perceptions about having the capability to perform a specific task.

Self-efficacy theory researchers have proposed that performance depends on an interaction between a person, the specific behaviour and the environment. According to SET, this interaction of interdependence between the person, behaviour, and the environment is reciprocally determined and forms the foundation for levels of self-efficacy for behavioural performance. Reciprocal determinism was Bandura's term for the nature of the dynamic interaction between a person and their desired goals, together with outcome expectancies and environment all of which influence self-efficacy (Courneya, 2004). Regulation of behaviour motivation or affect in SET has many causes. Regulation refers to a person's choices of types of behaviour and the effort and perseverance they put into that behaviour (McAuley et al.). A parallel construct to self-efficacy proposed to effect behaviour is outcome expectancy (Bandura, 1986, 2000; Courneya, 2004). Self-efficacy is informed by four main

mechanisms; performance accomplishments, vicarious experiences, physiological arousal, and verbal persuasion (Bandura, 1986).

Bandura (1986) argued performance accomplishments “provide the most influential source of efficacy information because it is based on authentic mastery experiences” (p. 399). People take their efficacy information based on past success or failure with specific tasks. Bandura (1986) proposed that failures with novel tasks markedly lowers efficacy for that task. If, however, a task has been successfully completed a number of times, infrequent failure at the task is unlikely to change efficacy perceptions for that task.

The vicarious experience of modeling is exemplified where someone sees another person (often termed the “actor”) making a particular task look easy. The “modelling” effect occurs as the observer recognises the actor’s easy task accomplishment. Consequently the observer forms the perception that they too can perform the same task. Bandura said;

People convinced vicariously of their inefficacy are inclined to behave in ineffectual ways that, in fact, generate confirmatory behaviour evidence of inability. Conversely, modeling influences that enhance self-efficacy can weaken the impact of direct experiences of failure by sustaining performance in the face of repeated failure. (p. 400).

Physiological arousal is another of the four main antecedent mechanisms influential for self-efficacy and relates to the tendency for people to interpret somatic symptoms, for instance racing heart, perspiration levels, or heavy breathing as signs of imminent danger possibly leading to thoughts of failure for the approaching task.

Bandura (1986) suggested this was because the fear of dysfunction that is generated by somatic arousal produces further thoughts of failure that exacerbates somatic arousal, and produces feared ineptitude. Somatic symptoms can result from participation in physical activities aimed at building strength such as weight training, or where breathing is difficult, for instance while running upstairs, or aches and pains after physical activity.

Verbal persuasion is where someone external will “talk people into believing they possess the capabilities that will enable them to achieve what they seek” (p. 400). In terms of physical activity behaviour, coaches and personal trainers rely heavily on this motivational strategy. The success of verbal persuasion is linked to the appraisal an individual holds about their capability for a specific task. For instance, if there are self-doubts about their capabilities and a tendency to ruminate about personal deficiencies the persuasive efforts of a personal trainer or coach will need to be strong enough to counteract the self-doubt and rumination. Verbal persuasion aimed at raising self-efficacy depends on the setting of realistic goals for effectiveness because Bandura (1986) argued unrealistic beliefs can reduce the persuader’s credibility to the hearer. Bandura contended that all four self-efficacy mechanisms provide barriers or facilitators to motivation, mood and behaviour (Bandura, 2000).

Having explained the history of SET, discussed what constitutes self-efficacy, and described the nature of the antecedents to self-efficacy, I will review the role of outcome expectancies. Outcome expectancies are the beliefs a person holds about the consequences of performing certain behaviours. Outcome expectancies provide

incentive or disincentive to behaviours depending on whether the expectations are considered negative or positive (Bandura, 1997, 2000; Courneya, 2004). In addition, Bandura categorised outcome expectancies as physical, social, or self-evaluative. Physical outcome expectancies are factors that are associated with pain, injury, or disease risk. For example, positive outcome expectancy can be described as the belief that the risk of developing diabetes would decrease as a result of being physically active and may provide an incentive for that person to take up physical activity. In contrast, someone may believe that physical activity requiring the use of an injured limb would exacerbate existing pain thus the outcome expectancy of physical pain would be a disincentive to doing more physical activity. Social outcome expectancies can result from negative comments a person hears about their involvement in physical activity. For example, an older woman doing resistance training may be criticised for going to the gym and undressing to lift weights, or a younger woman with children may feel judged for leaving her children in order to train. A self-evaluative outcome expectancy belief that could provide incentive for physical activity is exemplified where a woman is confident with a new exercise outfit so looks forward to walking. A self-evaluative outcome expectancy that provides disincentive for physical activity is exemplified by the belief that other people will negatively judge others for wearing bathers, and avoidance of swimming ensues.

Self-efficacy and outcome expectancy are key constructs within social cognitive theory. Efficacy expectations are also important correlates with self-efficacy, which although they sound similar concepts are quite distinct from outcome expectations. Efficacy expectations are a person's belief(s) about having the

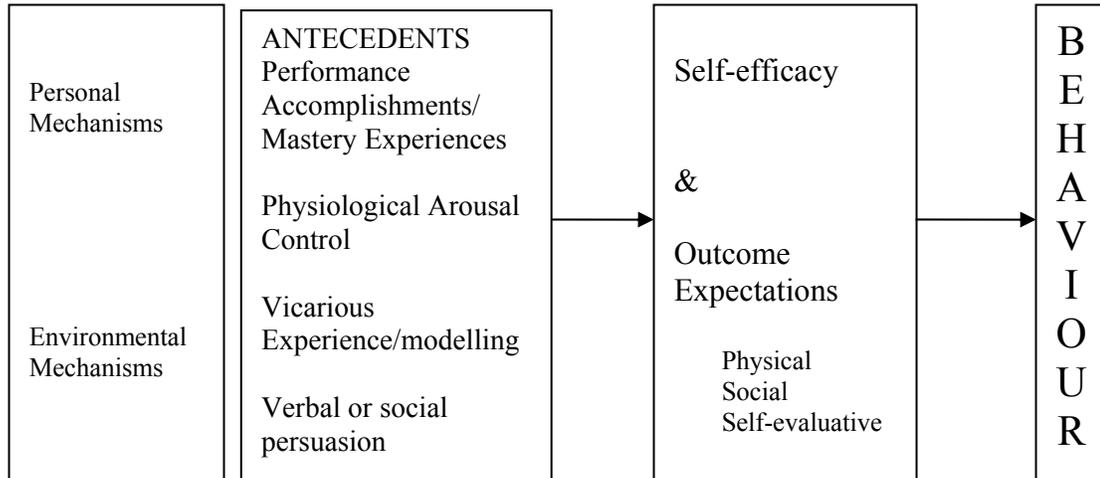
capability to perform a particular behaviour. In contrast outcome expectations are beliefs about the outcome of a particular behaviour. Both outcome and efficacy expectations affect self-efficacy by influencing whether a particular type of activity is chosen, effort level and the degree of persistence applied when obstacles occur (Blissmer & McAuley, 2002; McAuley, Pena & Jerome, 2001). For instance, a person might believe they are capable of swimming weekly for 6 months (efficacy expectation) but believe swimming weekly will not result in weight loss (outcome expectation) and become demotivated by these latter beliefs. It is interesting to note, however, that not everyone agrees with the value of self-efficacy across different contexts.

A proponent of self-efficacy for exercise in particular is Roberts (2001) who argued that self-efficacy was a greater influence on exercise efficacy in exercise compared with self-efficacy in sports motivation contexts. Roberts' argument was perhaps based on the erroneous notion that elite sportspersons already have high self-efficacy. Other researchers have shown that self-efficacy can be enhanced in sports motivation contexts (Callery & Morris, 1997; She & Morris, 1997). For instance, the value of self-efficacy in a sports motivation context involved the use of imagery for goal kicking performance.

To sum up, although outcome and efficacy expectations are linked with behaviour, researchers have shown self-efficacy to be more useful in explaining exercise and physical activity motivation than outcome and efficacy expectations (Biddle & Mutrie, 2001; Dzewaltowski, 1989; Morris & Koehn, 2004). Since 2001

researchers investigating self-efficacy and exercise have been very active compared with self-efficacy in sports research.

### Self-efficacy Theory



*Figure 2.1.* An illustration of the mechanisms and antecedents of Bandura's Self-efficacy Theory.

Researchers' interest in self-efficacy for exercise may reflect the urgency to enhance peoples' motivation for physical activity. In addition, researchers' focus on self-efficacy may stem from a need to determine the central concepts of SET.

#### *Self-Efficacy Theory Model-testing Research*

Latimer and Martin-Ginis (2005) provided an example of the first SET antecedent of performance accomplishments by showing how performance accomplishments affect self-efficacy. Assessing older adults' perceptions of success and accomplishment with respect to strength training, Latimer and Martin Ginis investigated whether lower perceived exertion of a single strength training session increased self-efficacy. They also examined whether appraisal of success of low

exertion strength training influenced self-efficacy for further strength training sessions. Participants were 59 previously sedentary men and women over 80 years of age. Perceived exertion was self-rated during various intensity strength training by participants. Perceived exertion was associated with increases in self-reported self-efficacy ratings and also related to better likelihood of using the fitness consultation voucher they received from Latimer and Martin Ginis.

One example of the positive effect performance accomplishments had on self-efficacy is provided by Wise and Trunnell (2001) and Courneya (2004). Wise and Trunnell studied the performance accomplishments of 52 women's intercollegiate gymnasts (Wise & Trunnell, 2001) associated with bench-press exercises, in a randomised study of 48 mid-life women. Of the four self-efficacy mechanisms, Wise and Trunnell found performance accomplishment significantly enhanced bench-press efficacy, that is, past mastery of the specific task being undertaken was the strongest determinant of self-efficacy.

O'Brien-Cousins' (1997) qualitative research involving examinations of self-report and recall data of 327 women also lends support to the power of performance accomplishment to enhance movement confidence and physical activity in later life. O'Brien-Cousins found links between self-efficacy for physical activity with movement confidence in childhood and that perceived well-being predicted late life exercise participation. Specifically 26% of the variance was accounted for by late life fitness exercise participation. Clearly, self-evaluations of well-being, as well as previous mastery or confidence about doing physical activity are important predictors of physical activity participation in later life. O'Brien-Cousins findings also indicated

the importance of performance accomplishment and perceptions of past success history with specific physical activities and later life confidence for physical activity participation.

Regarding physiological arousal control, people involved in performance behaviour may experience hyper arousal, including feelings or sensations of sweaty palms, increased heart rate, and nausea. If these are interpreted as problematic to the performer then self-efficacy for the task may diminish. If, however, a person interprets hyper arousal as readiness for optimal performance, then self-efficacy may increase (Bandura, 1977, 1986, 1997; Morris & Koehn, 2004; Wise & Trunnell, 2001). Physiological sensations or symptoms of pain, fitness, or fatigue can also influence self-efficacy (Feltz, 1992; Motl, Snook, McAuley, & Gliotoni, 2006).

The two largely environmental mechanisms that enhance self-efficacy are observational learning sometimes known as vicarious experience and verbal persuasion. In an experiment with snake phobic people Bandura, Blanchard, and Ritter (1969) compared symbolic desensitisation, symbolic modeling or live modeling with guided participation treatments. Bandura et al found that live modelling with guided participation provided the most self-efficacy. Vicarious experience or modeling from someone else is mostly influential on activities where the observed behaviour is novel.

Verbal encouragement another antecedent to SET is sometimes referred to as verbal persuasion (Bandura, 1996, 1997). Despite being the weakest of the antecedents it still plays a role in the physical activity context. Personal trainers, coaches and team members rely on their verbal persuasion skills to inaugurate and

maintain motivation for specific task demands (Morris & Koehn, 2004). There is little research into the effect of verbal persuasion on exercise self-efficacy but Wise and Trunnell (2001) found that verbal persuasion increased self-efficacy when applied following specific performance accomplishment compared with verbal persuasion offered prior to or during bench-press performance. Attempts to provide false feedback about performance have failed to enhance self-efficacy for a previously failed task (Yan, Lan, & Gill, 1984). There is evidence that verbal persuasion is most effective when given by someone the observer considered trustworthy and by an observer considered by the observer able to perform the task.

According to Bandura (1997) the prime predictive factors of self-efficacy for physical activity operate directly and indirectly. The direct motivators of self-efficacy are people's level of belief in their capability to control their behaviour and outcome expectancies. Other direct motivators are beliefs in the benefits of a particular behaviour, surrounding situation, or about doing a specific activity are motivational. With respect to the indirect motivational factors influential for self-efficacy, Bandura (1977a) hypothesised that goals, obstacles, setbacks, stress and levels of coping indirectly regulate and moderate motivation levels, naming this *regulation motivation*.

Exercise psychologists have demonstrated the strength of SET central concepts in predicting the adoption of regular exercise and adherence to exercise (Hofstetter et al., 1991, McAuley, Courneya, Rudolph and Lox, 1994; Rodgers & Brawley, 1991). Specifically, self-efficacy levels accurately predict exercise behaviour and adherence to exercise programs (Bandura, 1977; McAuley & Jacobson, 1991; McAuley, Wraith

& Duncan, 1991; Rodgers and Gauvin, 1998; & Sallis, Haskell, Fortmann, et al., 1986). If external factors, such as verbal persuasion or vicarious experience dominate during task performance then a sense of personal control diminishes motivation for that activity. By contrast, increased self-efficacy for physical activity, positive outcome expectancies, and strategies to increase personal control over the when, where, how, and what of physical activity are more likely to be motivational.

To summarise, within SET previous personal experience, the visible experience of others, verbal persuasion by significant others, and physiology are fundamental to the formation or malleability of efficacy expectations (King et al., 1992). Also, fundamental to self-efficacy is that although positive outcome expectancies generally lead to increasing physical activity, this increase depends on self-efficacy readiness. Bandura, urged caution when assessing or attempting to raise outcome expectancies. For instance, someone who is ready to increase their physical activity levels will find reading physical activity information motivational. Conversely, people without the intention or readiness for physical activity may need to identify strong incentives before they consider changing their physical activity levels (Bandura, 1997).

In the next section, I investigate the second aspect of model-testing for SET that is the effect of self-efficacy being reflected in behaviour. Researchers confirmed Bandura's (1977a) assertions about the importance of self-efficacy for behaviour, particularly for exercise. According to Bandura self-efficacy levels effect exercise behaviour and vice versa. For example, McAuley et al. (1991) tested the effect of an hour of graded exercise performed thrice weekly for 20 weeks by 103 sedentary males and females using physiological and self-efficacy measures at baseline and at

20 weeks. Participants used exercise bikes, walked, jogged or performed sit-ups. McAuley et al. reported significant pre- to post-exercise program gains in self-efficacy providing evidence of the positive interaction and benefits that exercise has on self-efficacy. In contrasting tests of exercise and behaviour, model-testing of self-efficacy and its affects on exercise, has shown that the regulation of participation motivation in traditional organised exercise sessions is lacking for many mid-life women. Researchers testing this part of the model have primarily studied diseased and asymptomatic populations (McAuley, Pena, & Jerome, 2001).

Unlike some stereotypical media driven images of people having fun while exercising, physical activity can be especially difficult and not necessarily enjoyable, for instance, following an illness or operation. Increasing motivation for physical activity, therefore, becomes more functional and utilitarian rather than for enjoyment per se. Beyond activity becoming important enough to begin physical activity it must still remain important. Researchers have determined that people with higher self-efficacy for physical activity exert greater effort towards being sufficiently physically active for health benefits (Dzewaltowski, Noble, & Shaw, 1990; Ewart, Taylor, Reese, DeBusk, 1983; McAuley, 1992). Specifically, in a comparison of self-efficacy, outcome expectancies and dissatisfaction Dzewaltowski (1989) found that participants who were most confident would stay with a strenuous exercise program than those who were unsatisfied with their current physical activity levels. Exercise correlated most highly with self-efficacy (.34), outcome expectancies (.15) and dissatisfaction (.23). Further examples of the value and different types of self-efficacy, such as maintenance and recovery self-efficacy, can be drawn from studies

of exercise in rehabilitation after myocardial infarction (Ewart, 1992; Luszczynska & Sutton, 2006) and chronic obstructive pulmonary disease (Kaplan, Atkins, & Reinsch, 1984).

Researchers testing the effects of self-efficacy on behaviour in asymptomatic participants have recognised how difficult it is to change physical activity. Deciding to change and to maintain physical activity when faced with difficulties is challenging for most people (Schwarzer & Fuchs, 1995). For exercise to become important enough to adopt and maintain long-term people need to overcome numerous barriers. Barriers and perceptions influence and perpetuate short-term adoption attempts rather than long-term maintenance of physical activity. While there is evidence of the crucial role of self-efficacy for exercise in physical activity adoption, there is some evidence that self-efficacy is a weak physical activity maintenance predictor (Luszczynska & Sutton, 2006). For example, McAuley and Jacobson (1991) studied asymptomatic participants exercise participation patterns in sedentary adult females as well as participation patterns and relationships between self-motivation and self-efficacy. McAuley and Jacobson established the importance of efficacy for exercise maintenance. Specifically, middle aged women, participated in an 8-week aerobic exercise program. Self-efficacy was measured pre- and post-participation and 3 months afterwards. Activity logs and class attendance provided participation data. After categorisation into either high or low exercise participation multiple regression analyses showed that self-efficacy was the only significant predictor of overall exercise levels ( $R^2 = .125$ ). McAuley and Jacobson also reported moderate correlations between self-efficacy and regularity of exercise ( $r = .28$ ) and self-

efficacy and duration of activity ( $r = .32$ ). Furthermore, the greatest contribution to exercise behaviour McAuley and Jacobson's study was for participants who reported high self-efficacy for exercise at the point where they perceived their progress was slow. McAuley and Jacobson concluded that types of efficacy cognitions concerning perceived or real barriers in different environments were important because those who exercised regularly thought themselves more able to continue exercising when barriers or aversive circumstances arose.

Another relevant type of efficacy is maintenance self-efficacy. Luszczynska and Sutton (2006) investigated whether maintenance self-efficacy predicted physical activity in people who maintain active lifestyles and whether recovery self-efficacy was predictive for physical activity in participants who relapsed to less active lifestyles. In this longitudinal study of people following myocardial infarction, Luszczynska and Sutton found maintenance self-efficacy predicted exercise continuation and recovery self-efficacy predicted physical activity in participants who relapsed. Identifying efficacy strengths and weaknesses could potentially help exercise and health professionals target messages according to need, leading to reduced relapse from physical activity or increased exercise maintenance.

Research provides evidence of how closely associated and influential are outcome expectancies and behaviour in relation to the exercise and health domains (Clark & Nothwehr, 1999; Dzewaltowski 1992; Kelly, Zyzanski, & Alemagno, 1991). Factors linked with outcome expectations span the physical, psychological, and socially based self-rewards (Dzewaltowski, 1994). Self-efficacy and outcome expectations have not been studied widely. Clark and Nothwehr (1999) did, however,

examine self-efficacy and outcome expectations. Participants (N = 771) who were largely women with over 50% being African American were asked about their self-efficacy and outcome expectations for physical activity. Clark and Nothwehr reported their findings in relation to sociodemographic, environmental, and intrapersonal factors. In relation to sociodemographic factors linked with outcome expectancy, Clark and Nothwehr found that being 70 or older was the only variable associated with outcome expectancy. In relation to the environmental factors, fear of crime, family verbal persuasion and doctor verbal persuasion to exercise, were associated with outcome expectancy. With respect to intrapersonal factors, disagreements with several statements were associated with outcome expectancy. From their regression analysis, Clark and Nothwehr concluded that sociodemographic, environmental, and interpersonal factors accounted for substantially more of the variance in self-efficacy than in outcome expectations.

A deeper understanding of self-efficacy and outcome expectations regarding functional status in older adults was contributed by Resnick (2002) who found that physical health, self-efficacy and outcome expectations strongly influenced older people's physical activity choices and physical activity participation. In particular, Resnick found that positive self-efficacy expressed through beliefs, positively influenced participant's motivation to walk. For instance, concerning the ability to walk, Resnick found that when people believed they were incapable of walking they actively avoided and were reluctant to walk. Essentially people's perceptions were very influential on their motivation to perform or not perform a behaviour. Despite early equivocal evidence that outcome expectations are influential in the SET model,

there is now substantial research supporting self-efficacy as more motivational than outcome expectancies with respect to physical activity, particularly for older adults (Brown & Conn, 1995; Conn, 1997; Resnick, 2002; Wieske, 1993). In addition, exercise behaviour correlates with self-efficacy levels and is particularly influential for exercise motivation (Courneya, 2004; McAuley et al., 2001; McAuley & Blissmer, 2002). Accordingly, social cognitive theory-based strategies have been applied to physical activity behaviour including goal setting, feedback, problem-solving, self-monitoring, and self-reinforcement (Marcus, King, Bock, Borrelli, & Clark, 1998)

#### *Summary of Self-efficacy Theory for Physical Activity*

Self-efficacy researchers have shown that a number of techniques, such as, realistic goal setting, the stepped approach, choice and variety of activities and settings, and social support are central to enhancing self-efficacy (Clark & Nothwehr, 1999; Dunn, Marcus, Kampert, Garcia, Kohl, Blair, 1999). According to Bandura, physiological arousal was the last source of self-efficacy information informing behaviour. Most importantly, in order to build up physical activity self-efficacy, symptoms of high arousal, such as sweating and increased heart rate, should be interpreted as a signal of readiness to successfully complete physical activity.

Vicarious experience is useful for exercise and sport, particularly when applied as a form of self-modelling, to increase self-efficacy for sporting activities including netball, soccer and roller-skating. The final antecedent to self-efficacy described here, verbal persuasion, is the least effective of the four antecedents in increasing self-efficacy, however, verbal persuasion enhanced self-efficacy when linked to someone

considered trustworthy and or knowledgeable about the behaviour in question (Fitzsimmons, Landers, Thomas & van der Mars, 1991). Verbal persuasion, as self-talk, is often used during physical activity, rather than as a tool for initiating physical activity, but the level of influence self-talk has on initiating physical activity is poorly understood (O'Brien-Cousins, & Gillis, 2005).

Regarding self-efficacy theory and exercise behaviour for diseased or asymptomatic people it is important to recognise different types of efficacy cognitions. For instance, self-efficacy for adoption of physical activity is a different construct to self-efficacy for exercise maintenance. Whereas self-efficacy for maintenance in people who are regularly physically active, and recovery efficacy have been shown to be important predictors of exercise and relapse behaviour in people recovering from myocardial infarction. Finally, researchers investigating outcome expectancies and exercise have distinguished the influence of factors such as age, fear of crime, verbal persuasion, and attitudes and knowledge on exercise and health. Researchers have also shown outcome expectancies contributed little explained variance in exercise behaviour, but that outcome expectancies were more influential for older people.

#### Theories of Reasoned Action (TRA) and Planned Behaviour (TPB)

The next theories under discussion are the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB). These are theories, of motivation for behaviour that researchers in the exercise domain in the late 1990s and early 2000s, where self-efficacy's role in intention formation was identified as important for behaviour change (Hagger, Chatzisarantis, & Biddle, 2002; Armitage & Conner,

2000). As mentioned at the beginning of the motivation for physical activity section each theory reviewed relates to one of Biddle and Nigg's organising categories. The TRA and TPB exemplify belief and attitude-based theories (Biddle & Nigg, 2000).

The TRA preceded the TPB and according to Ajzen and Fishbein (1975) the TRA (see Figure 2.2.) is based on the concept that people rationally consider the implications of their actions. Two main factors of the TRA are influential on intentions towards and during a particular behaviour. The first factor is attitudes towards behaviour, such as physical activity. Ajzen and Fishbein proposed that attitudes are based on individual perceptions about a behaviour and outcome beliefs.

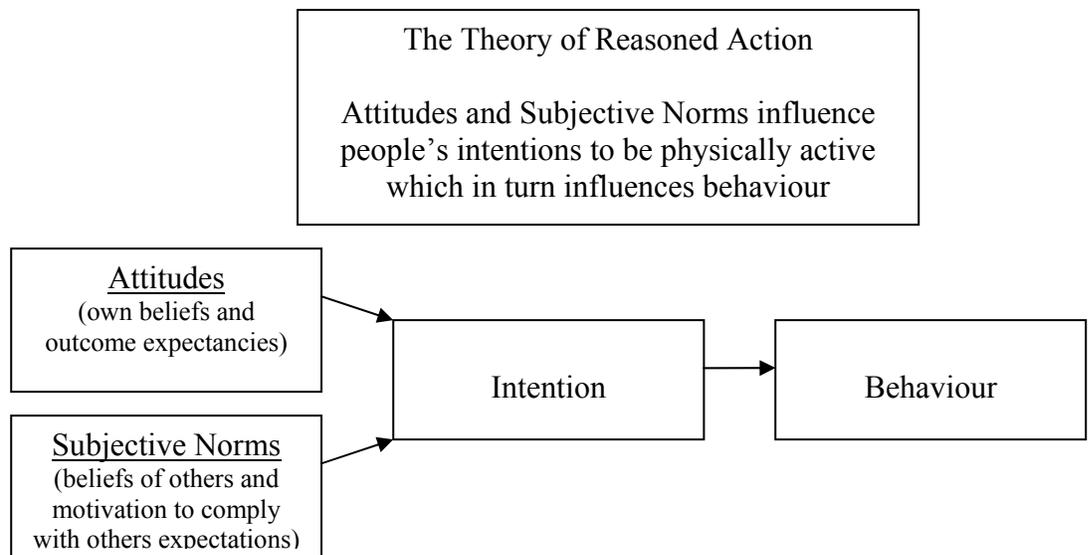


Figure 2.2. Model of the Theory of Reasoned Action.

*Central Concepts of the Theories of Reasoned Action and Planned Behaviour.*

In TRA and TPB the first antecedent to intentions are attitudes. Attitudes have been defined as an individual's positive or negative evaluations of specific objects or target behaviours (Biddle, Hagger, Chatzisarantis, & Lippke, 2007). In TRA and TPB

behavioural beliefs and outcome evaluations are the antecedents of attitude (Biddle et al.). In particular, beliefs are based on the notion that if certain behaviours are undertaken specific benefits will follow. For example, a person may believe that if they regularly walk for 30 minutes they will experience health benefits. This belief may translate into a positive attitude towards performing this behaviour.

In the TRA and TPB model, the second antecedent believed to influence intentions is subjective norm comprises two main concepts, the normative beliefs of others and the motivation to comply with subjective norms. Ajzen, (1991) broadly defined subjective norm as “the perceived social pressure to perform or not to perform the behaviour” p. 188. Ajzen and Fishbein (1980) later narrowed the definition of subjective norm to refer to people’s perceptions about whether significant others hold strong opinions about performing that behaviour (Courneya & McAuley, 1995). When assessed simultaneously, attitudes and subjective norms are predictive of people’s formation of intention to undertake physical activity. In addition the strength of those intentions predicts whether the behaviour is carried out (Ajzen & Fishbein, 1980). The development of subjective norms relies on judgements that are belief-based and judgements about the opinions of others (Ajzen & Fishbein, 1980). In the TRA, motivation to comply is an important, inherently subjective, response to perceived subjective norms. Where peoples’ decisions are affected positively by subjective norms, they have a “motivation to comply” (Ajzen & Fishbein, p. 539). Both normative beliefs and motivation to comply are indirect measures of attitudes that should correlate with any direct measures of attitude and subjective norms (Hagger, Chatzisarantis, & Biddle, 2001). Over 20 studies

researchers have applied the subjective norm construct in the exercise domain and found that when controlling for perceived behavioural control (PBC) and attitude, subjective norm is an inconsistent predictor of intention to exercise (Courneya & McAuley, 1995). This was despite correlational evidence showing significant associations between subjective norm and intention (Ajzen & Driver, 1992; McAuley & Courneya, 1993; Godin & Shepherd 1996; Rejeski, 1992). Intentions are firm thoughts about personal aims that are informed by personal attitudes and subjective norms of important others (Nutbeam & Harris, 2004). An intention-behaviour gap, however, has been identified within the TRA and TPB whereby inconsistencies within TRA and TPB are proposed to do with people forming intentions but failing to act rather than having no intentions to become active (Sheeran, 2002).

Identifying volitional processes that aid translation of intentions to action may assist to bridge the intention-behaviour gap (Norman & Conner). Intentions form a necessary step towards behaviour, however, they are insufficient as a behaviour determinant and some researchers have already distinguished between intention formation and intention implementation (Gollwitzer, & Oettingen, 1999). For instance, the utility of making plans has been tested in the meta-analysis of 15 intention implementation studies (Sheeran, 2002). Sheeran found that planning was a moderately effective factor influencing implementation intention on behavioural performance. Similarly Schwarzer (1992) identified motivational and volitional phases that respond to action planning. Tested across a range of behaviours including exercise behaviour action planning is a promising strategy for physical activity (Sniehotta, Scholz, & Schwarzer, 2005).

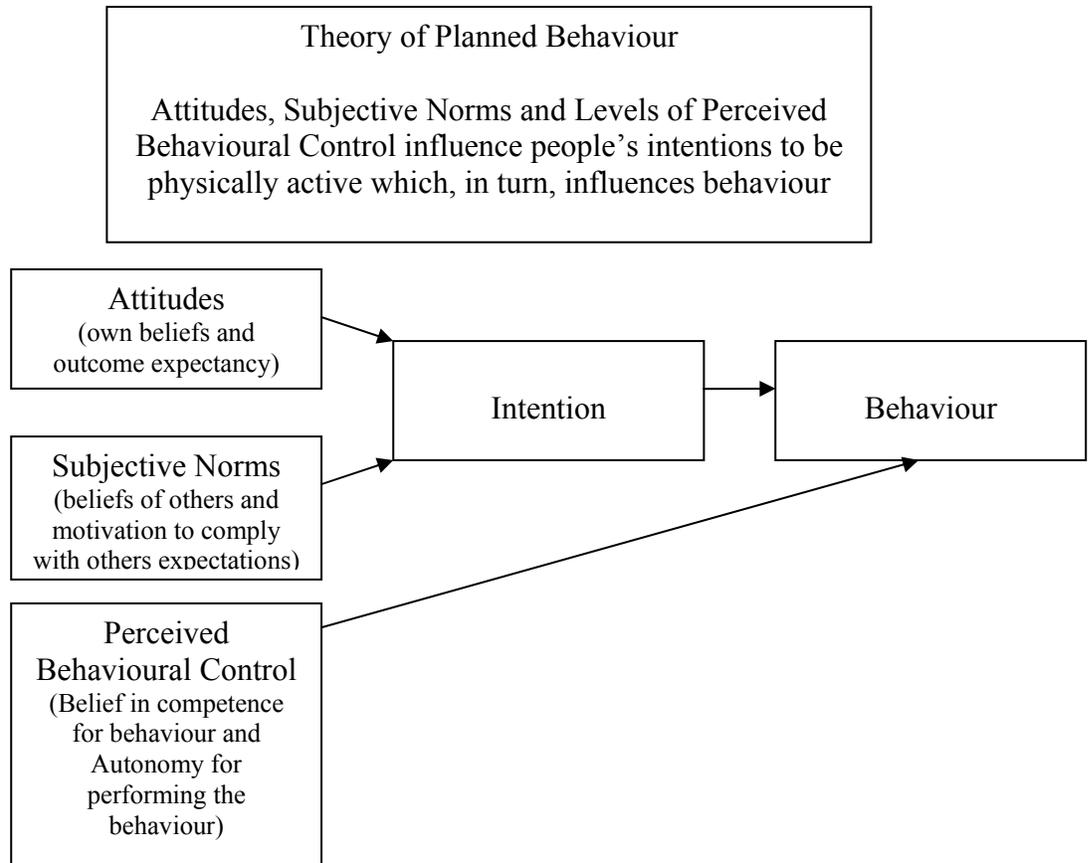
Researchers have provided ample evidence of attitudes and intentions predictive value for physical activity (Biddle, Hagger, Chatzisarantis, & Lippke, 2007). Moreover, there is consensus that subjective norms are less influential for physical activity than attitudes and intentions and strong support for the influence of attitudes on behaviour (Biddle et al.; Rejeski, 1992). Once perceived behavioural control enters the equation for intentions to translate into physically active attitudes, attitudes become most influential

In contrast to Rejeski's (1992) conclusion that intentions were more influential on behaviour than attitudes Courneya and Bobick (2000) demonstrated that attitude was influential when intention and self-efficacy were combined through self-liberation. According to Courneya and Bobick when participants perceived they had a choice of activity and were committed they experienced and exhibited self-liberation. Courneya and Bobick identified one TPB factor (intentions to change) using several techniques. Intentions to change physical activity were achieved by first changing attitudes, and techniques of counter conditioning and environmental re-evaluation. Support for Courneya and Bobick's findings also comes from a comparison of congenital heart disease (CHD) patients and non-patients (Prapavessis, Maddison, Ruygrok, Bassett, Harper & Gillanders, 2005). Prapavessis et al. found attitudes towards physical activity behaviour and their effects on intentions to become physically active did not limit exercise. Specifically, from the CHD patients' data Prapavessis et al. showed that subjective norm and PBC contributed most (69%) variance to their exercise behaviour.

Early research testing the TRA model factors of attitudes and subjective norms and their effects on intentions to become physically active was undertaken by Riddle (1980). One hundred and forty nine joggers and 147 non-exercisers were asked about their physical activity intentions then two weeks later asked how physically active they had been. Sixty seven percent of the variance in physical activity related to participants' initial intentions to be physically active (Riddle). Researchers have since cited variances in the effects of intentions on physical activity ranging from 9% (Wurtele & Maddux, 1987) to 31% (Godin, Valois, et al. 1987).

Despite the robust predictive value of TRA regarding attitudes leading to enhanced intentions to be physically active (Berger, Pargman & Weinberg, 2007), TRA has been criticised as a unidirectional model that focussed on cognitive processes to the exclusion of environmental influences (Biddle, et al., 2007). Although TRA had been a “viable unifying theoretical framework” (p.540) successfully adding to knowledge and understanding of exercise beliefs, the model was criticised for being incomplete (Ajzen, 1988). Consequently, while early research into the efficacy of TRA continued, limitations of TRA were identified (Ajzen). Specifically, a major limitation of TRA was peoples' absence of volitional control over their behaviours. Also, studies of attitude to behaviour models published in the 1980s and 1990s were inconclusive with respect to the value of TRA and the absence of perceived behavioural control in this model was questioned (Godin, Shephard, & Colantonio, 1986; Godin & Shephard, 1990). Ajzen (1988), therefore, proposed adding two main factors to the TRA model relating to perceived behavioural control

(PBC). These two main factors were belief in competence for a behaviour and autonomy for performing the behaviour.



*Figure 2.3.* Model of the Theory of Planned Behaviour.

Since TRA was renamed TPB in the 1980s, the model has been applied across an array of behaviours including exercise, self-examination and condom use (Courneya, 2004; Godin & Kok, 1996). With PBC's inclusion as a predictive factor in the model (see Figure 2.3) the Theory of Planned Behaviour (TPB) was complete (Ajzen, 1988; Conner & Armitage, 1998). Perceived behavioural control relates to the subjective power or control a particular behaviour is thought to entail. Ajzen (1988) asserted that PBC predicts behaviour when actual control of behaviour matches, or is

similar to, the perceived control felt by a person (Biddle & Nigg, 2000). PBC is a concept quite similar to self-efficacy (Nutbeam & Harris, 2004; Rhodes & Courneya, 2003). For instance, the more control a person perceives the more likely they will be physically active.

#### *Theory of Planned Behaviour Model-testing Research*

The newly named TPB, required the testing of the strength of associations between PBC, intention and behaviour. The effects of perceived behavioural control on intentions to be physically active have been shown to account for 11% of the variance in the exercise behaviour of CHD patients (Prapavessis, et al., 2005) and in exercise intentions (Brenes, Strube, & Storandt, 1998).

The utility of the TPB model for predicting intention to exercise and subsequent exercise behaviour was tested with older adults (Brenes, Strube, & Storandt, 1998). Intentions were not predictive of exercise behaviour and Brenes et al. speculated that this was because all participants intended to exercise and did so. Brenes et al included in their assessment what they called direct measures of attention, subjective norm, and perceived behavioural control. For instance, perceived behavioural control was directly measured using a sum of three ratings. One rating was about the level of control they perceived for exercising two or three times a week, the two other ratings were collected using the notion of agreement or disagreement with statements concerning either the ease with which they could be physically active during one week and during the next three months. Brenes et al. also included indirect measures of peoples' views on issues that could be inferred to relate to attitudes, subjective norms, and perceived behavioural control. For example, four barriers to physical

activity were identified in a pilot study. These barriers were rated with respect to the frequency they occurred and their likelihood. Responses above 10% of the pilot sample were used to form the indirect measure of PBC for the main study. From regression analysis of the main study, direct measures of attitudes, subjective norms, and PBC accounted for 9% of exercise behaviour after one month. Indirect measures of subjective norms explained 18% of exercise behaviour at one month. In addition, indirect measures of PBC explained 27% of variance at one month but dropped to 10% at three months (Brenes et al.). By 9 months the effects of PBC were no longer evident in the regression.

There are some discrepancies between exercise intention and expectations with the TPB (Rhodes and Matheson, 2005). Investigations of discrepancies of intention and expectations, particularly in relation to factors that influence behavioural intentions and expectations included a range of measures of intention. These measures comprised expectation, commitment to intentions, affective attitude, instrumental attitude, subjective norm, and perceived behavioural control. Correlational analysis of data from 241 undergraduate student participants showed commitment to the intention and PBC moderated the intention-expectation relationship, with individuals (0.01) with medium and high levels of intention commitment and PBC reporting behavioural expectations close to their intentions. Moreover, participants with low intention commitment and low PBC reported expectation to behaviour and intention-behaviour relations to have small to medium effects for expectation-behaviour over intention-behaviour. It seems that participants with low commitment to their exercise plans and low PBC tended to forecast lower

expected behaviour than planned. From their findings, Rhodes and Matheson suggested the need for interventions to increase physical activity to focus on intentions and expectations. Additionally, focus on intentions is particularly important for interventions designed for participants with low intention commitment and low PBC for physical activity.

The Theory of Planned Behaviour has been extensively applied with physical activity. For example Hagger, Chatzisarantis, & Biddle (2002) conducted a meta-analysis of 72 TPB-based exercise studies (Hagger, Chatzisarantis, & Biddle 2002). They identified moderate correlations between attitude and intention ( $r = .48$ ), subjective norm and intention ( $r = .25$ ) and PBC and intention ( $r = .44$ ). Moreover, 27% of the variance in exercise behaviour was accounted for by intentions and PBC. Intentions ( $r = .42$ ) and PBC ( $r = .31$ ) demonstrated significant moderate correlations with exercise behaviour that supports the utility of TPB for predicting exercise behaviour with particular strength evident in the PBC factor. The beliefs people have about their capability to control their behaviour rely on subjective perceptions of volition for physical activity or exercise. Specifically, beliefs can interfere with attempts to be physically active.

An example of the efficacy adding perceived behavioural control into the TPB model is provided by Courneya, Vallance, Jones and Reiman, (2005). They demonstrated how perceived behavioural control was a key predictor of exercise intentions (55%) in people with Hodgkins Lymphoma. Attitude and subjective norms were the next strongest predictors. If people are going to become physically active of their own volition, it is important they perceive the possible physical activity

behaviour as easy, rather than difficult. As well as beliefs about control, Courneya et al., also found that the perception of empowerment experienced by individuals also has an influence on their intentions to be physically active.

Another example of the important effect that perceived behavioural control has on physical activity is in a study of physical activity participation. Dzewaltowski, Noble, and Shaw (1990) found physical activity participation increases were directly related to changes in PBC scores. In addition to studies where researchers explored the effects of PBC on physical activity intentions, several meta-analyses of physical activity intervention effects have confirmed the value of PBC in the model (Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997; Spence, Courneya, Blanchard, Wilson, & Becker, 2001). These meta-analyses indicate that between 30 to 35% of the explored variance in exercise behaviour can be accounted for by intention and PBC. Furthermore, while intention was predictive in all the studies reviewed by Spence et al., PBC however, directly predicted exercise in half the reviewed studies (Courneya, 2004).

Another factor influencing the veracity of the TPB model relates how the strength of relationships between variables within the TPB Model strengthens according to the age of participants. When TPB was applied with over 4,000 Canadians, Wankel and Mummery (1993) found that, as a person's age increased, PBC and subjective norms were considerably more influential in motivational terms than attitude. Courneya and Bobick (2000) identified two additional factors, the existence of helping relationships and self-re-evaluation in the early stages of physical activity behaviour change, as influential on subjective norms in relation to

physical activity. In relation to the TPB model and physical activity, the technique of verbalising intentions to undertake a particular behaviour was related to variance in intentions to be physically active in a meta-analysis of 72 physical activity interventions studies (Hagger et al.). Not surprisingly, Hagger et al. concluded that an immediate predictor of behaviour was a verbalized intention to undertake that behaviour. In addition perceived behavioural control was as influential as attitude towards physical activity on intentions to be physically active. Hagger et al reported that decision-making about physical activity behaviour is biased towards entrenched thoughts about physical activity, unless negative past experiences of physical activity behaviour are overridden.

Beliefs also strongly influence behaviour in the TPB. Conn (1998) explored 30 community dwelling women's (65 years plus) beliefs about physical activity. The women were asked to report the factors that helped make physical activity easy. Perceptions of good health included experiencing good health, good genes, and lack of pain. Other helpful factors for physical activity related to having interested peers, desires, pleasures, finances, and beliefs. For instance having someone be active with them and support their physical activity, wanting to be active and living life to the full affected their physical activity perceptions. Furthermore, enjoyment of physical activity, financial standing and having a good attitude for activity were important for their physical activity. In addition having continuity in life, a positive outlook, feeling secure with few commitments were other factors impinging on their physical activity beliefs. All these factors added to the women's sense of perceived behavioural control. When findings from Conn's 1998 cohort of women from rural and small

communities, were compared with findings from a study of episodic exercise, the women from rural and small communities closely connected physical activity to their social lives, whereas the women engaged in episodic exercise viewed physical activity as separate from their daily life (Conn, 1998).

Hagger, et al., identified other strategies that were successfully applied within physical activity interventions based on the TPB. Strategies were related to moderator variables such as strength of attitude, strength of intention to change, age and past experience positive attitude formation; influencing internal perceptions; encouraging participation in activity that an individual feels competent to do; examining cognitions prior to forming intention to act; and examining automatic processes occurring on presentation of stimuli.

To summarise, the theory of reasoned action is based on the principles that behaviour is informed by intentions that are informed by attitudes towards particular behaviours, and perceived norms about the intended behaviour. Researchers found that the TRA was incomplete because it accounted for only small proportions of behaviour. When perceived behavioural control, however, was added to the model it accounted for a significantly greater proportion of variance in behaviour. The expanded model is known as the theory of planned behaviour. Extensive model-testing research has shown the antecedent of attitudes to be a stronger predictor of physical activity or exercise behaviour than antecedent of subjective norms. An intention-behaviour gap has been identified and further research is needed to explore the influences on this gap. Based on the TPB model, people will be motivated to fulfill their exercise intentions in three ways (i) when they have a positive attitude to

the activity (ii) when they important others encourage their activity, (iii) when they are confident that despite barriers, they have the personal control and resources, to perform the activity. Intervention strategies that have been successfully applied with physical activity and exercise behaviour include positive attitude formation, planning, and verbalising intentions to be physically active.

### Self-determination Theory

Self-determination theory (SDT) differs from other psychological theories relevant to physical activity being rooted in earlier humanistic, psychoanalytic, and developmental theories. Ryan and Deci (2007) began exploring motivation 30 years ago by developing mini-theories of motivation. There are four of these mini-theories, namely, cognitive evaluation theory, organismic integration theory, causality orientations theory and basic needs theory (Ryan & Deci, 2002). Specifically, cognitive evaluation theory, is an expansion of deCharms (1968) perceived locus of causality concept. Cognitive evaluation theorists propose that intrinsic motivation does not rely on instrumental outcomes for motivation but originates because of satisfaction inherent in an action. Conversely, extrinsic motivation is fuelled by rewards and outcomes external to a person (Ryan & Deci, 2002). During the development of SDT controversy emerged relating to the undermining of intrinsic motivation by the prospect or application of rewards. A meta-analysis of 128 studies resulted in substantial evidence that where tangible rewards are expected intrinsic motivation is undermined. Verbal rewards have been shown, however, to enhance intrinsic motivation (Ryan & Deci, 2007).

The mini-theory of organismic integration theory relates to motivation that comes from “natural, innate, and constructive tendencies to develop an ever more elaborated and unified sense of self” (Deci & Ryan 2002, p.5). In other words, people are driven towards certain behaviours because they are striving to build integrity and congruence between their needs and behaviours. Behavioural and cognitive theories, however, focus more on external conditions. In terms of physical activity, this means that cognitively oriented practitioners will support and facilitate clients’ behaviour change across a range of settings, when practitioners believe there is a natural, inherent, tendency to growth. Conversely, practitioners from the more externally driven motivation school of thought will prefer exogenous approaches that include training, controlling or directing behaviour (Deci & Ryan, 2002).

The causality orientations theory (Deci & Ryan, 1985a) focuses on how people approach environments that provide autonomy, control their behaviour, or lead them away from behaviour by amotivation. Causality orientations are “relatively enduring aspects of people that characterise the source of initiation and regulation, and thus, the degree of self-determination, of their behaviour.” (Deci & Ryan, 1985, p. 109) In contrast, the Basic Needs Theory was originally constructed to relate to well-being. In this context, well-being is defined either as being fully functioning or as happiness (Ryan & Deci, 2002). The basic needs mini-theory posits that meeting goals and a sense of well-being occurs where goals meet psychological, not physiological needs. The four mini-theories comprise the basis of the central concepts of SDT that hinges on the notion of people striving for growth and their motivation to act. People’s

motivations to act are based on interactions between integration of human nature and social contexts, either of which can help or hinder growth.

*Central Concepts of Self-determination Theory.*

Self-determination theory (SDT) researchers posit that internal needs motivate people to act. Deci and Ryan (2000) the pre-eminent researchers in SDT, defined needs as “innate psychological nutriment that are essential for ongoing psychological growth, integrity, and well-being” (p.229). The growth or organismic quality at the forefront of SDT is, therefore, closely linked to needs, and followed directly by the extensively researched concepts of intrinsic motivation, extrinsic motivation and amotivation (Deci & Ryan; 1985a, & Vallerand, 1997). SDT models (Vallerand & Losier, 1999; Vallerand, 2001) have evolved to the point where a hierarchical model illustrates the complex interactions believed to underpin motivation (see Figure 2.4). Model-testing researchers identified intrinsic, extrinsic and amotivation as essential to understanding motivation for physical activity (Frederick & Ryan, 1995; Ryan, Vallerand & Deci, 1984; Vallerand, Deci & Ryan, 1987; Vallerand & Reid, 1990; Whitehead and Corbin, 1997). These constructs are discussed in detail shortly.

*Self-determination Theory – Model-testing Research*

Vallerand (2001) asserted that the identification of situational (state), contextual (life domain) and global (personality) levels facilitates precision in future motivation studies and accounts for the complex nature of motivation. In particular, Vallerand

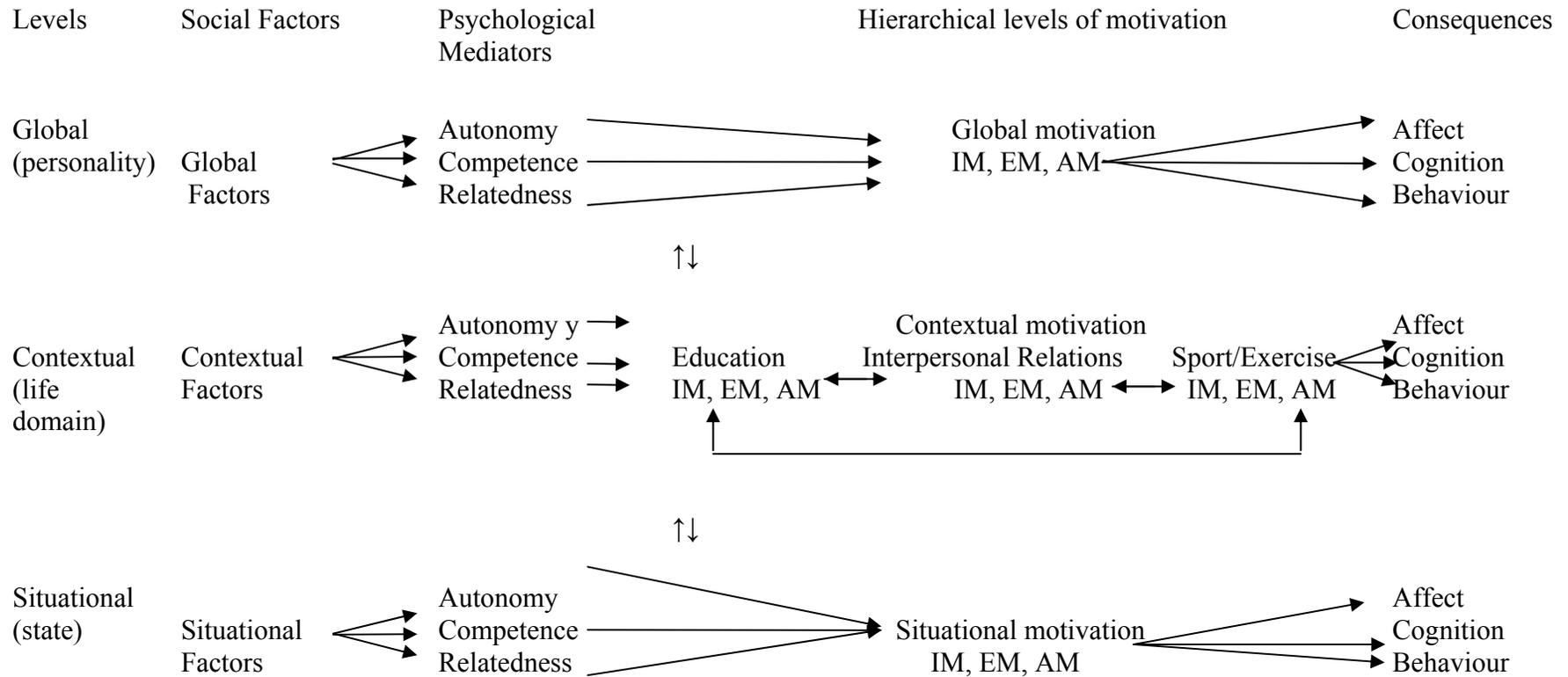


Figure 2.4. Hierarchical Model of Intrinsic and Extrinsic Motivation (Vallerand 2001).

(2001) emphasised that it is no longer sufficient to refer unilaterally to motivation but we need to appreciate that people are motivated at various levels and in different ways for different behaviours. For example, one may be extrinsically motivated to be physically active on a sunny day, when enjoying time off work (state), but be unmotivated for climbing stairs when carrying heavy bags of groceries (contextual). It should also be noted at this early point in the discussion of SDT that intrinsic and extrinsic motivation are constructs that researchers have presented as dichotomous but in reality there is no clear division and interactions operate at all levels.

Testing the role of situational factors for motivation in general has shown the relevance of situational level (Deci & Ryan, 1985a; Vallerand, 1997). The same follows for situational factors in relation to physical activity (sport and exercise). In a study with 105 primary age children performing a competitive run, Whitehead and Corbin (1991) investigated runners' intrinsic motivation (IM). First IM was measured pre and post random assignment to bogus positive or negative feedback conditions. Not surprisingly Whitehead and Corbin found that positive feedback from someone perceived as competent increased the students IM, whereas negative feedback decreased IM. Students without feedback reported no change in IM. The implication is that where feedback is perceived as reflective of a person's competence, the feedback positively influences situational IM (Vallerand, 2001). Notably, Vallerand points out that although present, the effects of such changes to situational IM are short, particularly if only one-off factors being presented.

Tests of contextual factors confirmed the presence of elements of motivation that are reliable for context, however, Pappaionnou (1995a) suggested they may

undermine motivation for physical activity. For example, a context where performance rather than task enjoyment and learning are the focus is likely to undermine motivation to be physically active (Papaioannou). In situations where coaches work hard to provide their players with choice and agency (autonomy), researchers have shown that identified regulation and IM were strengthened. In addition identified regulation and IM were negatively associated with amotivation and external regulation (Pelletier, Fortier et al. 1995). Global factors (e.g., personality) in relation to SDT have received little attention from researchers, but the available research supports the inclusion of global factors. In particular, O'Connor and Vallerand (1990) explored the motivation of 176 (146 women, 30 men) French-Canadians, (Mean age 81 years), who were confined to a nursing home environment. O'Connor and Vallerand explored the associations between four kinds of motivation (intrinsic, self-determined extrinsic, non-self-determined extrinsic and amotivation) and patterns consistent with SDT with important aspects of elderly people lives. They found that situation can indeed affect motivations. Moderate positive intercorrelations were found between non-self-determined extrinsic motivations participants and self-determined extrinsic motivation participants, whereas negative associations were found between the two extreme motivations of amotivation and intrinsic motivation. These findings support Deci and Ryan's (1985) proposition that motivation has multiple aspects and layers and a broad continuum of motivation. This continuum is illustrated in Figure 2.5. The continuum begins at amotivation, then flows to non-self-determined extrinsic motivation, to self-determined extrinsic motivation, and to

intrinsic motivation. A similar continuum is illustrated at the global level in Vallerand's levels in the hierarchical model of SDT shown earlier in Figure 2.4.

Type of Motivation	AMOTIVATION	EXTRINSIC MOTIVATION				INTRINSIC MOTIVATION
Type of Regulation	Non-regulation Regulation	External Regulation	Introjected Regulation	Identified Regulation	Integrated Regulation	Intrinsic Regulation
Quality of Behaviour	Non Self-determined					Self-determined

*Figure 2.5.* The Self-determination Continuum, with Types of Motivation and types of Regulation (Ryan & Deci, 2002).

According to self-determination theorists motivation results from the determinants found within global, contextual and situational social factors (see Figure. 2.4). These determinants are in turn affected by perceived autonomy, competence and relatedness. Autonomy is defined as a perception of freedom to choose your own course of action and competence is a sense of fitting in effectively with the environment. Relatedness, involves perceptions of connectedness with significant others (Vallerand, 2001).

Next in this model are the hierarchical levels of motivation each of which include intrinsic, extrinsic and amotivation (see Figure. 2.4). To date researchers have heavily investigated, with over 800 published studies, aspects of intrinsic and extrinsic motivation indicating the importance of finding ways to enhance motivation

in people for a range of behaviours (Vallerand, 1997). Intrinsic motivation is exemplified where behaviour is undertaken purely for pleasure and satisfaction stemming from the activity. This type of motivation is present when someone goes for a walk because they enjoy the sense of calm they experience within themselves with each repetitive act of putting one foot in front of another. It is an activity that provides satisfaction apart from any contextual or global feedback (Deci & Ryan, 2000). Extrinsic motivation is the second form of motivation identified within SDT. Extrinsic motivation comprises types of regulation named external, introjected, identified, and integrated (Biddle, Soos, & Chatzisarantzis, 1999; Ryan & Deci, 2004; Vlachopoulos, Karageorghis, & Terry, 2000). External regulation is exemplified by the statement “I’ll be physically active if I have to” or where behaviour control is subject to threat if no action is taken. Therefore, for external regulation, external authorities, rewards, fear, compliance, or coercion are pre-eminent. Introjected regulation is where motivation is from the internalised views and wishes of others (oughts) rather than true desire, and to avoid shame or guilt.

Identified regulation of behaviour is said to be “self-determined” (Biddle, Soos, & Chatzisarantis, 1999) leading to a “want to” attitude that is driven by the internalized central values of a person (e.g., seen in the phrase “I want to be physically active”). Figure 2.5 illustrates how the different types of regulation fit into Ryan and Deci’s (2007) self-determination continuum. First, integrated regulation is closest to intrinsic motivation, and driven by internalised central values of a person. Integrated regulation is when conscious endorsement of a particular action leads to a strong sense of control or autonomy for that action. For instance, when competition,

team playing, and self-efficacy for bowling are highly valued they are strongly motivated to bowl regularly. Intrinsically motivated behaviour, that is at the opposite end of the continuum from amotivation is exemplified in statements like “I am physically active because I enjoy it, it makes me feel good.” Intrinsic motivation encompasses feelings of personal investment and autonomy (Biddle & Nigg, 2000, p. 299). Intrinsic motivation is not reliant on reinforcements nor takes into account any consequences of behaviours (Deci & Ryan, 2000).

The concluding element relating to the determinants within SDT is that motivation occurring in the lower (situation and contextual) levels can affect motivation at the higher (contextual and global) levels and vice versa (Vallerand, 2001). Importantly, Vallerand stated that changes in global motivation will not, however, directly influence situational motivation. To illustrate, motivation towards exercise at the contextual level will be influenced by situational motivation (e.g., how one perceives the exercise at a particular moment in time) and by global motivation (e.g., aspects of personality). An implication for designing interventions arising from this model is the importance of facilitating the interactive effects of changes within levels that are proximal to each other (global and contextual, contextual and situational). The final aspect of SDT proposed by Vallerand (2000) is the various effects motivation has on consequences. Mood, patterns of thinking and behaviour are affected by motivation with intrinsic motivation producing most positive responses, amotivation leading to most negative responses and extrinsic motivation most often leading to negative and or short-lived responses. Again, the three levels reflect that

consequences occurring within the three levels of generality (global, contextual, and situational).

To illustrate the way that motivation is affected across global, contextual, and situational levels, consider the example of Naima. Singing songs of her own choosing Naima spends hours singing (having complete autonomy over how long, and what, she sings). While singing, Naima feels free and often loses her sense of time while metaphorically lost in song (being intrinsically motivated to sing). One day she was invited to sing the national anthem for a school concert. Shortly after she had agreed she found herself avoiding the room where she normally sang, and eventually she became so uncomfortable (displaying little perceived competence) she rang the school and cancelled her involvement with the concert. In addition Naima loved to walk being extrinsically motivated by the flower fragrances in her neighbourhood. When she considered her walks in comparison to singing in public there was no competition, she preferred to walk. In Naima's instance, the complex nature of motivation meant that she was intrinsically motivated to sing her own song choices, in the privacy of her own home, and while she experienced and enjoyed autonomy in that behaviour. Yet without autonomy, and when told what to sing, feeling incompetent to perform the chosen song, in the school (situational), in a concert setting (situational) she experienced a shift to extrinsic motivation that led to her withdrawal from public singing. There are several definitions of the complex concept of amotivation. Deci and Ryan (1985a) proposed amotivation was aimless or purposeless behaviour. Other definitions state amotivation is a lack of intentionality resulting from an absence of either intrinsic or extrinsic motivation (Deci & Ryan,

1985a; Koestner, Losier, Vallerand & Carducci, 1996; Vallerand 2001). Pelletier, Dion, Tuson and Green-Demers (1999) proposed that amotivation is exemplified in four factors, lack of ability to be successful, the use of strategies unlikely to be successful, the perspective that success may require too much effort to accomplish, and the person cannot effect desirable outcomes regardless of their efforts (i.e. learned helplessness). In addition, Vallerand drew the parallel with amotivation and learned helplessness (Abramson, Seligman, & Teasdale, 1978) however, only in that amotivation tends to engender feelings of incompetence and the sense of particular behaviours being out of ones control. Finally, in the SDT process model all these types of motivation produce consequences that are affectual, cognitive or behavioural. For instance, in Naima's story her intrinsic motivation to sing led to enhanced mood (affective consequence), then she experienced self-doubt (cognitive consequence) about performing for an audience that led to avoidance of the situation. Finally, her motivation to walk in fragranced areas positively motivated Naima to walk (behavioural consequence).

The SDT model has been tested across a number of domains including physical activity. Testing the SDT model as it applied physical activity and diabetes self-management Williams, McGregor, Zeldman, Freedman and Deci (2004) recruited 159 participants from a diabetes centre. Participants completed information on several motivation variables including autonomous motivation for diet, exercise, and perceived competence. These variables were measured at baseline, 6 months, and 12 months. Williams et al., provided the example for an autonomous motivation for diet and exercise question as "I've carefully thought about my diet and exercise and

believe they are the right thing to do”, (p. 61). Participants responded on a 6-point Likert scale. They also reported on six items that were taken from the Treatment Self-Regulation Questionnaire (Ryan & Connell, 1989). Four items from the Perceived Competence for Diabetes Scale (Williams, Freedman, & Deci, 1998) were also used to assess how well patients felt they managed their daily self-care. Williams et al. reported changes in people’s perceptions of autonomy and their perceived competence led to improvements in HbA1c levels. William’s findings provided further support to the veracity of SDT. Dacey, Baltzell, and Zaichkowsky (2008) have recently provided additional evidence of the motivational role of physical activity in perceived enjoyment for older adults. Confirmatory factor analysis of results regarding for exercise participation motivation was undertaken with adults (n = 645; mean age of 63.8). Exercise motivation was measured using the Exercise Motivations Inventory 2 (EMI-2) and stage of change scales. Dacey et al., reported that for the six factors including; health and fitness, social and emotional benefits, weight management, stress management, enjoyment, and appearance the enjoyment factor loaded the strongly for differentiating physical activity levels.

#### Intervention Research Using Self-determination Theory–Based Techniques.

Physical activity intervention research using SDT is limited. From early studies of self-determination theory, Ryan, Frederick, Lepes, Rubio, and Sheldon (1997) pointed to SDT’s promise for physical activity interventions, in particular increasing an individual’s sense of competence. To enhance adherence to physical activity interventions Ryan et al. (1997) proposed a strategy to increase physical activity

adherence by strengthening the elements of enjoyment and sense of competence. Ryan (1997) explored exercise motivation with people taking Tae Kwon Do or aerobics classes and found that motivation for physical activity was greater for the Tae Kwon Do participants whose higher levels of enjoyment was the key variable influencing adherence. Further examples of fundamental techniques suitable from an SDT perspective, for interventions, include encouraging the formation of enduring goals and developing routine associated with desired changes, enlisting social support, identifying autonomy of action and freedom of choice, mastery, intrinsic reward, situational and visual cues, and consistency (Iso-Ahola & Clair, 2000). With particular respect to adherence issues for intervention design Iso-Ahola and Clair also pointed to the utility of the fundamental techniques of identification; escape self-regulation, self-monitoring, self-evaluation, and self-reinforcement.

#### *Summary of Self-determination Theory*

Self-determination theory (SDT) developed from the 4 mini-theories of cognitive evaluation, organismic integration, causality orientations and basic needs. SDT is a tri-level (global, contextual, and situational) model of motivation. Within the global, contextual and situational levels, social factors are associated with perceptions of autonomy, competence, and relatedness. In turn, autonomy, competence, and relatedness are linked with intrinsic, extrinsic, and amotivation, for global and situational levels. At the contextual level model education, interpersonal relations, and sport/exercise have been explored for intrinsic and extrinsic motivation as well as amotivation. At the point of “consequences of motivation” within the SDT

model, researchers found that affect, cognition, and behaviour influence consequences at all levels. In relation to physical activity interventions founded on SDT, researchers have highlighted the utility of the formation of enduring goals, social support, the identification of autonomous action and freedom of choice, task mastery, intrinsic rewards, situational and visual cues.

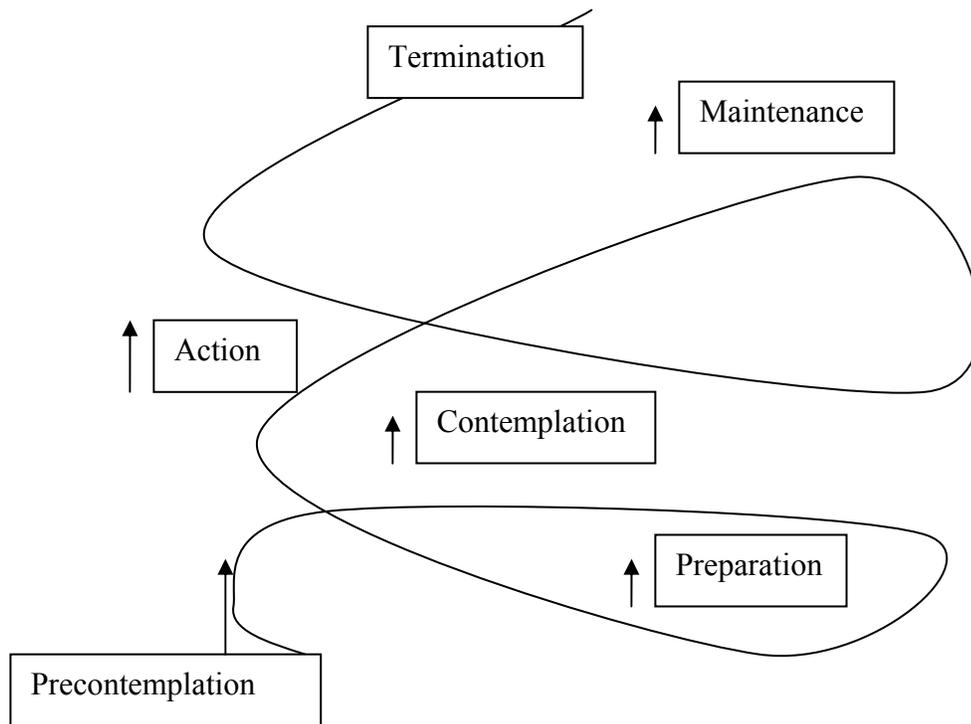
### The Transtheoretical Model

When Prochaska, Norcross, and DiClemente (1994) introduced the Transtheoretical Model (TTM) it appeared to be quickly and broadly accepted. Perhaps the acceptance was based on the model's intuitive appeal as a decision-making theory. Prochaska et al., (1994) initially applied TTM with health related behaviours (smoking and condom use). Since then, TTM has undergone substantial model-testing and been used in intervention research into health behaviours, especially relating to motivation of physical activity. The spiral format of behaviour change proposed by Prochaska et al. challenged the existing paradigm of linear change (Figure 2.6). The TTM model was seen as a promising tool for behavioural change because it accounted for and enhanced understanding of the way people cycle and recycle through various stages of change (Marcus & Simkin, 1994).

#### *Central Concepts of the Transtheoretical Model.*

The TTM (Prochaska et al.,) is a stage-based model that includes elements that influence self-efficacy (i.e., intrinsic and extrinsic motivational readiness, processes/techniques of change, and decision-making). Since TTM researchers launched their challenge to linear models of change other stage theorists have emerged and further tested stage models (Lippke, Ziegelmann & Schwarzer, 2005).

Discontinuity, that is the completion and termination of one stage before moving to another discrete stage in a model, is one example of a concept that can distinguish between the effectiveness of linear and stage theories. Lippke et al., tested discontinuity patterns in latent means and associations of variables with orthopaedic patients pre, post, and six months following the end of rehabilitation. Self-report questionnaires were used to examine variables including stages of change and self-efficacy. Analysing discontinuity patterns, Lippke et al. found strong support for stage theory with self-efficacy imperative for all groups of patients.



*Figure 2.6.* Conceptualisation of Transtheoretical Model.

Exercise self-efficacy is a key factor influencing movement across stages. According to Prochaska, et al. (1994), precontemplation, the period before a need for change is consciously recognised as the first stage in a change spiral. Contemplation,

the next stage, is the point where conscious awareness of the need to change occurs. Gorely and Bruce (2000) explored the possibility of sub-groups operating in the contemplation stage of change in terms of exercise adoption for 118 people identifying three clusters. The first cluster titled “pre-preparation” is where high self-efficacy, average “pros” and below average “cons” were reported. Note, Prochaska et al. used the specific terms pros and cons in TTM in relation to a process of individual cost analysis within decision-making. The terms refer to advantages and disadvantages of particular decisions respectively. In this dissertation, references to pros and cons are linked to the TTM. People in pre-preparation were considered possibly ready to change behaviour. People in the second cluster titled “middle contemplation” were below average in self-efficacy, but above average in pros and cons of exercise. The third cluster titled “early contemplation” was below average for self-efficacy, well-below average for pros of exercise but above average in cons of exercising. Participants matching this profile were unready to change. Gorely and Bruce emphasised the need to tailor interventions, to increase self-efficacy, to increase perceived benefits and lower perceived difficulties with people from the contemplation stage across to the maintenance stage. Gorely and Bruce’s conclusions were similar to those of Marcus, Eaton, Rossi and Harlow (1994). Marcus et al. applied structural modelling techniques to organise data in relation to variation and covariation in physical activity and to finding a good fit with the TTM.

The next stage of change is preparation, where planning and resourcing for the future action stage occurs in relation to assessing, modification, and reassessment.

The next stage, action, is where the desired change is regularly underway, and

generally has occurred for over 6 months. The maintenance stage is when the desired change is routinely and consistently undertaken. Maintenance is considered to occur after 6 months of action. The final stage is termination, the point at which the initially desired change is established and habitually incorporated into behaviour. Kingi, Towers, Seebeck, and Flett's (2005) study of exercise self-efficacy in relation to the stages of change emphasised the role of exercise self-efficacy with 106 New Zealand women of pacific island descent. Kingi et al. found 30% were sedentary, 34% did some exercise, while 35% exercised regularly. From the women's responses, reliable differentiation of stage membership occurred, providing further evidence of the utility of stage theory for the physical activity domain. The Kingi et al. (2005) study outcomes were similar to Cardinal and Sachs' (1995) outcomes from earlier prospective research, whereby stage movement was analysed in relation to a minimal contact, exercise motivation study. Three types of self-instructional exercise packets were posted to 113 asymptomatic, female, participants. One was focused on lifestyle exercise, another on structured exercise and the third was a control package. Cardinal and Sachs found that pre- and post-tests (31 days after pre-test) of physical activity resulted in all groups increasing leisure time physical activity. Within-group pre- to post-exercise behaviour changes favoured the lifestyle package group effectiveness over the structured exercise or control group. In particular, participants in the precontemplation/contemplation stages made the most gains in the lifestyle, structured exercise, and control group but the preparation stage participants showed the least improvement in physical activity over the short intervention duration.

In relation to physical activity, aspects of motivation to change form a critical cognitive variable within the TTM (Buckworth, Lee, Regan, Schneider, & DiClemente, 2006). In general, and in relation to physical activity, motivation comprises elements of direction, energy, and persistence that are enhanced or negated by intrinsic and extrinsic factors (Buckworth et al., 2006; Frederick-Racascino & Morris, 2004). To test the value of intrinsic and extrinsic motivation for physical activity across the five stages of the TTM, Buckworth et al. performed two psychometric studies. In their first study, Buckworth et al., examined the psychometric properties of the Intrinsic Motivation Inventory (IMI) and the Extrinsic Motivation Inventory (EMI), and then validated them in a longitudinal study. The second study tested the predictive validity of the IMI and EMI subscales in relation to the transtheoretical model's stages of change. The hypothesis of study one was that intrinsic motivation would be greater for participants in the later stages of change (i.e., action and maintenance stages) than in the earlier stages (i.e., contemplation and preparation). This hypothesis was supported. A profile analysis provided evidence that extrinsic motivators, for instance, money or tangible results are more influential for physical activity motivation in the early stages than intrinsic motivators. By contrast, intrinsic motivation tends to develop and form stronger motivation for physical activity across the later stages. In study two, participants' data were classified according to one of four patterns of physical activity. Analysis of variance of class by physical activity groups and by time demonstrated that participants were more likely to progress through one stage if they were in an activity class whereas participants in the lecture class tended to regress through the stages of change

(Buckworth et al.). Buckworth's findings provided support for the notion that, not surprisingly, people in activity classes have more strongly developed intrinsic motivation than those receiving only verbal information.

In addition to identifying the stages of change, and motivational readiness across the stages of change, TTM researchers have identified different techniques useful to people within the various stages of change. Prochaska et al. proposed the use of 12 common techniques drawn from Psychoanalytic, Humanistic/Existential, Gestalt/Experimental, cognitive and behavioural theories of psychotherapy. The techniques were identified from the literature based on their effectiveness as facilitators of the processes of change and included consciousness-raising, self-liberation and helping relationships (Prochaska et al.)

#### *Transtheoretical Model-testing Research*

The evidence for the implementation of the stage theory of TTM is mixed (Spencer, Adams, Malone, Roy, & Yost 2006). TTM has been applied widely in behaviour change studies across physical activity as well as smoking and drinking behaviours (Prochaska, Norcross, & DiClemente, 1994). Physical activity research using TTM is extensive as indicated by the availability of more than 70 published reports of empirical studies of TTM techniques and 150 studies in a systematic review (Marshall & Biddle, 2001; Spencer et al., 2006). The range of health behaviours investigated using the TTM is evident from the work of Nigg, Burbank, Padula, Dufresne, Rossi, Velicer, LaForge & Prochaska, (1999). Nigg et al. studied the model of behaviour change and relationships between health behaviours including regular exercise and stage distribution of seatbelt use, avoidance of high fat food,

high fibre intake, weight loss attempts, moderating sun exposure, using sunscreen, stress reduction, stopping smoking, and self-examination for cancer. Nigg et al. (1999) found that participants (19,266 older adult members of a health insurance organisation) the majority who were under 55 years reported themselves as mainly precontemplative or maintaining physical activity, therefore, Nigg et al. perceived the need to construct interventions suitable for people in the earliest stage of change.

Prochaska et al. (1994) advocated behaviour change through application of fundamental techniques, applied during discrete periods of cycling or recycling through the spiral model of change. In terms of physical activity change processes advocated in the TTM that are considered experiential or cognitive processes there are techniques of consciousness raising, dramatic relief, environmental re-evaluation, self re-evaluation, social-liberation. The change processes considered behavioural are, self-liberation, reinforcement management, counter conditioning, stimulus control and helping relationships (Gorely & Gordon, 1995). To explain the techniques further in terms of physical activity, consciousness raising is evident where someone might say to themselves “I want to understand more about exercise so I’ll get some brochures and read more about it”. Dramatic relief is where emotions intensify when associated with change in physical activity such as “I was relieved when I took my first walk and found I was excited to be outside and thought maybe I can be active more often.” Environmental re-evaluation occurs when someone thinks about their inactivity or how it might affect those they live with. Environmental re-evaluation may be represented in thoughts such as “Why am I taking the lift, when I could have taken the stairs without much more effort” or “how does my inactivity affect my

children?” Self re-evaluation contains elements of assessment of progress and others reactions to physical activity changes and may be expressed as, “I am so upset I really let myself down when I avoid doing my walk. I know what my partner will think of me if I tell him.” The last of the cognitively based techniques, social liberation, is where broad cultural factors affect physical activity outcomes. For instance, social liberation is represented where it becomes clear to someone that other people walking outside are subtly encouraging others to be physically active, perhaps by smiling at other walkers, or a nod of the head. People engaged in social liberation might say to themselves, “So many people are encouraging me to be physically active now”.

The technique of commitment, also termed self-liberation is based on individual empowerment through making a personal choice and commitment to be physically active and acting as though change is possible. People might reveal this technique when they say “I can do this, I can keep up my daily walk.” Another behaviourally-based change technique is reinforcement management, whereby a person rewards themselves for actions that are positive for physical activity. This is evident when they might say “I take a long, hot bath after I have taken my morning walk”. The technique of counter conditioning relies on changing one behaviour for another. For instance, instead of setting a morning alarm to begin with the radio news, someone may choose to set a clock-alarm to wake them up five minutes earlier than usual, and set it to a music radio station. When the alarm wakens them they include five minutes of dance before they begin their normal daily routines. This technique may be recognised in statements like, “I use more of my day to be physically active by including 5 minutes of dance to my day when I wake up”. Stimulus control is a

technique that requires someone to implement control of situations that lead to inactivity. For instance, stimulus control could involve planning and instigating active meetings where people walk and talk rather than passively sit and talk. People doing this may say “I prefer to organise meetings where I can walk and talk rather than sit and talk”. The final behaviourally-based change technique involves the development of helping relationships. Attempts to change using helping relationships involve enlisting the special help of someone to specifically aid the desired change. People may express the use of this technique by saying, “My friend walks with me once a week and helps me be more active just by being with me”.

Other important techniques in TTM are to build positive future outcome beliefs by increasing the pros and decreasing the cons of regular activity (Lippke, Ziegelmann & Schwarzer, 2005; Marshall and Biddle, 2001). Increasing the pros and decreasing the cons is particularly important in the early stages of change. Whereas, for maintenance of physical activity changes it is important to build self-efficacy, arrive at a decisional balance of pros and cons of change. Similarly, to maintain physical activity changes it is important to apply techniques already discussed that are cognitive, affective, and behavioural. Maintenance of change is also helped by the realisation that progression and recycling through the stages of change is an integral part of sustaining change in the long-term (Marshall & Biddle, 2001).

The efficacy of two further TTM change techniques was revealed through meta-analysis analyses. The techniques were consciousness raising and realistic goal setting and were particularly effective for change interventions (Gorely & Gordon, 1995; Marshall & Biddle, 2001). Self-re-evaluation was also a useful technique in a

Theory of Planned Behaviour intervention (Courneya & Bobick, 2000). Gorely and Gordon (1995) using a meta-analysis of TTM intervention studies reported the efficacy of additional fundamental techniques and strategies for change interventions. These important forces for physical activity change using the TTM were, increasing self efficacy from precontemplation to maintenance stages; addressing the balance between pros and cons across stages; encouraging a number of small steps, realistic goal setting, matching the change process to be used with a person's stage of change, and encouraging the use of positive self talk.

Similarly, there were several fundamental techniques identified in Marshall and Biddle's (2001) meta-analysis of change interventions. In addition to consciousness raising, that is providing information, educating with observations, confrontations, interpretations, and bibliotherapy, it was important to provide opportunity(ies) to experience dramatic relief, and to assist environmental re-evaluation. Other fundamental techniques that Marshall and Biddle demonstrated were important were, social liberation achieved by empowering an individual and looking at broader cultural factors in precontemplation, contemplation, and preparation stages. Other important techniques in TTM were to increase the pros and decrease the cons of regular activity to promote self-liberation, that is, "the belief that change is possible and that responsibility for change lies within the individual" (Marshall & Biddle, 2001, p. 243). Marshall and Biddle found self-liberation to be most evident across precontemplation and contemplation stages, whereas, integral to sustaining change in physical activity are the processes of change, mediated by self-efficacy, decisional

balance of pros and cons of change, strategies applied to cognitive, affective, and physical behaviour, and progression and regression.

A central concept in the TTM similar to other decision-making theories is decisional balance. Some theorists adopt the decisional balance concept in combination with more complex approaches. For instance, Janis and Mann (1977) in their “Conflict Model” of decision-making incorporate notions of instrumental benefits for self, instrumental benefits for others, costs to self, costs to others, self-approval, others approval, self-disapproval and others’ disapproval. Prochaska et al. have however, simplified these concepts to encompass the benefits and difficulties, or in official terms, the pros and cons, involved in performing, adopting or sustaining behaviours. Prochaska et al. use the title “decisional balance” for this concept. Achieving decisional balance involves the development of perceptions that positive outcomes of behaviours compensate for negative aspects associated with performing those behaviours (Gorely and Bruce, 2000). Researchers have indicated that pros increase and cons decrease across precontemplation to maintenance stages. Gorely and Bruce employed a decisional balance formula where the pros minus the cons indicated a decisional balance statistic. Using the decisional balance statistic Gorely and Bruce found that in the precontemplation stage the cons far outweighed the pros. They also found, however, that the weighting of pros and cons changes as people progress through stages. For instance, by the time people are in action stages the pros of exercise outweigh the cons. Also, with respect to exercise, researchers identified preparation and action stages as points where perceptions about pros and cons alter (Prochaska, Norcross & DiClemente, 1994).

The central concepts of the TTM were stages of change, processes and techniques of change, self-efficacy, and decisional balance (Prochaska et al.). All of these concepts were influential for change. Interestingly, however, physical activity interventions rarely apply all these techniques (Spencer, Adams, Malone, Roy & Yost, 2006). Furthermore, there is evidence from research assessing the discontinuity hypothesis supporting stage theory. A meta-analysis of applications of TTM to physical activity identified limitations in the stage process (Marshall & Biddle, 2001). Commonly researched mediators for physical activity are processes of change, self-efficacy, decisional balance, social support and enjoyment. For instance, the influence of affective attitude on physical activity was measured by Lowe, Eves, and Carroll (2002). Assessing intentions, attitudes, subjective norm, perceived behavioural control and exercise behaviour Lowe et al. found affective attitude directly influenced future behaviour independent of intention.

#### *Intervention Research Using Transtheoretical Model based Techniques*

The following is a useful example of where using a range of aspects of TTM have been combined to motivate men and women to increase their physical activity levels. The study involved presentation of materials about physical activity tailored to participants' stages of readiness to change. The intervention was applied over six months in conjunction with an American physical activity study of sedentary people. (Marcus, Bock, Pinto, Forsyth, Roberts, & Traficante, 1998). The term sedentary was clearly defined as not meeting the CDC/ACSM (Centres for Disease Control and Prevention/American College of Sports Medicine) criteria for minimum physical activity participation. The minimum was participating in moderate intensity physical

activity for 30 minutes on most days of the week. One hundred and fifty participants completed measures across the duration of the study. Participants were randomly assigned to receive either a motivationally matched, individually tailored intervention (IT) or a standard self-help intervention (ST). Interventions were delivered at baseline, 1, 3 and 6 months. Physical activity, self-efficacy and decisional balance were also measured at 1, 3 and 6 months. Marcus et al., found participants in the IT condition were significantly more physically active than participants in the ST condition. Although the results of this study provided evidence of the utility of individually tailoring interventions, and their potential benefits compared with standard treatments, the mechanisms enhancing physical activity participation have not yet been definitely identified. The IT approach also, did not yield significant changes in self-efficacy or decisional balance suggesting that factors other than provision of individually tailored intervention were influential for physical activity participation. One such factor suggested by Marcus et al., was the possibility that individualisation may have increased participants' attentiveness and retention of information because it was perceived to be specifically relevant. There was a particularly beneficial effect at baseline in the provision of the IT intervention, with participants designated as being in the pre-contemplation and contemplation stages of change. These stages where the presentation of strategies for diminishing the barriers to physical activity while emphasising the advantages of physical activity were the most effective. Marcus et al. achieved this result by using specifically designed and encouraging, cognitive and behavioural change messages relating to strategies for enhancing physical activity adoption. For example,

Good work! Since you began this program you have made excellent progress. Earlier in this program you were thinking about becoming active. Now you are doing something about it. You have found a way to make physical activity a regular part of your life. Congratulations on your efforts! (p. 179).

Another study providing an example of the range of aspects of TTM applied to motivate women to increase their physical activity was the Sedentary Women Exercise Adherence trial (SWEAT) (Cox, Burke, Beilin, Grove, Blanksby, & Puddey, 2001). SWEAT was a prospective, longitudinal (18 months) study based on TTM central concepts. The concepts were stage of exercise behaviour, self-efficacy, decisional balance and processes of change. Overall researchers found the application of these concepts returned increased self-efficacy for overcoming barriers. Sedentary, mid-life (40 to 65 years) participants (N = 115) were randomly assigned to either moderate or vigorous exercise. Sedentary status was defined by low  $VO_{2max}$  and self-reported activity levels assessed using a seven day recall questionnaire. Several hypotheses were tested, including whether stage changes were linear or cyclic. Cox et al. (2001) reported 28 different patterns of change. Linear patterns of change were most evident, however, other patterns showed periods of stagnation, progression and regression lending further support to the cyclical nature of change originally proposed by Prochaska et al., (1994). Cox et al. found patterns of change showed no significant differences associated with the settings in which physical activity was undertaken. Moreover, increased self-efficacy for overcoming barriers and the use of behavioural processes of change (e.g., reinforcement management, stimulus control, helping relationships, counter to conditioning and self-liberation) were most evident in the

contemplation and action stages irrespective of intervention condition. Self-efficacy for exercise was similar but appeared to be most influential for participants in the vigorous physical activity condition.

In conclusion, the TTM represents an intuitively appealing model of the change process has been used to challenge previous research findings focused exclusively on linear models of change. TTM central concepts included self-efficacy (influenced by intrinsic and extrinsic motivation), and stages of readiness to change within which processes of change can be applied to effect behaviour change. These processes of change are posited to be more or less effective according to the individual needs during each stage of change. In addition, decisional balance is also an important concept in TTM where the pros and cons of behaviours are gauged as influential across the stages of change. Intervention research has shown the utility of the TTM through physical activity interventions, in particular when all the central theoretical concepts are applied.

#### Other Physical Activity Motivation Theories

In Biddle and Nigg's four categories of theoretical frameworks the Health Behaviour Model, (HBM; Becker, 1974; Becker, Haefner, Kasl, Kirscht, Maiman & Rosenstock, 1977), and protection motivation theory (PMT; Rogers, 1983); control-based theories, such as self-determination theory, and Locus of Control (LOC; Rotter, 1966); were also applied with physical activity, however, they have not proven particularly useful for physical activity adoption and maintenance. I have not, however, included an in depth review of these theories in the following section in view of consensus of the utility of and greater interest in physical activity research in

the widely cited theories of SET, TPB, SDT and TTM (Biddle & Nigg, 2000). In short, HBM and PMT are belief-attitude theories and LOC theory is a control-based theory.

### *Health Belief Model*

The health belief model (HBM) was developed from public health screening and immunisation interests, however, applications of the HBM now extend to other health behaviours such as physical activity (Nutbeam & Harris, 2004). In HBM the interaction between beliefs of perceived susceptibility to a specific problem, the perceived seriousness of a problem, the perceived benefits of certain actions, and the perceived barriers to performing perceived beneficial actions are central. Interactions between these four factors were found to be predictive of self-efficacy when associated with the formation of perceived threat and outcome expectations related to specific health behaviour (Nutbeam and Harris). For instance, using the HBM, a person's level of swimming for health benefits self-efficacy would depend on two perceptions in relation to the level of threat and their outcome expectations of swimming. The level of threat a person perceives about an activity, in this case swimming, emerges from two types of belief. The first type of belief is the perceived need to swim for health. For example, whether someone believes their health problems increase their vulnerability to lack of physical activity/swimming. The second type of belief is the reverse of the first and concerns the person's perceived seriousness of not swimming. This is akin to thinking whether or not swimming will make any difference to their health. With respect to a person's outcome expectations about swimming for health, these may be the result of the combination of another two

types of belief. The first relates to the perceived benefits of swimming for health. Reasons such as whether swimming would provide them with increased mobility or fitness. The second type of belief is whether there are identifiable barriers to swimming. Barriers might include beliefs about the practicality of swimming or self-consciousness about swimming.

In the early stages of model-testing that applied HBM with, for example, HIV infected participants, some interventions relied heavily on encouraging fear of adverse consequences (King et al., 1992). Despite the HBM's usefulness for identification of perceived barriers as a determinant for exercise that has potential for change, the HBM focuses on risk avoidance rather than health promotion. Generally the HBM has not been very helpful from an intervention perspective (King et al.). The model shows a cost analysis approach to motivation for preventive health behaviours, whereby the perceived benefits minus the perceived barriers directly influences the probability of engaging in health promoting behaviours (Biddle & Nigg, 2000). Although over 40 studies have assessed HBM in relation to health promotion, because HBM has an illness-avoidance focus, its veracity for positive health promotion has been limited. Biddle and Nigg concluded that HBM was more suited to predicting levels of inactivity than promoting health-behaviour. Nutbeam and Harris (2004) however, concluded that "The health belief model has been found to be most useful when applied to the behaviours for which was originally developed such as screening and immunisation." (p.13).

*Protection Motivation Theory*

Rogers' (1983) protection motivation theory (PMT) was initially formed to explain health promotion messages based on fear of ill-health (Biddle & Nigg, 2000). PMT is similar to HBM with respect to an illness avoidance focus. Also, PMT involves notions of appraisal of threat (i.e., assessment of level of vulnerability) and coping abilities, for instance, consideration of engagement in, and strength of ability to engage in, preventive behaviour. PMT's foundations are fourfold; perceived severity, perceived probability, perceived self-efficacy, and perceived efficacy of preventive behaviour. These four areas contribute to the formation of protective intention and that the protective intention leads to protective behaviour.

Research applying PMT to physical activity is scarce and the few studies conducted (Fruin, Pratt & Owen, 1991; Godin, 1994; Stanley & Maddux, 1986; Wurtele & Maddux 1987) indicate only limited usefulness of PMT in relation to interventions aimed at adoption and maintenance of physical activity (Biddle & Mutrie, 2001). For instance, Wurtele and Maddux applied PMT to physical activity by asking 160 women to read "persuasive appeals" about increasing their exercise. The appeals were tailored to four dimensions; severity, vulnerability, response efficacy and self-efficacy. Wurtele and Maddux found high self-efficacy predicted strong intentions to be physically active whereas, persuasive threat or health appeals did not influence exercise intentions. Similarly, in his examination of the indirect evidence for effectiveness of PMT, Godin (1994) concluded that persuasive appeals are somewhat effective in increasing intentions to be physically active but less effective for the adoption and maintenance of physical activity.

*Locus of Control*

In contrast to the previous two theories briefly summarised, Rotter's Locus of Control (LOC) theory has been used to examine aspects of behaviour control and stems from social learning theory approaches of behavioural psychologists in the 1950s and 1960s (Rotter, 1954, 1966, 1973). Specifically, LOC refers to peoples' perceptions and expectations about reinforcements for particular behaviours being contingent on individual behaviour or on forces outside of an individual. The first and second sets of perceptions were labelled internal control and external control respectively. People who are internally controlled perceive their actions as their own ideas and their behaviours are biased towards internal control. McCombs and Marzano (1990) suggested that internal locus of control refers to the concept of "self as agent". Whereas, people who believe outside forces or others control their behaviour, are biased towards being externally controlled. LOC is a derivative of social learning theory, whereby behaviour is dependent on the expectancy that the behaviour will provide valuable reinforcement. Tests of these concepts, however, have not found a relationship in relation to exercise. For example, McCready and Long (1985) tested the combined effects of locus of control and attitudes towards physical activity with 61 female participants who voluntarily joined an 8 to 12 week aerobic fitness program. McCready and Long found that a weak relationship existed between adherence to the fitness program and LOC and attitude. Kennedy, DeVoe, Michel and David (2001) investigated whether LOC concepts of internal and external control were influential for physical activity. Kennedy et al. found that people in the preparation stages of readiness to change their physical activity tended towards more

internal locus of control behaviour particularly when stage matched materials were available.

### *Applications of Motivational Theories to Physical Activity Participation*

Physical activity participation was the focus of Biddle and Mutrie (Biddle & Mutrie, 2001; Biddle & Nigg, 2000). These researchers evaluated the vast range of work theorising physical activity participation. Biddle and Mutrie made several recommendations pertinent to further physical activity study regarding motivational and psychological determinants of physical activity. The first recommendation was to conduct research with attention to the complexities of physical activity. The second recommendation was to move on from directly comparing theories, a strategy that has not proven useful, but confusing and divisive. According to Biddle and Mutrie, particular aspects in many theories have credence, but no single theory can usefully explain all aspects of motivation for physical activity. Similarly, Buckworth (2000) noted the limitations of applying interventions to general populations, extrapolating from increasing evidence that the efficacy of physical activity interventions stems from considerations of the unique demands of the targeted population. Biddle and Mutrie (2001) and Buckworth (2000) supported research with a strong focus on concepts contained within the following pre-eminent four theories; the theory of planned behaviour, the self-efficacy theory, the transtheoretical model, and the self-determination theory.

The motivation for physical activity intervention section focused on studies of physical activity in the applied setting that were used to test a theory-based physical activity intervention or provided a theory-based intervention to increase physical

activity. There is a growing body of literature on active lifestyle interventions, many of which have been implemented without a specific theory base. It is important to note the growth in active lifestyle and ecological interventions, but space limitations here do not permit a full review. Appendix A is included to provide an overview of active lifestyle interventions and the growing importance of integrating physical activity to everyday living, especially for people who are mostly sedentary.

#### Summary of Motivation for Physical Activity Section

An examination of over 40 years of exercise and health psychology literature, shows a relatively constant level of interest from researchers seeking to understand why people choose, adopt, and maintain physical activity. Including in the literature are a growing number of intervention studies. Yet, despite continued and increasing interest in the benefits of physical activity to lower the risk of chronic poor health there is no clear understanding or consensus about how to encourage long-term physical activity engagement.

A number of central concepts and fundamental techniques that have been applied in researching physical activity theory-based interventions are provided in Figure 2.7. From the literature review of interventions based on these theories (SCT, TPB, SDT, & TTM) I found considerable overlap in techniques implemented in physical activity interventions. For example, goal setting can be used to increase perceived competence, or in SCT based interventions to enhance self-efficacy and in TPB-based interventions to develop behavioural control. Despite the use of overlapping techniques SCT, TPB, SDT, and TTM represent the theories most often applied leading to the adoption of physical activity, but rarely for sustained periods.

Intervention researchers have identified a variety of motives associated with participation in physical activity. Researchers have addressed variables including health issues including stair-climbing (Stewart, et al., 2001), personal choice (Bauman, Smith, Stoker, Bellew, & Booth, 1999), and to a lesser extent environmental factors such as green space, and transport options. In addition, perceptions of personal choice and behavioural control (Biddle & Mutrie, 2001) have been found to be predictors of physical activity participation. The more choice a person has about engagement in physical activity (what, where, when, who with, and how) the more likely they will sustain physical activity. Until the year 2000, over 300 studies investigating the determinants of physical activity had been undertaken (Buckworth, 2000). These studies described a range of factors relating to exercise programs and general levels of activity. More availability of interventions does not necessarily translate into participants being more successful in increasing their physical activity (Marcus & Stanton, 1993). Furthermore, Buckworth noted the lack of experimental research involving interventions to promote physical activity. Researchers have concluded that demographic, biological, cognitive and emotional factors affect physical activity behaviour. In addition, behavioural skills, the human environment, physical environment, and the characteristics of activities also affect the adoption and maintenance of physical activity (Buckworth, 2000). Theory based and atheoretical attempts to change physical activity have been largely unsuccessful in promoting sustained physical activity.

<b>THEORIES</b>	<b>CENTRAL CONCEPTS</b>	<b>FUNDAMENTAL TECHNIQUES</b>
Self-efficacy Theory	Behaviour is Formed as Interaction Between Self and Environment; informed by Outcome Expectancy and self-efficacy informed by Mastery Experience; Vicarious Experience; Verbal Persuasion; Emotional Arousal Control	Realistic Goal Setting Leading To Mastery Experience; Choice Of Activity(ies) and Settings; Social Support; Problem Solving Approach; Stepped/Staged Approach; Verbal Persuasion; and Demographics
Theory of Planned Behaviour	Attitude, Intention; Subjective Norms; and Perceived Behavioural Control	Self Re-evaluation; Environmental Re-evaluation; Helping Relationships; Choice of Change; and Commitment to Change
Self-determination Theory	Intrinsic Motivation; Extrinsic Motivation; Perceived Competence; and Self-determination	Social Support of Personal Choice; Positive Affirmations; Developing Routine; Mastery Experience Through Identification, Escape, and Self-regulation; and Situational and Visual Cues
Transtheoretical Model	Stages of Change; Processes of Change; Decisional Balance; Self-efficacy; the Spiral Model of Change; and Context	Consciousness-raising; Social Liberation; Emotional Arousal; Self re-evaluation; and Commitment

*Table 2.3.* Theories, central concepts, and fundamental techniques for application with physical activity.

Psychosocial intervention approaches up to the late 90's were frequently based on physical activity studies and theories drawn from males experiences with minimal attention to the physical activity contexts faced by women and women's consequent attitudes towards physical activity (Vertinsky, 1998). Contextualising physical activity as a motivational factor missing from previous research bears future examination.

### Women's Motivation for PA

In mid-life, women's motivation for physical activity is often low arguably because of the constant demands of work and family. Low motivation often leads to many women's minimal physical activity levels (Biddle & Nigg, 2000; Spirduso, 1995; Vertinsky, 1998). Motivation has been defined as the embodiment of energy and direction of particular behaviour (Frederick-Racascino & Morris, 2004). To illustrate further, motivation can be explicitly related to the amount of effort spent in an activity and the level of personal interest. Although this perspective on motivation is rooted in instinctual and drive theories of Freud (1923) and Hull (1943), the study of motivation, particularly in sport and exercise domains, has taken the effectance motivation approach as the basis for recent work in the fields of intrinsic and extrinsic motivation (White, 1959). White's effectance motivation perspective on motivation is that intrinsic and extrinsic motivation represents the polarised extremes of the motivation continuum.

Researchers have indicated differences in the amount and direction of available energy for physical activity, the motivation of mid-life women compared with other population segments and age groups. For instance, Mathes and Battista's (1985)

study of college women's physical activity participation motives showed competition, health and fitness, and social experience in relation to physical activity held little meaning for the student participants. For mid-life women intrinsic factors such as finding enjoyment in physical activity or hating heavy perspiration and extrinsic factors such as pleasant, safe environments to be physically active, or perception of threat influence mid-life women's attempts to be physically active. In the context of participation motivation, Frederick and Ryan (1993) found that participation levels were associated with physical well-being, but not with mental health. They found that intrinsic and extrinsic motivations are linked to participation and satisfaction in sport and exercise, both positively and negatively. For instance, intrinsic motivation in the form of feelings of satisfaction and extrinsic motivation in the form of praise can positively assist in the maintenance of physical activity. Extrinsic motivation in the form of monetary reward does not necessarily assist and can actually detract from participation if the reward is considered inconsequential.

Self-motivation is an important factor influencing the beginning and continuation of physical activity and for some women self-motivation is enhanced by countering negative thoughts (O'Brien-Cousins, 2003). In her study of inactive and active adults aged 55 and over O'Brien-Cousins found that active people motivated themselves to be active by countering negative thoughts about their activity with positive thoughts about the value of physical activity. The countering strategy led to participants maintaining their levels of physical activity, thus, the active participants differed from the inactive people in their self-motivation (O'Brien, 2003). In addition O'Brien-Cousins pointed to the reasons women give that they believe restrict their

physical activity. The reasons included low levels of self-motivation, lack of time, poor environment, and low body image.

#### *Summary of Women's Motivation for Physical Activity*

The literature reviewed concerning women's motivation for physical activity indicates that women's motivation for physical activity is dependent both on the removal of barriers and increasing positive factors for physical activity. There is a clear need for the removal or minimisation of numerous physical activity barriers such as being time poor, lack of self-motivation, and environmental safety concerns. In addition, there are indications of the value of increasing self-efficacy for exercise and finding enjoyment in physical activity. For women, the barriers to physical activity have been evident for many years, yet they still remain firm hindrances to active lifestyles. Consequently, research is needed to address how to encourage people to motivate themselves, make time for activity, make the most of their available environment, change their thinking and increase their efficacy for physical activity (Dishman, 1982).

#### Methodological Issues and Gaps in the literature

##### *Research Bias*

A research bias towards extensive concentration on men's physical activity involvement, and men's physical activity experience, has been identified by Erlichman, Kerbey, and James (2002) and Greenberger (1998). Their work highlighted the lack of research into women's physical activity involvement and women's physical activity experiences. Greenberger lists over 24 diseases, conditions and technologies affecting women including exercise that she proposed needed closer

research scrutiny. With the physical activity literature base largely drawn from men's physical activity experiences it is important to explore women's physical activity engagement because recent physical activity motivation literature indicates that men's and women's physical activity experiences are somewhat different (Booth, Owen, Bauman, Clavisi, & Leslie, 2000).

Further support for the need to research women's physical activity experiences, particularly in the area of context specific psychological barriers (e.g., household chores and family commitments) is found in Lee's (1993) survey of exercise patterns of 286 mid-life Australian women. Lee found very different perceptions of family support between women who were physically active and women who were not. Specifically, over 40% of the inactive women reported that their families would not relieve them of their chores to support them doing physical activity. Gender inequities are also disadvantageous to women who want to be physically active (Lee, 1993). Social constraints within families can make engagement in regular physical activity more difficult for women and research is needed in this area to develop interventions to address such constraints.

Researchers have consistently reported multiple benefits of physical activity and there are documented associations between doing physical activity and being healthy (Biddle & Nigg, 2000; Stephenson, Bauman, Armstrong, Smith, & Bellew, 2000). The direction, magnitude, and intensity of the physical activity and health relationship are, however, unclear, partly because much of the research in this area has been correlational. Researchers investigating associations between physical activity and health have generally favoured correlational and cross-sectional research

design. Greater experimental rigour and employment of well-designed mixed methodology in the physical activity domain is required.

### Thesis Rationale

Researchers have shown that sedentary lifestyles increase the risk of declining functionality due to physical inactivity. In contrast physically active lifestyles provide the possibility of more functional years of life before death. The challenge to be more physically active is daunting for many women as indicated by the present inability to incorporate more physical activity into their lives and to sustain higher physical activity levels. In the current literature review drawn from more than 40 years of research evidence is provided of the physical and mental health benefits of being physically active and given examples of theories that have previously been applied with cohorts other than mid-life, sedentary women, to successfully increase physical activity levels. Although there was little evidence of successful maintenance of new levels of physical activity researchers have trialled theory-based interventions aimed at increasing physical activity participation. Multi-theory-based interventions have not yet been applied with mid-life sedentary women. Research into psychosocial issues specific to women's life contexts within which attempts are made to change physical activity levels is also necessary (Greene, 2000, Vertinsky, 1998). For instance, Greene proposed addressing psychosocial issues in life contexts because important changes "...are embedded in the flow of a person's life and in a system of meanings which can only be fully grasped by seeing them in the context of the person's life story" (p. 51). As women age, they sometimes revise previous perspectives or develop new perspectives on many issues including physical activity.

Greene asserted that from a practitioner's point of view, promoting change within life contexts provides an optimal framework for change to occur. For instance, recognition of the consequences for women's physical inactivity, where women live, their social, economic, and cultural situations all require consideration if women's self-motivation for physical activity is to be facilitated. Facilitating self-motivation for physical activity on women's own terms (tailoring choices) rather than by imposition of generalised approaches is required to empower women's change and to avoid repeating unsuccessful attempts at physical activity change. Disassociation with women's life contexts from the "Everyday lived reality...of women and girls in our society... It is essential to listen more carefully to what women and girls say about their own experiences in their lived bodies and how they see them as providing a location for health and healthful practices." (p. 97).

How women think about physical activity may be a more influential element for physical activity change than simply receiving information. As I indicated in my literature review knowledge is not enough to promote lasting change. Vertinsky echoes that notion arguing that feeling more capable, feeling more powerful, and feeling a greater sense of belonging may be more important to a woman's physical health than whether she exercises more (Vertinsky). Primary care physical activity prescription programs, community interventions, and individual studies of physical activity change have often measured intervention outcomes with objective, quantitative approaches (Morris & Choi, 2005). Mid-life women's subjective experiences of their journey changing physical activity levels have not been well documented. Consequently, we know little about the nuances and what mid-life

women perceive about physical activity or what motivates them to be physically active. Possibly knowing what motivates mid-life women to be physically active differs between generations because there are notable differences in upbringing and inherent attitudes towards physical activity. For instance, mid-life people are often referred to as “baby boomers” (i.e., born between 1945 and 1955). Many baby boomers’ parents returned from World War II to set up their families. In most westernised countries from 1945 onwards people have lived in booming economies, the birth of popular culture in the 1960s, freedom from wars, and a mentality of having money to spend rather than saving. Rapid economic and cultural growth meant baby boomers grew up in a consumer culture where new technologies enabled them to own washing machines, and cars. Baby boomers had unprecedented access to fast food outlets, lifts escalators and sedentary based technologies (e.g., televisions and computers). By contrast, people born one or two generations prior to the baby boomers knew economic depression, wars, lack of essential foods, heavy household labour requiring significant physical exercise, and a great deal more walking than subsequent generations. Prior to the baby boomer generation older women were physically active daily, as a matter of necessity. Nowadays, baby boomers’ work demands mean women are typically sedentary in order to perform their work. Often performing administrative roles or working at a computer for long periods, many women sit for much of their working day. Compounding the factors of occupational, financial necessity, family responsibilities require women to engage in sedentary activity such as driving to and from work and the supermarket. Moreover, women may be the designated driver for their children’s leisure or sporting activities

providing “Mother’s Taxi” service (Thompson, 1999). Often women will also drive sick family members to doctors, hospitals or dental appointments compounding the difficulties women face in view of their work and family demands. Family and work commitments seem to affect physical activity disproportionately. Berger (1996) said

Something is drastically wrong, when exercise is associated with so many health benefits but only a small portion of the female population exercises sufficiently to accrue those benefits. (p. 330).

As well as taking the imbalance of research between men and women’s experience of physical activity into account the theoretical rationale for this study draws largely on issues arising from measurement of physical activity, lack of multiple theory-based research, the short duration of previous studies and a lack of understanding about what motivates women to be physically active. For instance, much physical activity research has relied on quantitative measures of behaviour that are limited in terms of explaining the contextual or psychosocial aspects of change. Research is also further limited because of recruitment difficulties associated with sedentary people. Understanding whether and how sedentary Australian women could integrate physical activity into complex life contexts is absent from the current literature. Much of the existing research has concentrated on building models or developing theories about physical activity participation and implementing interventions with communities, targeted groups, and individuals, then quantitatively assessing their effectiveness (Morris & Choi, 2005). In addition, the application of short-term cross-sectional approaches to physical activity have not lead to the adoption and sustained maintenance of moderate intensity physical activity.

From the literature review five main issues emerge. First, physical activity is accepted as globally important to health and well-being. Second, theories of motivation have been applied with physical activity individually or tested against each other, rather than combined. Third, few of the theory-based interventions have been applied with sedentary cohorts or in a longitudinal manner. Fourth, it is apparent that mid-life women are at high risk of physical inactivity. Fifth, there has been little in-depth exploration of what motivates women to become and remain physically active.

Because it is now generally acknowledged that physical activity is imperative to health and well-being, and previous research has identified sedentary mid-life women as particularly at risk of poor health, a decreased sense of well-being, and a reduced capacity to age well, a multiple theory-based intervention will be developed. The current research was designed to further explore the determinants and methods of changing individual approaches to physical activity engagement. Thus, the aim here was to explore the effects of a multiple theory-based intervention applied with mid-life, sedentary, Australian women. In chapter 3, I describe the nature and results of the intervention study. In Chapters 4 and 5, I report on the in-depth interview study conducted following the intervention study. Finally, in chapter 6 overall conclusions and recommendations emanating from these studies are presented.

## CHAPTER 3: STUDY OF MOTIVATION WITH SEDENTARY

## MID-LIFE WOMEN

## Introduction

Two main arguments for implementing an intervention study based on previously effective theory-based strategies have been presented in Chapter 2. First, there is the global issue of low physical activity levels compounded in the Australian context identified by Armstrong, Bauman, and Davies (2000). Armstrong et al. had found that few report engaging in physical activity during the week prior to completing a survey of physical activity patterns in Australian adults. In addition, in the 45 to 59 year age range, 18.2% of participants were classified as sedentary for the week prior to the survey. If these figures were not problematic enough, Armstrong et al. also identified a number of exacerbating factors linked with physical inactivity of being a middle aged woman including being less educated, being widowed, and being obese. Second, there have been very few applications of combined motivation theories (Biddle & Mutrie, 2001) using randomised control trials of physical activity interventions with sedentary cohorts. Moreover, there is a paucity of research that reports on the experiences of women attempting to change physical activity levels (Masse, Ainsworth, Tortolero, Levin, Fulton, Henderson, & Mayo, 1998).

The present study combined strategies from motivation theories with a sedentary cohort of mid-life women and sought to add deeper understanding of physically inactive women's efforts to adopt and maintain new activity levels. The theoretical rationale behind inclusion of strategies into this study included success with strategies in previous research. Instrumental strategies included in this study

included cost and sustainability. This was a longitudinal (12 months duration) and prospective study where data was collected as the intervention progressed rather than in hindsight. Data was collected across the year by using a range of questionnaires (see Appendices B, C, & D) and using an ejournal (see Appendix E for examples of ejournals). In 2008 the term “ejournal” has acquired a different meaning to the way I use it in this dissertation. At the beginning of my doctoral studies the term “ejournal” was not understood as it is nowadays (e.g., descriptive of a collection of journal research papers accessible and delivered electronically via the internet). In this dissertation ejournal is used to describe a series of open-ended questions designed to elicit reflection on physical activity that were sent to each participant electronically via email.

The main thrust of the present study was to investigate whether combining strategies is motivational for physical activity. My approach and decision to engage in a multi-theory approach to motivation for physical activity was based on a review of the literature and Biddle and Mutrie’s findings that had highlighted a gap in understanding regarding the usefulness of combining theoretical approaches. In addition, Biddle and Mutrie provided strong evidence for the Self-efficacy theory (p.105) the Transtheoretical Model (p. 148) and the Theory of Planned Behaviour (p.114) being useful for physical activity motivation interventions. Furthermore, the Self-determination theory was in Biddle and Mutrie’s own words showing promise for future physical activity motivation interventions. Strategies sometimes overlap across several psychological theories, e.g., positive self-talk that has previously been used in physical activity interventions based on the Transtheoretical Model and Self-

determination Theory (see Chapter 2, TTM and SDT sections). The aim was to tailor strategies towards not only adopting more physical activity, but to maintain the new physical activity levels at appropriate points in the intervention.

CBT-based theories were judged appropriate for sedentary women for three reasons (Meichenbaum, 1977a). First, REBT (Ellis, 1958, Ellis 1998) is suitable because of the theory's link between low levels of physical activity and maladaptive use of "shoulds" and "oughts". Second, CT targets polarised thinking about doing physical activity, such as having to do large amounts of physical activity or none at all. Third, CBM can quieten fears and guilt associated with, for instance, taking time to do physical activity instead of meet family demands. Many of Beck's 10 main Cognitive Therapy (CT) principles (Beck, 1995) lend themselves to application with physical activity. The principles most relevant here were principle three, collaboration and active participation; principle four, being goal oriented and problem focused; principle five, being focused on the present; principle six, being educative and addressing relapse; principle seven, of limiting time and being structured; principle nine, of identification of dysfunctional thoughts and beliefs; and principle ten, that advocates the inclusion of a variety of techniques to change thinking, mood, and behaviour. Strategies suitable for application in the current planned intervention, with the cohort of sedentary, mid-life women most at risk of remaining inactive was based on the CBM principles concerned internal dialogue and developing a variety of techniques and coping skills. Other considerations when choosing strategies for inclusion in this intervention were the feasibility of application in a low budget and minimal contact intervention.

The hypotheses were as follows. Hypothesis one was that the multi-theory based intervention would provide motivation to adopt and maintain physical activity. Hypothesis two was that positive mood would increase and negative mood would decrease during the period of the intervention. Hypothesis three was that perceived well-being would improve across the intervention year.

### Method

#### Participants

Participants were 71 sedentary women aged between 45 and 59 years recruited from I recruited participants for the intervention study through national and local media releases and brief articles in local newspapers, email advertisements to three metropolitan universities and local Councils. The Goulburn Valley Division of General Practitioners and VICFit also placed notices in their newsletters. In addition, 15 local libraries were sent flyers for display on public notice boards.

The demographic profile of participants is included as Table 3.1. All participants reported being physically inactive for at least the year prior to the study and they had not engaged in physically active pursuits for periods of more than six months in the past three years. Women (N = 78) who responded to advertisements but who were not actively recruited either did not meet the selection criteria or later decided not to participate.

The rationale for assessment points was based on two factors. The first factor was the need to take pre - and post - intervention measures. These occurred at baseline and 12 months. In addition I needed to assess intervention effectiveness post

workshop (4 weeks) and pre - and post – intervention maintenance briefing measures (40 and 44 weeks).

Table 3.1

Demographic profile of intervention study participants at 0, 40, and 52 weeks

Demographic	0 weeks Number of participants (N=71)	40 weeks Number of Participants (N=39)	52 weeks Number of Participants (N=27)
<b>Age Ranges</b>			
45 to 50	35 (49%)	20 (51%)	12 (45%)
51 to 55	21 (30%)	11 (28%)	9 (33%)
5 – 59	15 (21%)	8 (21%)	6 (22%)
<b>Marital Status</b>			
Married or partnered	50 (71%)	29 (75%)	21 (78%)
Single, separated, widowed	21 (29%)	10 (25%)	6 (22%)
<b>Number of people living with them</b>			
0	10 (14%)	8 (21%)	5 (19%)
1 other	23 (32%)	8 (21%)	7 (26%)
2 others	18 (26%)	9 (23%)	7 (26%)
3 others	13 (18%)	10 (26%)	6 (22%)
4 others	7 (10%)	4 (9%)	2 (7%)
<b>Education Level</b>			
Higher Education & TAFE	53 (75%)	30 (77%)	21 (78%)
Other	18 (25%)	9 (23%)	6 (22%)
Admin/Lib/Clerical	100%	100%	100%

The second factor was to meet Lowther's (1999) recommendations that a maintenance intervention provided between 6 and 9 months would be useful, hence pre and post measures at 40 and 44 weeks.

The rationale for choice of measures was based on the need for measurement of physical activity, affect and perceived mental and physical health. In addition, the measures sought needed to reflect accurately the types and range of physical activity sedentary mid-life women engage in, easily self-administered, and not unduly taxing for busy women to complete. Evaluating the measures available in 2001, physical activity measures with even several of the above criteria were lacking. Measures that had been previously used to measure physical activity changes over time included the Paffenbarger Physical Activity Questionnaire – PPAQ (Paffenbarger, Jr., Blair et al., 1993), the Stanford Seven-Day Physical Activity Recall – 7 DPAR (Sallis, Haskell, et al., 1985), the Scottish Physical Activity Questionnaire – SPAQ (Lowther, Mutrie et al. 1999) and the Godin-Leisure-Time Exercise Questionnaire – GLTEQ (Godin and Shephard 1985). The International Physical Activity Questionnaire – IPAQ (Booth, 2000) had at that time recently commenced, but was ongoing. A major problem faced in the choice of an appropriate physical activity questionnaire related to measuring activity levels for largely sedentary people. For instance, most measures were not sensitive enough to track a 15 minute walk one day a week, but would have been sufficient to meet the requirements of physical activity interventions that were promoting increases in moderate to vigorous exercise as opposed to changes in activities of daily living such as walking to catch a bus or parking away from shops and walking a few minutes extra one or two days a week. I recognised the problems

associated with measuring small physical activity changes across time, and accordingly spent a considerable portion of my first dissertation year commencing work on developing a specific and appropriate measurement tool. However, as indicated in the discussion, time constraints precluded completion of this planned questionnaire. In view of work completed by Lowther and Mutrie with sedentary participants, I adopted the SPAQ. I believed mood was a possible confound for physical activity and chose to also use the Positive Affect Negative Affect Schedules Questionnaire because it had been well validated by previous researchers. As far as perceived physical and mental health, again it was thought that perceptions of health and well being are associated with capacity to be physically active and vice versa. Again, I chose to use the MOS – SF36, a well validated and established measure for the women in my cohort. The specific nature and validation of these measures is described later in this chapter.

### Study Design

This was a two factor (conditions and time) longitudinal, prospective intervention that was implemented with three conditions, namely adoption (A), maintenance (M), and waiting list control (WLC) (see Table 3.2). In the present study, I evaluated the influence of a psychological intervention that combined elements of motivation theories previously reported as effective in increasing physical activity engagement on physical activity and subjective well-being. The study included three conditions, adoption (A), maintenance (M), and waiting list control (WLC). The core timing and intervention engagement for each condition are illustrated in Table 3.2.

Table 3.2

Study design intervention condition by weeks.

Condition	Element	Weeks 1 to 4	Week 4	Week 40	Week 44	Week 52
Adoption		Initial Workshop & Weekly ejournals x 4	← Monthly ejournals →			
			Measures	•	•	•
Maintenance		Initial workshop & Weekly ejournals x 4	← Monthly ejournals →			
			Extra ejournal one week after second workshop			
			Maintenance Briefing Meeting			
		Measures	•	•		•
Control		Waiting List One meeting	← Monthly ejournals →			
			Measures	•	•	•

Essentially, women in the adoption and maintenance conditions attended a workshop in their first week as participants; in addition women in the maintenance condition attended a maintenance briefing session at 42 weeks. The WLC condition

participants attended a 40-minute session at the beginning of the study. All participants received e-journals across the year but the WLC condition e-journals had less content than e-journals for A and M participants (see “The Intervention” section in this chapter for explanation). The intervention is described in detail later in this chapter, however, it is important to emphasise that the strategies employed in relation to delivery mode (workshop and e-journal) and the content were based on the review of literature that had shown utility in increasing physical activity when applied individually.

#### Treatment Conditions

The planned involvement was for participants in the treatment conditions to attend the initial half day workshop that was designed to get them started with their physical activity. The workshop delivery mode was chosen because of the benefits workshops provide of a semi-structured private, supportive, forum in which the women could discuss, and plan their physical activity changes.

#### *Description of the Study Conditions*

In the adoption condition, participants ( $n = 31$ ) undertook one 3-hour workshop and the e-journals whereas in the maintenance condition ( $n = 27$ ) participants initially undertook one 3-hour workshop and one maintenance briefing session (2 hours) and the e-journals. Participants in the waiting list control (WLC) condition ( $n = 14$ ) attended one (45 minute) meeting. Measures were conducted for all participants at pre- and post-workshop (0 & 4 weeks), pre- and post-maintenance briefing (40 & 44 weeks), and post intervention year (52 weeks). Measures were taken at 0, 4, 40, 44

and 52 weeks to minimise the possibility that measures spread over the year may have confounded the effects of a minimal contact intervention.

Unlike the adoption and maintenance participants the waiting list control participants did not receive any psychological intervention. See “The intervention” section later in this chapter for a full explanation of the intervention components.

Rather than receiving a “workshop” the waiting list control participants completed the same four questionnaires (detailed in measures section of this chapter) as the adoption and maintenance participants.

### The Intervention

There is considerable theoretical overlap in the strategies used, thus I have opted to list the strategies chosen for application in the present study. Table 3.3 describes the intervention content by condition. Essentially the LIFE: Live It Up (LLIU) workshop was the vehicle for strategy delivery. In the workshop strategy delivery took the form of group discussions (in pairs and in whole group) a video presentation and researcher presentation of materials in the LLIU booklet (Appendix G).

### *Ejournals*

The one strategy that was delivered across the year to participants in each condition was reflective journaling. Although still largely a tool used for academic and teaching purposes there is some evidence that reflective journals provide useful aids to learning for athletes and for those involved in the recreation and leisure areas (Dyment & O’Connell, 2003; Kaiser, 2004). Research into the professional preparation of physical and occupational therapists has also successfully applied

reflective journaling to enhance and to document practicum experiences (Case-Smith, et al. 2007). Specifically in the academic training of physical education teachers journaling provided a forum to identify obstacles to progress, address problems, and constructively review practice. This strategy represented a user-friendly approach to elicit reflection concerning participants' cognitive processes, motives, and obstacles. While CBT overarches many strategies applied to physical activity interventions Table 3.3 details the specific links between theories, strategies and delivery modes for this intervention. The ejournal questions were designed to be simple, understandable, and leave plenty of space to express their own thoughts. Ejournals in the current study were not a measure of physical activity participation and were not designed for that purpose. Ejournals were included as a possible vehicle for gathering valuable insights into participants' experiences with physical activity and with their research involvement. Up to ten open-ended questions relating to their feelings and experiences during the past month were sent to participants on a regular basis. Through the ejournals participants were invited to reflect on their current activity goals, about what was helping or hindering them in achieving their goals, their thoughts about changing their physical activity, and what positive statements and reminders they were using. I also asked about their current physical activity goal levels. At the end of the ejournal there was a section for other spontaneous comments. See Appendix E for examples of ejournals.

Table 3.3

Description of intervention content by condition

	Point of Delivery	Strategies	Theory base(s)	Delivery mode
Adoption	All in Workshop 1	<ul style="list-style-type: none"> <li>• Information</li> <li>• Planning</li> <li>• Goal setting</li> <li>• Choice</li> <li>• Positive self-talk</li> <li>• Social support</li> <li>• Commitment</li> <li>• Situational &amp; visual cues</li> <li>• Verbal persuasion</li> <li>• Consciousness-raising</li> </ul>	<p>TTM</p> <p>TTM</p> <p>TTM</p> <p>TTM/SDT</p> <p>TTM/SCT/SDT</p> <p>TTM/SCT</p> <p>TPB</p> <p>SDT</p> <p>TTM/SCT</p> <p>TTM</p>	<p>LLIU, Group Discussion (GD), Video Presentation (VP) and ejournal</p> <p>LLIU, GD and ejournal</p> <p>LLIU, GD and ejournal</p> <p>LLIU and ejournal</p> <p>LLIU</p> <p>LLIU, GD &amp; ejournal</p> <p>LLIU, Posters (See Appendix L)</p> <p>Researcher Presentation (RP)</p> <p>VP, RP</p> <p>VP, RP, GD &amp; ejournal</p>

## Description of intervention content by condition / continued

	Point of Delivery	Strategies	Theory-bases	Delivery mode
Maintenance	Workshop 1	Same as Adoption Condition (SAC)	SAC	SAC
		<ul style="list-style-type: none"> <li>• Goal setting</li> </ul>	TTM	Plan
	Workshop 2	<ul style="list-style-type: none"> <li>• Verbal persuasion</li> </ul>	SDT/TTM/SCT	Video Presentation (VP) and Researcher Presentation (RP)
		<ul style="list-style-type: none"> <li>• Re-evaluation</li> </ul>	TTM	Group Discussion (GD)
		<ul style="list-style-type: none"> <li>• Visual &amp; Situational Cues</li> </ul>	TPB	Posters
		<ul style="list-style-type: none"> <li>• Action Choice</li> </ul>	SDT/TTM/SCT	GD
		<ul style="list-style-type: none"> <li>• Self-reinforcement by reward</li> </ul>	SDT/TTM	GD & Individual Discussions (ID)
		<ul style="list-style-type: none"> <li>• Identification as changer with reference acceptance and change</li> </ul>	TTM/SDT	RP, GD, ID and VP

	Point of Delivery	Strategies	Theory-bases	Delivery mode
Maintenance continued	Workshop 2	<ul style="list-style-type: none"> <li>• Reinforce positive self-talk</li> <li>• Positive attitude formation</li> <li>• Positive review &amp; reframing</li> <li>• Countering</li> <li>• Environment control</li> <li>• Social Support/Helping relationships</li> </ul>	<p>SDT</p> <p>TPB</p> <p>TPB</p> <p>TTM</p> <p>TTM</p> <p>TTM/SCT</p>	<p>GD, ID, VP</p> <p>GD, ID RP</p> <p>GD, ID, RP</p> <p>GD, ID, VP, RP.</p> <p>GD, ID</p> <p>GD, ID, RP</p>
Control	Meeting for questionnaire completion	No techniques employed for control group	Meeting with Felicity	<p>Short prompt to complete ejournal</p> <p>4 questions ejournal</p>

### Measures

Despite the paucity of measures directly applicable to use with a sedentary, mid-life cohort I used four existing measure to assess physical activity, affect, and perceived health. The Scottish Physical Activity Questionnaire (SPAQ) designed by Lowther, Mutrie, Loughlan, and McFarlane, (1999), the Positive Affect and Negative Affect Schedule (PANAS) scales developed by Watson, Clark, and Tellegen (1988), and the Short Form Health Survey (SF36) Ware and Sherbourne (1992). After extensive literature searches the SPAQ was chosen over other measures such as the IPAQ (Booth, 2000) because the SPAQ had been applied with a sedentary cohort, was specifically designed to aid 7-day recall of a variety of activities, was relatively simple to complete, and assessed stage of change. The main issue with the SPAQ was concerned problems with occupational walking and over inflation of physical activity levels when occupational activity was included (Lowther, Mutrie, Loughlan & McFarlane, 1999). Again, several measures were available or under development for the measurement of affect, however, the PANAS was the clearest, shortest, and simplest measure for busy women to complete. The SF 36 was shown to be more sensitive the Nottingham Health Scale in relation to low levels of ill-health., therefore the SF36 was considered the most appropriate measure for use with LLIU participants who may perceive they have low levels of ill-health. Using the Nottingham health scale may have produced bias towards a “good health” rating rather than low level ill-health. Another advantage of using the SF36 was its inclusion of the vitality subscale.

*The Scottish Physical Activity Questionnaire.*

With respect to the SPAQ, Lowther et al., gave permission to slightly modify the language in the questions in order to reflect Australian meanings more closely e.g., “hillwalking”, was changed to “bushwalking” (see adapted SPAQ Appendix I). The SPAQ is specifically designed to assist seven-day recall of physical activity and assess stage of exercise behaviour change. The SPAQ is well suited to self-report and group administration. The SPAQ has 4 main sections. In the first section participants informed that regular physical activity relates to exercise (e.g., weight training aerobics 2 to 3 times in a week or bushwalking at least 2 hours once a week), sport (i.e., hockey or netball 2 to 3 times per week) or general activity (i.e., walking, gardening to at least 30 minutes 4 to 5 times each week. physical activity. Following on the first question asks how regularly active participants consider themselves to be now, three months ago, and 6 months ago. In section 2 participants respond to questions about their stage of change with response options in this section ranging from “I am not physically active and do not intend to be so in the next six months”, to “I am regularly physically active and have been so for longer than six months.” In section 3 the amount and type of activity participants have undertaken for one week is reported. Participants report their activity in a number of categories including (a) walking at work, (b) walking outside work, (c) manual labour at work, (d) manual labour outside work, (e) doing active housework, (f) dancing, (g) cycling for pleasure or to work, (h) participating in sport, leisure activity or training, and (i) other physical activity. The initial Total Physical Activity Score is a simple summation of all the time reportedly spent in physical activity across one week.

Leisure related activity (totalled responses to activities, b, d, e, f, g, h, and i) and work related activity totals can also be calculated. Totals are also adjusted for typicality. In Section 4 participants respond to statements of how typical was there reported physical activity such as “is this typical of your usual physical activity level?” The SPAQ also contains some demographic questions (see Appendix B)

The psychometric properties of the SPAQ were tested by Lowther et al. (2001) and found to be strong. High retest reliability ( $r = 0.99$ ), moderate criterion validity, and strong concurrent validity have been reported for the SPAQ. The concurrent validity of the SPAQ was assessed against an objective measure of physical activity, a motion sensor (Lowther et al., 1999). Measures were obtained from 34 people who were either members of a slimming class or volunteers for a dietary analysis project. Data across 4 consecutive days were compared with self-reported SPAQ estimates of activity (for the same four days). A moderate (correlation coefficient  $r = .52$ ) concurrent validity for the SPAQ was evident.

*The Positive and Negative Affect Schedule scales.*

The Positive and Negative Affect Scales (PANAS; Watson, Clark, & Tellegen, 1988) were used in the current study to measure changes in positive and negative moods intermittently during the intervention. The PANAS (see Appendix G) contains two subscales positive affect (PA) and negative affect (NA). There is a list of 20 adjectives (10 positive and 10 negative) denoting feelings and emotions. Mood as measured by the Positive Affect and Negative Affect Scale (the PANAS) refers to self-reported levels of 10 positive and 10 negative adjectives of feelings and emotions (see appendix C). Positive adjectives were interested, excited, strong,

enthusiastic, proud, alert, inspired, determined, attentive and active. Negative adjectives were distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid. Responders rate their feelings during the past week using a Likert scale format. The psychometric properties of the PANAS were tested by Watson, Clark and Tellegen (1988) and the measure has been widely used across a variety of applications including physical activity research (Watson & Clark, 1994). The PANAS has high internal consistency ranging from Cronbach alphas ranging from .8 to .90 for positive affect activity and .84 to .87 for negative affect (Watson, Clark, & Tellegen, 1988). Test-retest reliability maintains its high standard across a range of time instructions (Watson, Clark, & Tellegen, 1988).

*The Short Form Health Survey.*

Participants' perceived vitality and mental health was measured using the Short Form Health Survey (SF36; Ware & Sherbourne, 1992). The SF36 is a well established measure of perceived health having been applied in nearly 4,000 published studies. For the current study the SF36 was considered a suitable measure of physical and mental changes relating to physical activity and health because functionality and perceived health are assessed. The SF36 would enable direct comparison of related outcomes from the current study with results from previous studies. The 36-item (see Appendix D) SF36 consists of 10 subscales: mental health, physical health, physical functioning, role limitation due to physical problems, social function, bodily pain, general mental health, role limitations due to emotional problems, vitality, and general health perceptions. Each sub-scale entails the application of either 4 questions or 5 of questions exclusively related to the construct

being measured (e.g., vitality measure comprised response scores from 4 questions, 9a, 9e, 9g, and 9i.) Vitality (a construct relating to energy level and fatigue, Ware, Kosinski & Gandek, 2003) subscale questions were “Did you feel full of life? Did you have a lot of energy? Did you feel worn out?” and “Did you feel tired?” Similarly, the mental health subscale was calculated from participant answers to questions 9b, 9c, 9d, 9f, and 9h. These were the questions “Have you been very nervous? Have you felt so down in the dumps that nothing could cheer you up? Have you felt calm and peaceful? Have you felt downhearted and depressed?” and “Have you been happy?” (Ware, Kosinsky, & Dewey, 2000). The psychometric properties of the SF36 have been established with McHorney, Ware, and Raczek (1993) finding high internal consistency. McHorney et al., found Cronbach alphas ranged from .7 to .86.

### Procedure

Following notification of ethics approval for this study from the Victoria University Human Research Ethics Committee I recruited participants. (For recruitment details see page 137). All advertisements called for expressions interest in participation and for people interested in receiving further information to contact the researcher by telephone or email for further information. Following contact from a potential participant a screening checklist (see Appendix F) was used to assess potential participants' health risks. Health risks included past or current heart conditions, diabetes, balance, and bone or joint problems. When the selection criteria were met potential participants were selected to participate. Participants were

Table 3.4

Procedure for the Adoption and Maintenance Condition Participants' Initial  
Workshop and Ejournal

Time	Procedures
0 – 30 minutes	Introduction & informed consent, introductions, hand out Live It Up Booklet (LLIU) (see Appendix, for contents)
31 - 75 minutes	Baseline questionnaire completion (SPAQ, PANAS, SF36, Demographics)
76 - 90 minutes	Video presentation
121 - 180 minutes	Refreshment break  Workshop: Working through LLIU booklet (read, discuss, formulate action plan), to set goals, identify reminders, identify positive statements, identify social support and complete the “Action Plan” in LLIU  Ejournal orientation & information re schedule for ejournals and questionnaires, future focus, questions, thank you to participants
Weeks 1 – 4	Ejournal delivered to each participant weekly
Weeks 5 – 52	Ejournal delivered to each participant monthly
Weeks 41 – 42	Ejournal (x 1) maintenance 1 wk after maintenance session

randomly assigned to the adoption (A), maintenance (M) or waiting list control (WLC) conditions. All participants were assured of the opportunity to undertake the full intervention irrespective of initially assigned conditions. Approximately one week before their first planned workshop participants (n = 38 adoption and maintenance participants) that had been assigned to the two treatment conditions were sent email confirmation of the meeting dates, times, venue details, and a location map. The first workshops took approximately half a day during which participants undertook the activities as outlined in Table 3.4. Procedures for the treatment conditions first workshop, the WLC control meeting and e-journals are provided in Table 3.4., Table 3.5, and Table 3.6 respectively.

Table 3.5

Procedure for the Waiting List Control (WLC) Condition Participants Meeting and E-journals

Time	Procedure
0 - 30 minutes	Introduction and informed consent Baseline questionnaire completion
31 - 46 minutes	Discussion of past experience with physical activity Information re schedule for e-journals and questionnaire completion and return. Thanks
Weeks 4 - 52	Ejournal delivered to each participant monthly

On arrival at their workshop the Adoption and Maintenance participants received an envelope containing the “Life: Live it up the journey begins...” (see Appendix G) booklet, a demographic survey, two sets of three quantitative measures (detailed in measures section), an addressed reply paid envelope or internal main envelope, spare consent form and spare “PLAN” sheet. They also received a postcard (see Appendix H) that could be used as a reminder or request for help from a friend.

During the workshop I encouraged treatment condition participants to use the ejournals as a tool to reflect on their experiences, and on research participation. The ejournals were sent as email attachments. The email contents that accompanied the ejournal were generic and comprised motivational quotes, exhortations to continue, and encouragement to return their ejournals. Participants in the WLC condition were sent emails where the contents were brief and used neutral language informing them that the ejournal was attached. The meeting with Waiting List control condition participants took approximately 45 minutes and delivered content as per Table 3.5. During this meeting all control participants were offered the opportunity to undertake the intervention at the close of the research.

*Procedure for the maintenance briefing meeting (MBM).* The Maintenance (M) condition participants (11) attended an MBM between six and ten months following their initial workshop session. The procedure for this session is given in Table 3.6.

Table 3.6

## Procedure for the Maintenance Briefing Meeting

Time	Procedure
0 - 45 minutes	Welcome and thanks Week 40 measures completed Reflections on the efficacy of applied fundamental techniques (goal setting, positive statements, social support, ejournals) Discussion on physical activity experiences Video re activities of daily living
46 - 60 minutes	Refreshment break
60 - 120 minutes	Further information given re positive statements, making time for activity, and change processes. Brief reminder about the one extra ejournal they would receive one week after the MBM.

## Intervention Study Quantitative Analyses.

The Scottish Physical Activity Questionnaire (SPAQ), the Medical Outcomes Study Short Form 36 (SF36), and the Positive Affect Negative Affect Schedule (PANAS) questionnaires were completed by participants in the current study on 5 occasions during the year. High attrition resulted in fewer full data sets than anticipated thus the data from the adoption and maintenance groups were collapsed to form data representing a single treatment group (N = 17). Analyses of data from

the treatment groups were conducted on change scores calculated individually by subtracting the baseline level on selected dependent variables at various measurement points. Analyses on all change scores were conducted using a series of two group (treatment versus control) Analysis of Variance (ANOVA) procedures. Effect size analyses were conducted for each outcome variable using Cohen's  $d$  ( $\Delta$ ) (Thomas & Nelson, 1996). All quantitative data were analysed using the Statistical Package for Social Sciences. First, descriptive statistics from the raw data were calculated. Then, to establish whether the intervention treatment conditions were effective, for the adoption and maintenance of physical activity, one-way analyses of variance were performed on data from the SPAQ, in relation to the adjusted total physical activity scores; the SF36 vitality and mental health scales; and the PANAS positive and negative affect subscales scores. To minimise the potential for confounding factors, an assessment of treatment and control groups' baseline physical activity levels, vitality, mental health, positive affect, and negative affect and other background characteristics were performed on pre-intervention (baseline) (baseline) data. There were no significant differences between groups on the main measures and across the conditions there was a similar spread of age, marital status, education, and employment. Individual gain scores in all dependent variables were chosen as a more suitable form of presenting these results. To use gain scores data is transformed to zero thereby standardising the scores controlling for issues arising from variable baseline scores on dependent variables. There were 17 complete data sets for the SPAQ from the treatment conditions (adoption and maintenance) and 7 complete data sets from control condition participants.

## Results

The results of the quantitative analyses of the SPAQ, the SF36 and the PANAS are presented followed by the findings of the qualitative data analysis. Measures were taken pre and post workshop (baseline and 4 weeks), pre and post maintenance meeting (40 and 44 weeks) and at the end of the intervention period (at 52 weeks). The unusual data collection time frame was selected in order to minimise any confounding effects that questionnaire completion may have had, however, on reflection quarterly measures may have been a better choice. In the final analyses the veracity of the jeopardised results were tainted by high attrition, therefore within condition narrative is presented for each of the measures. ANOVA, T-tests were run and effect sizes were calculated. It was clear, however, from a statistical perspective, that with only 5 or 6 final full data sets (out of a possible 19) available for the control condition participants and 17 to 19 data sets (out of a possible 52) for the treatment conditions participants the data were just not strong enough to yield an accurate picture of the intervention's effectiveness. Thus, in this section the reported results are not indicative of direct comparison but of trends in the data.

### Physical Activity

The actual (i.e. as opposed to gain scores) means and standard deviations of adjusted minutes of physical activity per week were analysed from five data collection times for the two treatment conditions and the control conditions. The mean gains of the treatment condition are provided in Table 3.7. With respect to the means it may be surprising to see such high means from people who are being termed sedentary. It should be noted that outlier participants were found across all

conditions and the SPAQ measures global physical activity as opposed to only leisure-time physical activity. With more completed data sets it would have been less crucial to keep outliers in the data, however, in the present study having complete data sets resulted in the inclusion of outlier data into the final statistical analysis. There are several reasons for excessive means. Some participants reported increased physical activity that was exceptional during the measurement weeks (e.g. moving house or office, or being involved in performance related activities). Regarding possible expectations that sedentary participants would be doing less than 150 minutes of leisure-time physical activity each week two issues are pertinent. First, the LLIU was an intervention for global physical activity increases and as such the measure we used needed to be able to capture the global physical activity undertaken at baseline and across the intervention year. Second, the LLIU participants were recruited because they were not active during leisure or at work, or at home. From a possible 10,080 minutes in a week, treatment group means ranged from participants in the current study means ranged between 458 minutes to 669 minutes per week. Participants were being asked to add physical activity into any area of their lives, work, home, or leisure, therefore it is reasonable that the means are higher than the Center for Disease Control (CDC) recommendations of 150 minutes of moderate intensity physical activity accumulated across a week. Participants also considered themselves sedentary in relation to their occupations or their disinclination to exercise.

As indicated earlier, direct comparisons of groups will not be made in the results section because of the disappointing level of attrition and subsequent lack of

full data sets for analysis, particularly in the control condition. As expected from such data there were no statistical differences. For physical activity ANOVA revealed no statistical significance at 4 weeks;  $F(1,22) = .12, p = .73$ , at 40 weeks;  $F(1,22) = .31, p = .58$ , at 44 weeks;  $F(1,22) = .82, p = .38$  and 52 weeks;  $F(1,22) = 1.21, p = .28$ . Cohen's  $d$  was, however, calculated as  $.72$  at 52 weeks (a large effect size) but as stated the veracity of the data is poor. The SPAQ is a measure of global physical activity (with work-based and leisure-based subscales) that is completed for 7 days. What did seem to be evident from the means, standard deviations and gain scores (Table 3.7) was the following. First at baseline global physical activity, as opposed to purely leisure-based physical activity mean for the 19 participants was 458 minutes for the week. The standard deviation was however, quite high indicating that there was considerable variability within the participants as to how much physical activity they were engaged in on a regular basis. Second, four weeks after the intervention workshop the participants mean gain was 7.58 minutes for the week. This is a small gain but when assessed in the light of the decreased standard deviation possibly other factors were operational. Third, at 40 weeks, just before participants in the maintenance condition received their extra maintenance briefing meeting physical activity means had increased to 614 minutes for the week. The treatment group mean gain score was 156.9 minutes for the week which was a substantial increase from baseline and time 1. Standard deviations rose again at this point, perhaps indicating that some participants were finding it more difficult to sustain their gains, while others may have increased their physical activity, at least strengthened their gains. Fourth, 4 weeks after the maintenance briefing meeting

treatment condition participants mean physical activity was 476.4 minutes for the week. This was a large decrease compounded again by the variability illustrated by the large standard deviation of 314.4. The mean gain score dropped back to 18.4 minutes. Sixth, the treatment group mean was 669.6, the highest. None of the gains were statistically significant.

Table 3.7

Global (Work, Leisure, & Home) Physical Activity Means, Standard Deviations and Gain Scores across 52 Weeks for Treatment Conditions (N = 24)

SPAQ	Treatment* means in minutes of physical activity per week (n = 19)	Treatment gain (relative to baseline) score means in minutes of physical activity per week
Baseline	458.05 (320.73)	0
Time 1 4 weeks	465.63 (281.05)	+ 7.58 (298.85)
Time 2 40 weeks	614.94 (416.37)	+ 156.89 (466.13)
Time 3 44 weeks	476.42 (314.38)	+18.37 (409.55)
Time 4 52 weeks	669.63 (446.87)	+ 211.58 (399.24)

Note \*Adoption and Maintenance Groups Combined

Note none of the gains shown in Table 3.7 recorded across the intervention year were statistically significant, however, there were large standard deviations occurring. The mean gain score for the treatment conditions was 211.6 with standard deviation of 399.2. These results pose several interesting issues. One issue concerns the influences of seasonal variation, another issue concerns evidence for the Transtheoretical Model's (TTM) cyclical nature of change. It is possible that the seasonal variation in recruitment affected initiation of physical activity in this sample. Although the winter climate in Melbourne is not severe, cool and cloudy conditions might have discouraged some participants from initiating physical activity. Strategies need to be used to encourage people to initiate physical activity in all seasons. In relation to the TTM it would appear from the above results that it took some time for women to build physical activity into their life contexts but some may have managed to do so quite successfully.

#### *The SF36 Vitality and Mental Health Subscales Analyses*

As indicated earlier direct comparisons of groups are not being reported in this results section because of the high attrition level and subsequent lack of data sets for analysis. The vitality and mental health subscales analysis were affected similarly to the SPAQ. Questions comprising the vitality sub-scale ranged from how full of life, energised, worn out or tired participants felt. They responded to the SF36 questions using on a Likert type scale. Data from the Vitality subscale was run through SPSS using the SF-36 protocol (Ware, Kosinski, & Gandek, 2003) as a paired samples t-test for treatment and control conditions. Gain scores were calculated for participants

in each condition who had submitted baseline and 40-week data. With the exception of time 4 statistical significance was evident with at 4 weeks  $F(1,22) = 5.98, p = .02$ . Forty weeks after baseline measures treatment condition participants still reported significant gain scores;  $F(1,22) = 11.44, p = .00$ . By week 52, however, there was only a trend towards vitality gain;  $F(1,22) = 1.71, p = .20$ . Again, however, these results cannot be relied on for statistical veracity. An examination of effect sizes was made for the intervention in terms of vitality and ranged from extremely large (1.10) at 4 weeks to 44 weeks (1.56). At 52 weeks a moderate effect size of .59 was evident. Again, though the paucity of the data set really means these results are not reliable. Therefore, only the trends in the data evident from the means, standard deviations and gain scores that are now discussed. Table 3.8 shows the means and standard deviations for the women's vitality gains for the treatment conditions at 4 weeks, 40 weeks, 44 weeks, and 52 weeks.

At baseline, treatment group means for vitality were 40.6 with standard deviations of 14.7. Despite the possible increase in vitality the treatment group means of 40.6 was somewhat low compared with American national norms of 60.6 documented for SF36 in women ages 45-54. The difference between the vitality mean for the Australian participants in the current study could perhaps reflect a generally low level of vitality experienced by mid-life or be an aberration that can be attributed to high attrition and low numbers of participants and uneven numbers of participants in the treatment and control conditions. At time 1 that is four weeks after the intervention workshop scores in the current study increased to 50.9 indicating a mean gain for the treatment group of +10.3.

At time 2 that is 40 weeks after the intervention workshop and just prior to the maintenance briefing session, mean vitality scores were 56.2 with a low standard deviation of 11.5. At time 3, vitality dropped a little to 55.0 but the standard deviation of 10.9 was also low. At time 4 that is 52 weeks after the intervention workshop, vitality had increased to 53.2 that was a gain of 12.7 from baseline vitality. From these means it appears that vitality was at its peak at 40 weeks after the intervention and was maintained during and after maintenance briefing period, but then it dropped slightly. Vitality is a difficult concept to operationalise. It is possible that vitality in this instance was related to the intervention's effectiveness in minimising guilt, thus releasing a greater sense of well-being.

It was not anticipated that the levels of physical activity that participants would undertake would have physiological effects, particularly because they were not participating in aerobic challenges. Although it is difficult to say with any certainty where increased vitality it could be speculated that in this instance increased vitality was related to participants reduced guilt and enhanced self-efficacy for physical activity. Information from ejournals may add to the evidence for this speculation.

Table 3.8

Vitality SF36 Initial Means and Gain Scores, and Standard Deviations, across 52 Weeks for all Conditions (N = 24)

SF36	Treatment* means & standard deviations in vitality scores	Treatment mean gain score (relative to baseline) & standard deviations in Vitality scores (n = 17)
0 weeks	40.59 (14.67)	0
Time 1 4 weeks	50.88 (14.06)	**+10.29 (12.68)
Time 2 40 weeks	56.18 (11.53)	*** +15.59 (11.16)
Time 3 44 weeks	55.00 (10.89)	*** +14.41 (13.21)
Time 4 52 weeks	53.23 (19.20)	+12.65 (15.52)

Note. \*Adoption and Maintenance Groups Combined, \*\* significant at .05 level  
\*\*\* significant at .01 level

*Mental Health Results.*

Participants' mental health over the year was explored applying a one-way analysis of variance (by condition) to the data. There were no statistical differences between the treatment and control conditions at 4 weeks after baseline measures  $F(1,22) = .22, p = .64$ , at 40 weeks;  $F(1,22) = 2.02, p = .17$ , at 44 weeks;  $F(1,22) = .61, p = .44$  and at 52 weeks the significance level was  $F(1,22) = .15, p = .70$ . (p. 17). However, the same data constraints apply to this data as for the previous data. Seventeen full data sets from the treatment condition participants and only 7 full data sets were available for this analysis. Unsurprisingly, analysis of the available data set indicated no statistical differences between the treatment and control conditions at any data collection point. No inferences can be drawn from the data.

*Positive Affect and Negative Affect Scales Analyses.*

The suggestion that treatment condition participants would increase their positive affect and decrease their negative affect over the year was examined using the PANAS. Again the veracity of the resulting data is questionable and with alpha set at .05, a one way ANOVA (condition) revealed no significant differences in gain scores on positive affect;  $F(1,24) = .31, p = .58$  at 4 weeks;  $F(1,24) = .00, p = .97$ , at 52 weeks. In addition, there were no significant differences in negative affect gain scores between treatment and control conditions;  $F(1,24) = .21, p = .65$ , at 4 weeks;  $F(1,24) = .40, p = .53$ , at 52 weeks. Eighteen full data sets from the treatment condition participants and 8 full data sets were available for this analysis. It appears that positive affect for both treatment conditions was largely unaffected by the intervention, however, negative affect mean gain scores indicated a possible

lowering of negative affect at 52 weeks. Examination of positive affect also revealed no statistical significance.

### Conclusions for Quantitative Analyses

Ideally I would refer back to my hypotheses at this point, however, as indicated previously I have dealt very cautiously with the results and reported my results descriptively and discussing what may be trends towards effectiveness. With respect to hypothesis one, that a multi-theory-based intervention would provide motivation to adopt and maintain physical activity assessed using the Scottish Physical Activity Questionnaire (SPAQ) was not supported. Hypothesis two, that positive mood would increase and negative mood would decrease during the period of the intervention was not fully supported but there were trends towards decreased negative affect in the treatment conditions. Hypothesis three that perceived well-being (vitality) would improve across the intervention year was supported. These results indicated that ANOVA revealed no statistically significant differences between the gains in physical activity, as measured by the SPAQ, of the treatment and control groups at any stage of the intervention. At 52 weeks after participants undertook the face to face workshop, in practical terms, women undergoing this kind of program exceed the gains of physical activity levels of those not receiving this intervention by .72 of a standard deviation. In practical terms this is a large intervention effect. These results, however, must be interpreted with caution largely because of sample issues. With respect to Vitality, measured participant's responses to the SF36 vitality subscale provide evidence that women undergoing this kind of intervention exceed the gains in vitality of those not in the intervention by .41 and .72 of a standard

deviation at 40 and 52 weeks respectively. In relation to the participants' mental health, as measured by the SF36 mental health subscale there were no significant differences in participants' perceptions about their mental health between the treatment and control conditions. Analysis of effect sizes, however, indicated a trend verging on large intervention effects of .53 at 40 weeks, that later reduced to .19 at 52 weeks. Finally, when measured using the PANAS, positive and affect showed no significant differences overall and minimal intervention effect.

### Qualitative Data Analysis for Study 1

#### Ejournal findings for study 1

There was considerable variability in the number of ejournals, and the regularity with which the women returned across the intervention year. Some women, however, did not use the ejournals at all. Although six participants returned no ejournals, insights were forthcoming from the reflections received from participants who did return ejournals.

Insights came for the questions "did participation in this research help women to change?" and "Were ejournals motivating? In this findings section I will present the women's perceptions of change and research participation that were collected using electronic journals (ejournals). Of the 71 participants (n = 46) who returned their first ejournals, 19 participants responded at three months, 16 replied at six months and 8 completed them 12 months. All participants were encouraged to use the ejournals. I had hoped they would use the ejournals as a reflection tool. Contrary to initial expectations, however, responses were often returned within minutes of being sent out with obviously minimal reflection. Women reported wanting to return

e-journals quickly so that completion would not be forgotten. Specific comments on how e-journals helped participants think about and change physical activity ranged from, the usefulness of knowing their thoughts and feelings were being monitored in the e-journals, to the e-journals being an effective way to reflect on their progress. For the majority of the women, however, the lack of time coupled with the desire to return information quickly, before it was overtaken by other demands, eroded the anticipated benefits of extended reflection and meaningful narrative engagement in the change process. Content analysis was undertaken whereby themes and sub-themes were coded using constant comparison and framework methodology (Lacey & Luff, 2001). The themes and dimensions reported in this section reflect e-journal comments of 27 participants in treatment conditions and 8 waiting list control participants. Discussion and conclusions are drawn from the data spanning first journals, month 3, month 6 and month 12. To preserve participant confidentiality pseudonyms have been used. An e-journal provides a semi-structured vehicle for participants to reflect on various aspects of experience. In this instance, the e-journal elicited information about a) e-journals' motivational effectiveness for changing physical activity levels and b) the value of various intervention features (e.g., monitoring).

Before I begin to address the findings I will make two points. First, note that although the e-journals are a direct reporting device, most of the responses lacked depth. Consequently this section represents a summary approach to the data rather than being heavily laced with deep and thoughtful quotations. The e-journals were designed to identify and explore participants' experiences in each condition. The

questions were tailored differently for treatment condition participants. For example, the control conditions participants were asked generally about their experiences and the treatment condition participants were asked to reflect on their overall experience including particular aspects of the treatment. Second, note I have used an identification system for quotes to indicate the name of the respondent, the condition assigned to the participant, and which ejournal the quotation comes from. For instance, Sarah, AM3, jd1, means that the quote was from Sarah's ejournal, that Sarah was in the adoption and maintenance condition and the quote can be found in ejournal number 1.

In this section I first address two broad dimensions (personal and program) identified in response to content analysis and then present issues I identified concerning a) the women's thoughts about physical activity, b) the women's experiences of increased physical activity c) the women's perceived impact of being more physically active and d) notes of caution about the ejournal strategy. I identified two broad dimensions through the content analysis process. The first dimension included by intervention aspects that were personally valued by participants that I have called "personal" elements. The personally valued elements of the program that were reported included the ways clarification of mental blocks came to the women during their completion of ejournals and the irregular nature of the women's thoughts about being part of an intervention. The second dimension I identified from the data was formed by intervention aspects that the women considered helpful features of the program; so I have called these "program" elements. For instance, Sarah wrote in her first ejournal response "I am finding it

easy to do. I think ‘monitoring’ helps me a lot” (Sarah, AM3, jd1). Sarah thus indicated that having someone monitor her personally helpful. Pam, however, reported receiving reminders as a helpful program element for her “Receiving the journal has been a good reminder of the program” (Pam, AM1, jd4). From the 46 participants responses to their first ejournal it was seen that other program and personal comments at this stage were about accountability and personal concerns about sustaining the ejournal task over the long-term, respectively. The women reported that ejournals were motivational and focusing (personal elements), and an aid to reflection (program element). For example

I think I might have said last time that I actually don’t think too much about being involved in anything as it is becoming just part of my normal activities. But receiving these journals makes me take the time to sit and think about things and getting back on track if I feel I’m slipping (Yvonne, AM22, jd9).

Frequent and regular ejournals were described by Anna as giving “gentle accountability” and seen as a helpful part of research participation “After the workshop, I felt as though being in a research project would make a difference in that it supplies a bit of accountability – albeit very gently” (Anna, AM18, jd1). Some participants also reported positive feelings experienced through accountability, however, Anna’s experience at this point was of uncertainty about her self-efficacy for this task. She expressed her concern in this way “I’ve never been a journal writer so I am a bit unsure about how or whether I’ll keep to it.” (Anna, AM18, jd1). It seemed that for Anna there were both program and personal facets to her experience

of intervention participation. The variability in the number of responses may reflect low self-efficacy for the program element of the ejournal.

There were difficulties associated with completing ejournals for some of the women but more often positive comments were about the way the ejournal provided a reminder to be active, or to think about doing more activity. At three and six months after workshops the program element of frequency of ejournals was raised. Julia also considered the ejournal program element provided focus for physical activity describing the relief focus on physical activity brought in this way “These emails serve as a useful aide to memoir in keeping me focused [on being more physically active] which is no small feat!” (Julia, AM10, jd9).

The second question I asked of the ejournal data concerned whether research participation had helped ejournal responders to change their attitudes to physical activity and their actual physical activity levels. In answering this question early ejournal responses indicated the development of being aware of a positive sense of self, being motivated and inspired, enjoying the support and reflection aspects of the program and changed thinking. Miranda’s following ejournal excerpt illustrated the “positive sense of self” and “focus” as a result of participation in research that was also experienced by Juliet and Sheree.

I feel a lot more positive about myself. I think actually setting myself some goals has helped considerably. I am not working myself into a knot as much but complimenting myself on the small things I do instead of worrying about the big stuff. (Miranda, A27, jd1).

Other “Helpful” themes arising at this stage were those of changed or challenged thinking, motivation, and achieving goals. Waiting list control participants also commented on feeling better, being inspired, and having more energy. For some women in the treatment conditions, however, research participation was not immediately helpful because they had not yet begun their action plan and this was a source of frustration and disappointment. Dionne, for instance, felt

Frustrated that I have not really made a start on my plan... I feel fine about participation .....but I am feeling somewhat of ‘no value’ as I’ve not really commenced my planned activities (Dionne, A11, jd1),

Feeling of no value is obviously difficult and the fact that it was linked to having a plan but not having implemented the plan may serve as a caution for future researchers with sedentary, mid-life women. Also, waiting list control participants reported being disappointed about not being in the workshop group.

At three months after the intervention begun ejournal respondents once again focused strongly on the motivational aspects of research participation, changed thinking, how participation reminded them of their goals and the benefits of physical activity. At this stage also, control participants again, rather surprisingly, commented on inspiration experienced through participation. Half way through the intervention year the women’s reports still focused largely on changed thinking about being physically active resulting from research participation. A few waiting list control participants also wrote about thinking differently, feeling positive about research participation because they had more to report, and wanting to help research.

Helpful changed thinking was expressed in terms of increased activity awareness and about “the little things”: “Perhaps a raised level of consciousness that these are little things I can change or be bothered to change” (Lily, A20, jd9). Lily changed her thinking and acted by taking her dog out twice a week for 15 minutes, as well as taking opportunities to be active such as walking up and down escalators or stairs and parking a bit further away. Recognising opportunities to be physically active and taking these opportunities as they arise was important for Lily and Emma. Emma reported

[Research participation] was beneficial in maintaining my awareness of the need for additional physical activity ....difficult but it is possible. You simply need to be open to opportunities and be prepared to make the most of opportunities when they do arise (Emma, AM28, jd9)

#### Primary Study Summary

To summarise, ejournals were offered to participants as one strategy from a suite of five (goal setting, positive statements, social support, action planning). Although all participants were encouraged to use the strategy, the number and regularity of ejournal responses was variable. Of those who responded most found ejournals helpful for self-motivation to change their thinking about activities of daily living and to increase physical activity. The women who found the ejournals strategy useful reported ejournals provided opportunities for accountability, regular reflection, re-evaluation, and focus on being more physically active. Although my quantitative data was not strong enough to say with certainty that significant change occurred, and most women’s ejournals were not detailed there were reports of

planned changes and more that had occurred in a meaningful way. The punctuation mark, provided by the ejournals, each time they were received served to build up self-motivation to be physically active more often for some. For instance, it appeared to me that as the women reflected on their progress regularly, they experienced increased awareness of the value of doing small amounts of activity regularly. The increased value placed on being opportunist about physical activity was largely identified from reflections in the ejournals. Consequently the self-motivation of the participants to make changes increased both in thinking and action. As a reflection tool ejournals provided a useful “snapshot” measure of my participants’ broader story of change. For instance, reflection led Teresa, Yvonne, Iris, and Joy, considering being more physically active and acknowledging the pressures of life present and influential in life in general, and specifically in their families, and at their workplaces.

In a similar way to the reflection element of ejournals, the re-evaluation element of ejournal completion was motivational for some (Joy, Christina, Pam, Juliet, and Sheree) in changing their thinking about activity and finding ways to engage in physical activity without having unreal expectations. Re-evaluation also motivated participants to choose realistic goals. Finally, ejournal completion reminded recipients of their goals and provided them with fresh focus points each time.

The second question I applied to the data related to whether research participation helped women to change. I found respondents, from both treatment and waiting list control conditions, who used the ejournal strategy generally perceived

participation as positive and self-motivational for attitude and activity changes. Two main areas of change reported by the women concerned the development of a positive sense of self, and changed thinking about doing activity. Most of the women appreciated having a forum that promoted different ways of thinking about physical activity, encouraged realistic expectations, and advanced achievable goals. I suggest caution is necessary when considering whether the ejournal is a suitable inclusion in a range of strategies to promote self-motivation for physical activity. Primarily caution is important because some workshop recipients had concerns about the value of the program, and experiences of personal stress attributed to life events. Some people found the time needed to complete the physical activity questionnaire was problematic and some were disappointed in their efforts because of personal obstacles (e.g., ill-health) that prevented increases in physical activity. From these cautionary findings it seemed that perhaps mid-life, sedentary women need reinforcement of the value of small amounts of activity done often, particularly when the activities relate to daily life. In addition, I found ejournal were a very useful tool for reflection and accountability that researchers, psychologists, allied health workers and clinical practitioners might consider offering their patients or clients. Some clients or patients, however, may find keeping ejournal an added and unwelcome burden. The ejournal strategy might, therefore, be offered as one of several tools of choice in building up self-motivation for physical activity. Periods spent in activities of daily living became “windows of time” in which change occurred, and women’s perceptions that new realistic goals were personally beneficial and achievable. Attempts to be more active, even just briefly on each

occasion should be positively reinforced by doctors, practitioners, friends or family. I suggest this because I found that reinforcing the value of often doing small amounts of activity can facilitate both attitudinal changes and behavioural changes.

#### Primary Study Discussion

Hypothesis one, that the multi-theory-based intervention would provide motivation to adopt and maintain physical activity was not supported. Hypothesis two, that positive mood would increase and negative mood would decrease during the period of the intervention was partially supported with trends towards decreased negative affect in the treatment conditions. Hypothesis three that perceived well-being would improve across the intervention year was supported in terms of vitality that improved after the initial workshops and was maintained across the intervention year. These findings were tainted, however, by the effects of high attrition and are only indicative of possible trends in the data. In the LLIU study I also explored the participants' experiences of trying to change their physical activity levels in mid-life from ejournal data. Because the ejournals were just one of five possible strategies and because there was considerable variability in the number of women who used the ejournals the data lacked generalisability. There were, however, some insights worth noting from the data. In particular women commented on the reflective role and accountability support they attributed to their completion of ejournals. Reflection is a strategy considered important in both the TPB (self-re-evaluation) and the TTM (consciousness raising). As such, reflection could provide another form of support and become an important additional strategy for patients or clients who lack social support. Social support has been shown to be successful in enhancing

self-motivation for physical activity in SET-based physical activity interventions. For instance, Litt, Kleppinger and Judge (2002) carried out a study based on social learning theory. This study, with older women (59-78 years) was aimed at determining how modifiable social learning constructs predicted adherence to an exercise program. The study is a little removed from the minimal contact, psychological intervention received by participants, and as such the results cannot necessarily be generalised to a younger cohort such as my cohort. Unlike Litt et al., who identified social support as useful in the prediction of long term maintenance of exercise, I found social support was more likely to have a negative effect on my participants sustaining physical activity.

The current findings lend support to the positive role that reflection has in changing attitudes and activity. The second insight related to the accountability the women perceived as e-journals providing. In terms of theoretical foundations for the strength of the women's perceptions about accountability I suspect, although it is not at all clear, that accountability is linked with the strategy (TTM and TPB) of social support.

As a strategy, e-journaling was not chosen on a regular basis by many participants. Several strategies for future interventions to encourage e-journaling have been identified including: a) provide email or verbal (by phone) reinforcement of e-journaling on a variable schedule and or b) rewards be provided after the receipt of a specific number of e-journals and or c) spot prizes for the a priori e-journals received.

Limitations of the present study included difficulties in recruitment and larger attrition than planned. Such limitations resulted in a lack of statistical power and inadequate data from which to draw conclusions. As a result of the limited quantitative data the necessity and value of conducting follow-up additional qualitative research in the form of in-depth interviews became evident (see Chapters 4 & 5).

CHAPTER 4: PERCEPTIONS OF CHANGE IN MID-LIFE,  
SEDENTARY WOMEN FOLLOWING A PHYSICAL ACTIVITY INTERVENTION

Introduction

The exploration of women's motivations and experiences from the initial study, presented in the previous chapter, facilitated some understanding of how mid-life women can begin to incorporate physical activity into their daily lives. The variability of ejournal responses and inconclusive results from the first study raised my interest in conducting a follow-up interview study. Essentially the rationale for this study evolved from the increased awareness that greater depth of information and insights were needed regarding what it was like for sedentary women to make and maintain physical activity changes. Researchers in the physical activity domain have not capitalised on the potential of collecting subjective accounts of long-term changes of physical activity. The high attrition rate of participants from the previous study was a key factor in deciding to collect in-depth information. By the final months of the initial study, it became apparent that the quantitative measures would at best only indicate tentative trends in the women's physical activity changes. Because there has been little psychological exploration into physical activity interventions with older adults (Crone, 2002), this in-depth interview study could provide useful further understanding of the effectiveness of a multi-theory-based intervention for mid-life sedentary women.

The interview study was designed to elicit additional contextual, motivational, and emotional aspects of the women's experiences. This subjective information about women's physical activity change experience is derived from 11 of the women, who were involved in the intervention study and represents a different research lens. The focus on the women's

cognitive and physical activity change experiences places this exploration in the epistemological field of constructionism that assumes variation of individual experience (Crotty, 1998). Because interpretism is the theoretical perspective underpinning this investigation (Charmaz, 1995), content and framework analysis were used to scrutinise the interview data. Essentially, subjective understanding of intervention participation is lacking. In their review of physical activity interventions King Rejeski and Buchner (1998) demonstrated the trend towards a positivist emphasis in the study of physical activity. King et al. asserted the positivist approach disregards mental health benefits apart from those that accompany physical health improvements. In order to explore subjective mental health benefits of physical activity in the present study I, therefore, examined mental health issues such as stress, guilt, depression, and attitudes to physical activity.

The strength of in-depth semi-structured interviews is the opportunity to explore in depth the women's current attitudes towards physical activity, and provide the opportunity for evoking insights into the contexts of change experiences across the year while gathering perspectives into the extent of their change experiences over an extended period. The benefits of in depth interviews are fourfold. First, semi-structured interviews use of participants' time effectively by referring directly to their physical activity experiences from the start of the interview and address the use of theory-based strategies including re-evaluation and reflection. Second, interviews facilitate specific and pre-defined focus in interviews (e.g., with probes into such areas as cognitive and physical activity experiences). Third, is enablement of using a wide research lens with participants being able to articulate unique aspects of the physical activity experiences without the imposition of artificial

boundaries. Fourth, interviews can be closely aligned with the structured intervention study and the focus on motivation for physical activity.

Using the interpretivist approach as my foundation for the interview study I sought to explore the factors that contextualised women's physical activity change, to investigate how the women experienced intervention participation as a whole, and examine the dominant physical activity change experiences of women from adoption, maintenance, and control conditions. This chapter's format reflects the first two of these areas beginning with my interpretation of women's change contexts, followed by a framework analysis of the women's experiences of aspects of the intervention as a whole. Chapter five addresses the dominant physical activity change experiences across the adoption, maintenance and waiting list control perspectives using a case study approach.

#### Method

##### *Interviewees*

A convenience sample (Denzin & Lincoln, 1998) was sought by invitation sent to all initial study participants. Four women from the maintenance condition, five from the adoption condition, and two from the waiting list control condition, agreed to participate. All of the women were aged between 45 and 55. Most of the interviewees were married, and most were engaged in paid employment (Table 4.1)

##### *Information Gathering*

Information for qualitative analysis was obtained using an in-depth, semi-structured interview that typically lasted an hour. The focus was on the women's experiences of the 12 month intervention. The semi-structured interview (see Appendix J for interview guide for treatment condition participants) elicited information about the women's workshop

experiences, their change experiences, and their hopes for the future. Discussions concerning the use of the same questions for each participant have arisen in the sport and exercise psychology area (Biddle, Markland, Gilbourne, Chatzisarantis, & Sparkes, 2001). Biddle et al. concluded in their discussion of the value of several different interview protocols that within sport and exercise psychology the use of confirmation questions and elaboration probes was sufficient to ensure trustworthiness of interview data collected using the semi-structured approach. Detailed information concerning the basis of question design for the interview guide is given in the information gathering section of this chapter. Questions for the semi-structured structured interview fitted several of Patton's (1980) six question categories, of experience/behaviour, opinion/values, feelings, knowledge, sensory, and background/demographic questions.

The interview questions for the treatment condition interviewees differed somewhat from those for the control condition because the waiting list control participants had not received either treatment (Appendix K). Each interview began with a general introductory question about their thoughts about physical activity across the year. The second introductory question was used to seek background information concerning their physical activity levels before they joined the intervention. Subsequent questions focussed on what the women currently felt and thought about activity.

Table 4.1  
Demographic Details of Follow-up Study Participants

Alias	Age Range	Education Level	Status	Occupation	Physical Activity
Sue	45 to 50	Higher Education	Married	Office Administrator	Increased 420 mins
Sally	45 to 50	Tertiary	Single	Administrative Officer	Increased 75 mins
Penny	50 to 55	High School Cert.	Married	Administration Coordinator	Increased 285 mins
Evelyn	50 to 55	Higher Education	Married	Social Worker	Increased 65 mins
Julia	45 to 50	Higher Education	Married	University Administrator	Increased 418 mins
Rebecca	50 to 55	Higher Education	Married	Social Worker	Decreased 40 mins
Yvonne	50 to 55	Higher Education	Married	Research Assistant	Decreased 140 mins
Helen	50 to 55	Higher Education	Single	Lecturer	Decreased 55 mins
Lily	50 to 55	Higher Education	Married	Unemployed	Decreased 365 mins
Victoria	45 to 50	Higher Education	Single	Librarian	Decreased 175 mins
Mary	50 to 55	Tertiary	Married	Administrator	Decreased 135 mins

Core questions were used to explore their specific intervention experiences with the workshop(s) strategies of goal setting, reminders, positive statements, and social support, using the e-journals, and completing the questionnaires. Because the control condition interviewees had not received the full intervention they were not asked questions about the workshop strategies in their interview. The concluding questions were used to ask women to raise, or add, any additional information they believed to be pertinent to what had already been said.

Control condition interviewees were asked to describe their physical activity experiences and feelings across the year, as well as e-journal completion. They were also asked about their physical activity background experiences before joining the research program, their current and future feelings about physical activity, and their thoughts about completing the questionnaires. The interview data provided the basis for deconstructing the subjective experiences of participation in each intervention condition and a basis for discussion of experiences relating to the specific theory-based strategies and also research participation generally. My conclusions regarding the effectiveness of strategies are necessarily limited but helpful in better understanding the lived experiences of these women.

Maximising the trustworthiness of qualitative data is most important, both from the participant and researcher's perspectives (Reissman, 2008) therefore, in addition to using questions to understand my interviewees perspectives on physical activity, it was considered important to verify my understanding of participant's perspectives on their intervention experiences by summarising any available e-journal data from the LIFE: Live it Up (LLIU) study. I compiled these summaries with special attention to participant's

narratives and metaphors in order to, therefore, maximise my understanding of interviewees experiences. Summaries were to be presented as perspectives that only they could validate, amend or discard.

### *Procedure*

Each interviewee gave permission for the interviews to be audio-taped then transcribed and regular informed consent procedures were followed. The interview then proceeded according to planned interview guides. During the interview participant received one-page ejournal summaries I had compiled in order to clarify the depth of my understanding of their intervention experiences (see Appendix K). Participants were asked to read the summaries and whether they accurately represented their intervention experiences. They were also asked if they would like to amend, add to, or discard the summary. Verbal probes elicited additional detail and explanations for responses. A validity check was made following interview completion whereby audio-tapes were transcribed verbatim and returned checked to participants for member checking purposes and any alterations requested were made.

### *Data Analyses*

The inductive content analysis (Denzin & Lincoln, 1998) technique was used with attention to five fundamental steps. First step was to identify and locate sentences or statements directly speaking to the pre-identified phenomena. Second, I assigned meaning to the identified statements. Third, I focussed on establishing a good fit between the assigned meanings and participants' meanings. Fourth, I attempted to examine and draw links between meanings to improve understanding about trigger points of motivation for physical activity. Fifth, I found a number of factors regarding sedentary mid-life women's

self-motivation for physical activity. This stepped approach to the analyses added a deeper understanding to the influence of the women's contexts for change, their cognitive change processes, and their practical intervention experiences.

The stepped approach was implemented in two ways. First, content, and framework analyses were carried out on all the women's transcript data. From this content analysis emerged a dichotomy of women's responses associated with experience of changing activity in their daily life context, and their experiences of being a research participant for the duration of the intervention. Framework analysis using apriori themes and subsequent sub themes enhanced the extraction of rich nomothetic data, relating to the women's motivation for physical activity. Presenting the themes and sub themes that emerged clarified important issues to mid-life women in their quest to be more physically active. Content and framework analysis began after transcription, as the questions and responses were read and re-read. Open and axial coding were then applied to the data (Strauss & Corbin, 1990). In this instance, careful initial open coding aided the identification of all possible patterns and themes. Careful initial open coding and subsequent axial coding, facilitated data reduction, and my interpretation of the data. In addition, to my analyses, my supervisor undertook an extensive category audit to minimise the risk of biases unduly influencing interpretations and links.

### *Reflexivity*

My background and views on physical activity are very similar to many of the women, perhaps most pertinent to aspects of the current study is that I believe that women who feel guilty about their physical activity levels are at risk of remaining inactive. In addition, I hope that, for those working with sedentary women this thesis will add new

meaning to the term “sedentary”. Also, others’ interpretation of this data might emphasise different aspects of the interviewees’ experiences. My interpretation of the women’s experiences is informed by my own and relevant experiences in counselling people for change and my analyses of the data that was verified by my supervisor. The remainder of this chapter presents my findings in relation to the women’s lived experiences of thinking about and doing more physical activity, followed by the findings from their intervention experiences as a whole. Although several women in the control condition reported increasing physical activity I have not discussed the experiences of the control condition participants in detail. The analysis of control condition participants experiences warrant separate consideration and analysis. This research focus is on the effectiveness of the intervention and treatment condition participants’ experiences.

I have used an identification system to indicate the interviewee and the source of quotations (e.g., Sue, L.330 indicates the participant was Sue and the quotation begins at line 330 of the member checked transcript).

## Findings

### Thinking and Doing Physical Activity

Analyses of the women’s responses led to identification of several themes (Table 4.2) and sub themes associated with the intervention treatment. The dominant themes were commitment, change driving forces, positivity, licence to change, and guilt reduction, elements of choice, control and capacity to follow through, self-efficacy expectations, and for mid-life women social support is not necessarily useful. In the following findings I report on the three dominant themes of commitment, change driving forces, positivity,

licence to change and guilt reduction, and elements of choice, control and capacity to follow through.

### *Commitment*

Commitment is a cognitive process where ambivalent thinking about an issue (what, how, why, where, when, who) becomes a firm intention to a positive state of thought about an issue that can then lead to following through on that intention into action. For the women interviewed changing physical activity usually meant that procrastination ended and a period of self-focus and self-initiative began. Procrastination is a dominant enemy of change. For some of the women I interviewed procrastination involved putting issues “on the back burner” (Sue, L.330) until time became available to attend to them. Also, among the women I interviewed all thought physical activity was necessary, however, in the contexts of their lives physical activity was frequently overtaken by work and family commitments.

Table 4.2

Main themes and dimensions drawn from Framework Analysis

Themes	Theme Description	Sub themes	Intervention Condition
<b><i>Commitment</i></b>	Specific steps taken towards action	☛ Freedom from procrastination	Adoption
<b><i>Change driving forces</i></b>	Change driving forces may come from within or without. They encompass feelings of enjoyment, achievement, as well as reward or encouragement from significant others	☛ Enjoyment being physically active ☛ Motivation to be active from self and others	Adoption Maintenance
<b><i>Positivity Through Licence to Change and Guilt Reduction</i></b>	Positivity is a feeling that all is well – A feeling of being released into an earnest expectation (hope) or achievable long-term change. Guilt reduction was no longer feeling guilty about low physical activity level but good about self and efforts to change	☛ Positive participation experience ☛ Hope instilled for increase and maintenance with enjoyment ☛ Punishing attitude about physical activity reduced ☛ All consuming work/activity mitigates against Licence to change ☛ Stop start change ☛ Changing attitudes ☛ Awakening to exercise ☛ Change physical activity led to getting out of a rut and overflow/possibility thinking	Adoption       Maintenance
<b><i>Elements of choice, control and capacity to follow through</i></b>	Choice with respect to type and setting of activity, and time to exercise their choice as well as Freedom is the availability from competing demands at the same time as feeling motivated to act Control in terms of how free women feel to change	☛ Restricted Choices ☛ Common restraints ☛ Patterned thinking	Adoption Maintenance

Table: 5.2  
cont.

<b><i>Elements of choice, control and capacity to follow through</i></b>	Follow through is the ability to not only form an activity intention by a change of attitude but also to perform that activity as intended	<ul style="list-style-type: none"> <li>☛ Boxed vs. broad thinking</li> <li>☛ Metaphors of thinking –Stuck on life’s merry go round</li> <li>☛ Life as an octopus (big core priority and lots of legs)</li> <li>☛ Thinking space – turn off, slow down, zone out</li> <li>☛ The activity health cycle &amp; personal health</li> </ul>	Adoption  Maintenance
<b><i>Self-Efficacy Expectations</i></b>	Self-efficacy is the belief that one is able to perform a particular task or goal	<ul style="list-style-type: none"> <li>☛ Reality/fantasy tension</li> <li>☛ PA self-efficacy determined future focus</li> <li>☛ Using equivalents</li> </ul>	Adoption  Maintenance
<b><i>Two people not necessarily better than one</i></b>	Support to talk about or actually to be physically active with another person	<ul style="list-style-type: none"> <li>☛ Infrequent windows of opportunity</li> <li>☛ Reasonable doubt about efficacy of this strategy</li> </ul>	Adoption Maintenance

The findings from the interview study were clear that even after a cognitive shift away from procrastination, without permitting themselves self-focus time, it is unlikely that the status quo of mid-life women would receive sufficient attention for sustained change to occur. Sue illustrated this when she described how often her commitment to change had been delayed prior to the study. Since the intervention, however, Sue thought more regularly about her well-being. Sue said she was “Looking at myself, my well-being more...rather than putting it [physical activity] back all the time” (Sue, L 525).

Procrastination was a long-term problem that the LLIU workshop helped women overcome long enough to begin making their changes. Having begun to incorporate more positive thought toward physical activity and making some physical activity changes, women were more committed to maintaining their chosen change.

#### *Change Driving Forces*

The change driving forces theme emerged most strongly from the women’s reflections. These forces were experienced in several ways, following the intervention workshop. In particular, the women spoke of the enjoyment they experienced while being physically active and enjoyment derived from others who were important to them. Change driving forces were unlikely to be drawn from enjoyment of physical activity rather motivation came from others or, less often, from within themselves.

*The enjoyment of being physically active.* Having overcome procrastination, and deciding to implement behavioural change, women became motivated by a broad range of change driving forces. Sedentary women moving towards being more physically active need to develop and find both external and internal triggers for

physical activity. My findings echo those of Dacey, Baltzell, and Zaichkowsky (2008) who found enjoyment a strong factor in physical activity for older adults. Dacey et al. reported that both intrinsic motivation and self-determined extrinsic motivation are both especially pertinent with respect to physical activity levels of older adults.

Both sources of triggers for physical activity are important to establishing self-motivation for physical activity and sustaining increased physical activity. Sedentary women, however, found external change driving forces, like enjoyment stemming from the activity itself and the influence of other people more accessible than internal factors.

External triggers for physical activity that the women found increased their self-motivation to be active included having pleasant surroundings and varying the chosen walking route. Walking in pleasant surroundings and varying their route, provided sensory pleasure that stimulated change. Perhaps change was stimulated in part by the heightened senses and emotions elicited by rhythm response, cultural impact and associations as investigated by Karageorghis and Terry (1997). With respect to motivation for physical activity some participants may be particularly tuned into rhythm. Perhaps the rhythmic effects of walking induce similar pleasurable effects. Possibly some sedentary women are pre-disposed to positive emotions elicited by the pervasive sensory impact of their surroundings. The danger is that if negative emotions are triggered then the result could be amotivation or demotivation to those who are particularly sensitive to and aversive to high sensory stimulation. Walking in isolation provided some of the women with thinking time, and reflection space that

reenergised and revitalised the women's senses. Walking with another person mostly provided stress free social time, however sometimes partners, particularly husbands were unhelpful when they walked. Walking with friends outside their homes overcame obstacles to having visitors such as having to clean up before someone visits or cooking for guests.

One analogy of mid-life woman's life that several of the women identified with was of having multiple pots boiling on a hob. They reported that so much of the oppression women experience stems from a sense of being unable to leave the pots for fear of their boiling over and needing attention. It was clear that having experienced many years of being stretched to capacity and developing ingrained cognitive processes, negatively affected their psychological well-being. The women I interviewed, who had changed their thoughts about walking at their workplace as part of their work, or during times of active daily living, were positively affected by the intervention. In particular they experienced renewed well-being and vitality.

Once the opportunities for walking linked with work or active living were identified, walking also provided mid-life women with opportunities for more physical activity. The women reported the intervention workshop helped them become more aware of looking for active living opportunities where they could add in extra walking. They became skilled at task adaptation (TA) either in daily home, at work, or during shopping routines.

Task adaptation (TA), that is, simultaneously performing one task whilst fulfilling another, occurred for many of these women when they restructured their shopping habits to facilitate more walking, or used bathroom facilities furthest away,

or used a manual mower rather than a ride on type, or parking further away and walking. One example of established TA was found in Evelyn's experience. Evelyn found TA became ingrained and flowed over into rehabilitation needs following major surgery. This was particularly because of the incremental or stepped nature of the intervention and the intervention approach to physical activity. Evelyn said she "...started with sort of, down to the corner and back, and then I knew I was just going further, and further, so that worked well." (Evelyn, L. 710). It was the triple emphases of the intervention on every little bit of activity counting, seeing the big picture, and realistic planning, that were instrumental in the women's successful outcomes of increased physical activity.

Another two environmental components of the women's motivation for physical activity were the weather and available daylight. These components were identified as contributors to their enjoyment of physical activity. Longer daylight hours facilitated outside activity, and less likelihood of women feeling "seasonally low" like Sally. In particular, daylight enhanced positive cognitions resulting in higher physical activity levels. The women told me they were more inclined to meet with friends and family during fine weather and extended daylight days. These factors provided the motivation to them to socialise while being physically active.

*Motivation to be active from self and others.* Although the intervention involved minimal contact, the social approach was welcome. It was clear from the women's reports that gathering women together in small groups, for a half day session resulted in enthusiasm, motivation, information, and support for physical activity change. Similarly, regular eJournals provided another dimension to the change experience

with additional text messages strengthening the women's resolve, enthusiasm, and motivation. Most of the women were strongly family oriented and this perspective lead to the family being influential in whether the women engaged in physical activity. Family values and family duties were prominent and effective motivators to be more physically active. If becoming active exclusively for oneself was not an option, identifying physical activity with another purpose was helpful for beginning and maintaining physical activity. For instance, as Sue demonstrated making sure that children have opportunities to develop their active interests involved, particularly in a rural area, identifying, locating, or even creating an activity program of the children's choosing.

Two further motivational factors were family traumas of early death of a significant other and pets also provided motivation. Penny's father's death, aged 66, prompted thoughts of her own mortality and influenced her to join the research program because she "had so much more I want to do" and she wanted to be alive to do it. (Penny, L. 754). With respect to pets for instance Julia reported

They [dogs] get really hyper if, if for some reason I get up and I don't have time to take them for a walk, not that that happens very often now ...they need to walk as much as I do, so that's another reinforcement for me; how much they enjoy it and need it (Julia, L. 192)

Dogs' obvious enjoyment when being walked reminded women of the freedom possible with being active and this added to their enjoyment of physical activity.

The use of feedback technology, specifically readings from a pedometer, was another kind of external motivation useful to the women. Some women found the

pedometer a tangible and convincing motivator that engendered increased awareness of how a few steps here and there make up the “big picture” and provide a visible “balance of averages” (Evelyn, L. 286). For those who enjoy immediate feedback about their physical activity level from step counts, the pedometer was useful, and added to feelings of satisfaction with progress. Evelyn bought a pedometer because a colleague had bought one and

...that was fun, so I could really see a difference in that as well... It [the pedometer] confirms what you’ve done and you, you’re pleased with your achievement.... So I started putting it [number of steps done] in my diary. So I could see that some days I’d do lots, and other days, say when I work longer, that I do less. I can see that over a week on the days I was working less, and I might be at home more, that I might actually do more ...So that was good. I was really I’m pleased that I did that because it gave me more motivation than I expected. (Evelyn, L. 286).

Pedometers spurred two of the women I interviewed to walk more steps to meet specific targets. They found pedometers fun to use when the feedback was positive as even a short walk increased the step count total adding to the pleasure of achievement. Also, generally step counts appealed to those women who enjoy the visible and tangible reward of recording and reviewing their results on paper. These findings are in line with those of Wilde, Sidman & Corbin (2001) who reported having specific targets helpful for physical activity motivation.

Although intrinsic motivation was not readily evident from women’s initial experiences as they began to make physical activity changes, some internal sources of

motivation emerged. I identified three types of internally reinforced motivation in operation for Julia, Sue, and Evelyn; energy and self-efficacy from goal achievement; thinking differently about physical activity, and from actually doing the chosen activity. For instance, Evelyn felt she was getting older and unable to be more active. Having made the decision, however, to commit to change, she identified where she could build in more physical activity, and then began. After a short while doing her new physical activity program, she felt refocused and reenergised. Committing to change, identifying opportunities for physical activity and beginning to do physical activity were instrumental in Evelyn's ability to keep up her increased physical activity level. Her feelings of energy and well-being, derived from increased self-efficacy for physical activity, motivated her towards physical activity and to remain more physically active. Evelyn reported feeling younger, and more capable. For example Evelyn said

...once I started doing more I actually did start to feel how I felt maybe a few years ago, before my parents got quite frail, and I had, I fit in a lot more in the day, and I felt better (Evelyn, L. 104)

#### *Positivity Through Licence to Change and Guilt Reduction*

The second theme emerging from interview data related to aspects of positivity. These findings echo the results of Jette, Rooks, Lachman, Lin, Levenson, Heislen et al, 1998. Jette et al. studied the exercise participation of 102 sedentary and functionally limited adults aged 60 to 94 years as they undertook home-based resistance training. Jette et al found positive attitudes and sense of control influential for sustaining physical activity, albeit in an older cohort.

*Positive Participation Experience.* In this study positivity in relation to the experience of being physically active encompassed a sense of well-being, and earnest expectation (akin to hopefulness) of achievable long-term change. This hopefulness translated into a continued quest for change. The women's hopefulness related to enjoying the activity and recognising that increased physical activity was achievable. Also having a relaxed sense of enjoyment for physical activity and a more determined attitude towards physical activity was manifested in hopefulness. The positive participation experience that resulted in positivity for physical activity was illustrated by Rebecca's new attitude towards physical activity following the intervention. Her attitude was

I'm enjoying the activity that I'm doing and I look forward, I actually look forward to getting up in the mornings and going for that walk, and I've been really enjoying the garden, since all that work, and that's a lot better than it was. (Rebecca, L. 699)

For some of the interviewees, they began the intervention feeling inhibited or negative or awkward about participating in physical activity. Across the intervention reports were of attitude change. Movement from feeling guilty about their lack of activity to owning a "licence" to change, to feeling good about the physical activity level they achieved was documented. Licence to change can be explained as referring to feelings of being released or liberated into an earnest expectation (hopefulness) of achievable long-term change. Guilt from overwhelming work, family, or social commitments, however, worked against licence to change. Thus, decreasing guilt and establishing instead a positive attitude was liberating leading to acceptance and the

ability to make choices that were important for successful change. An example was Penny's liberation to spending time doing things to benefit herself rather than others.

It's [the intervention] been a help to me. And I can see myself continuing and ... talking to myself to improve more. I've always tried to do things for myself and give myself time, but that's quite difficult... but it's [the intervention] given me licence I suppose to perhaps do that a bit more. (Penny, L. 1034)

After the intervention Penny had a completely different attitude towards doing necessary physical activity, including mowing over eight acres of land. She said "I use the push on mower more because that's better for me exercise wise" (Penny, L. 115), whereas before the intervention she said she "tended to just get on the ride on mower" (Penny, L. 122). Now she felt it was

Easy to get the little mower and wander up and down for a few hours each day, so that's enough [Question: so that's definitely a different attitude towards activity to last year?] Oh yes...I've got a completely different attitude...I feel better about it. (Penny, L. 135).

#### *Guilt Reduction.*

Liberation from guilt was another component that led to more relaxed attitudes towards physical activity. Liberation from guilt also led to women accomplishing and sustaining small, yet important, behavioural changes. All the women talked about juggling time and responsibilities, and their resultant guilt. The women reported experiencing feeling out of control that stemmed from multiple role mayhem. Across many aspects of their life, the interviewees' attention to multiple roles, and frequent focus on others rather than themselves dominated their thoughts. The effect of

redirected attention was that their capacity to act autonomously diminished thus increasing their guilt. They experienced guilt from being physically inactive and about taking the time to be physically active. Some women expressed feeling that others control their lives, consequently they devoted valuable emotional energy to self-criticism over their negativity towards physical activity and life. Dividing their own and others time and responsibilities influenced physical activity levels. Some interviewees felt they had no opportunity to control their time and activities because family demands controlled them. For example Sue said “You just don’t have control over things because everybody has an impact on you ...you have to just try to live with them, or ...deal with them somehow, that’s life I guess” (L. 851). Conversely the women’s family commitments and hobbies were high priorities within their time management. Personal choice in the execution of multiple roles affected time management during the year and personal choice was a considerable structural constraint away from physical activity for a large proportion of their time. Multiple roles affected physical activity levels positively and negatively. Roles that positively helped increase physical activity involved grand parenting activities, gardening, and being a “helpful” mother-in-law. For example Penny said

Apart from working full time, renovating the house, making time to go down, and do the grandma thing... I’d like to spend more time with the grand children. She’s [the daughter and grandchildren] two hours away in Melbourne, but I’m sort of a bit torn between getting things done around the house, and then getting down there to spend time with her.... When I go... I’m helping with something, with the garden and giving them advice on the garden. (Penny, L. 791)

Each of Penny's roles increased her physical activity, however, finding time to perform them was difficult because although some roles were positive for physical activity, the women's choices of and interest in sedentary work or sedentary leisure activities were negative for physical activity. Penny's following statement illustrated the diverse sedentary leisure roles she enjoyed.

I've got lots of interests, you know, but I would like to do more. I enjoy gardening, and I enjoy reading I'm, I'm a bobbin lace maker. I teach bobbin lace... I have two ladies come up once a month for the day for, for lessons and apart from working full time renovating the house (Penny, L. 791)

It was clear from most of the women's comments about choosing to be involved with creative hobbies, such as sewing, lace making, reading novels, playing a musical instrument, or singing, impinged on the amount of time available for physical activity. I believe their involvement in these largely sedentary activities met strong desires to engage creatively with life. The women's creative preferences were problematic for the development of positive attitudes toward physical activity. Their strong preferences for sedentary hobbies and being engaged in working many hours at sedentary jobs served to sustain sedentariness. Sedentariness often meant a strong focus was required for instance, when women were intensively engaged at keyboards (musical or computers) for extended periods of time. It was patently clear that all-consuming work responsibilities and preferences for sedentary hobbies particularly worked against developing "licence" to change. The women found sedentary work and sedentary hobbies limited their self control of opportunities for extra physical activity. Paradoxically though, as well as women's high value put on relationships

frequently interrupting their efforts to increase their physical activity levels, they also provided “open windows” of time for the opportunity to be more physically active where time permitted. In addition to little or no sense of self-control over their time, priorities, and schedules, one perception of their general level of control was that participants were influenced by people’s expectations of them as machine-like. As Sue said

You see the thing is, these days for some reason people, I don’t know whether it’s this generation, or it’s just the twentieth age, or what it is. I think society in general expect that people can be like a bit machine to like really...part of it is that we, we stretch ourselves to the limits (beyond them sometimes) and in the end they are asking for trouble (Sue, L. 379).

Sue also wanted to take time to “smell the roses” (Sue, L. 379) to slow down, and to be more spiritual and less materialistic. Like Penny, however, Sue felt today’s society did not encourage women to slow down or reject consumerism.

Responsibility for change was accepted and developed following the workshop by the women I interviewed. Acceptance of responsibility for change was manifested in the finding that the choice to change could only be made personally. Assuming personal responsibility for increased physical activity led to firm resolutions to be physically active. Importantly, personal responsibility also increased the women’s ownership of their capacity and will to change. Realisation of the importance of taking personal responsibility for change was powerful, especially for Julia. Although she was extremely busy and committed to her work, by the end of the intervention, Julia

found physical activity “easier to fit ...in” (Julia, L. 619). Julia successfully made choices to be active because she made it her responsibility to be active.

*Stop start change.* None of the women’s reported changes were linear, they all experienced physical activity level fluctuations. The kind of factors affecting physical activity that punctuated the year included, the positive effects of summer sun (Sally); for having major surgery midway through the intervention year was negative (Evelyn) for times of creative activity playing for musical productions (Rebecca). Other factors influential for physical activity levels included having holidays, physical health issues, and changed study demands.

*Changing attitudes.* The intervention was motivational for increasing physical activity, with improved self-efficacy for beginning and sustaining physical activity. For some, attitudes changed positively by accepting the belief that being less active one day was not an end of change, but were part of the change process. New beliefs that led to increased hopeful feelings were that physical activity opportunities could be chosen at any time, and could be carried out in a number of ways. Physical activity also increased particularly because of the positive thought that they “did not have to give up” (Yvonne, L. 839) because of occasional lapses. The women could pick up where they left off, like Evelyn who found “it didn’t take as long to get going... I could actually do things [PA] during the week and I was moving around more.” (Evelyn, L. 839).

*Awakening to exercise.* One particular form of changed attitude was the awakening to exercise. It was clear that an “exercise awakening” as a result of the intervention was part of a successful transition from being sedentary to

being more physically active. Awakening to exercise entailed the recognition of a desire to build in physical activity in daily life, committing to change oneself, pursuing an achievable goal, finding enjoyment in the activity, seeking places to exercise, supervised gym access, and taking part in short-term exercise programs. Julia's context for awakening to exercise (Figure 5.1) was a substantial change in thinking that led to actively engaging in supervised physical activity. The steps illustrated in Figure 4.1 were evident in, and integral to, Julia's change experience and resulted in the enhancement of self-efficacy for physical activity change and self-efficacy for change in her work place (i.e., "overflow thinking"). Having taken the first three steps on the change ladder, Julia stated "It is actually possible... for me to, change, and I can do these things ...I do feel better and other things are, are not as stressful as they were maybe...." (Julia, L. 580). Without the advent of possibility thinking, none of the other steps can occur.

For some of the women the intervention experience apart from possibility thinking talked about "overflow thinking". I define overflow thinking as thinking that emerges from one type of cognition overflows into other distinct areas of thought.

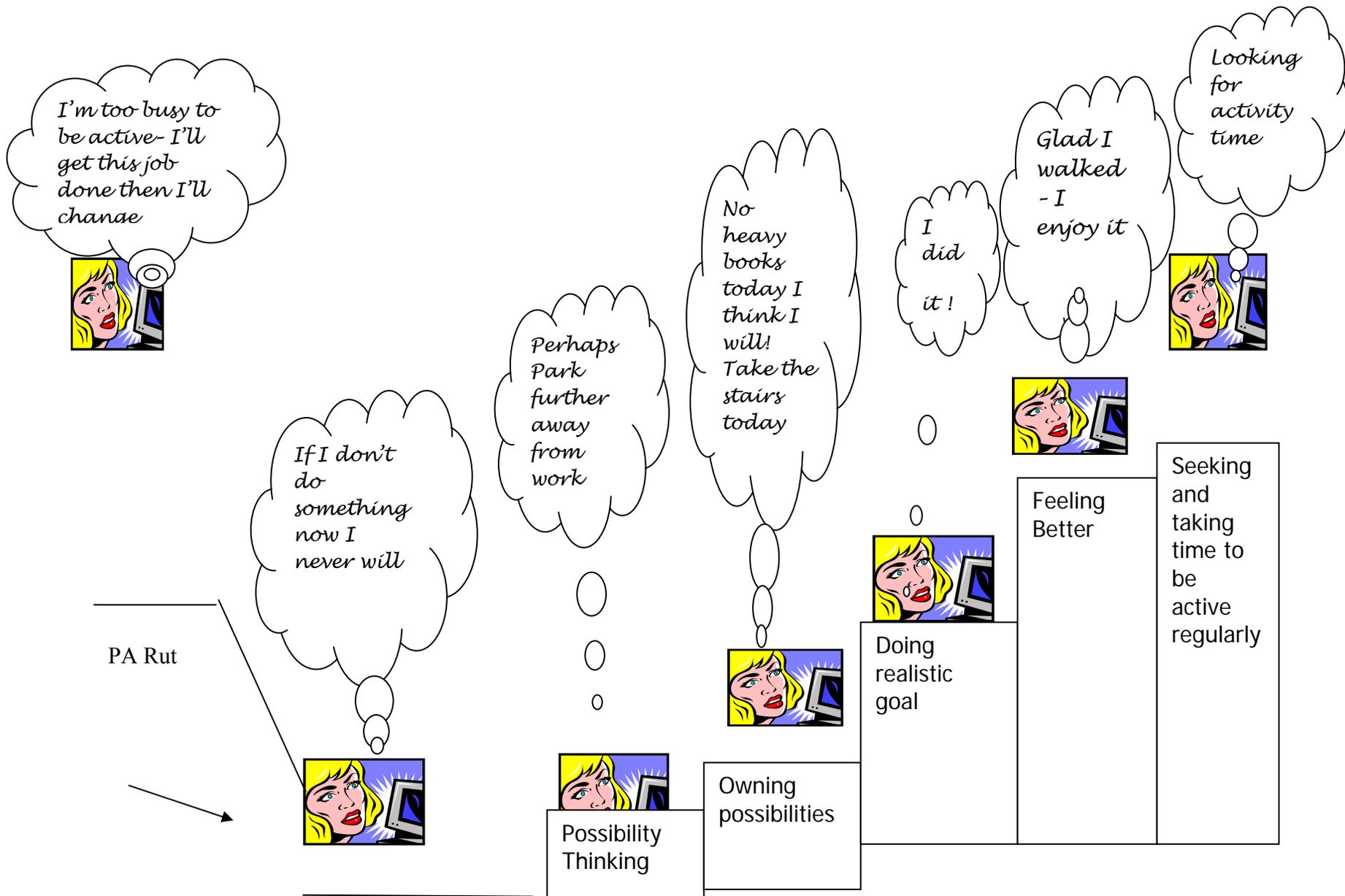


Figure 4.1. Sedentary women's cognitive and practical steps to increased PA.

Overflow thinking can be described as thinking about changes over and above the originally desired goal for change. I consider that overflow thinking stems from having successfully followed through on an intention-to-change in one cognitive area then linking it into another area of desired change. For instance, Julia found thinking about, and carrying through on her intention to climb out of her physical inactivity rut led to her belief she could climb out of her work rut.

*Elements of Choice, Control and Capacity to Follow Through on Physical Activity*

I identified three cognitive areas (choice, control, and intention follow through) that were central components of behaviour change for the women I interviewed and these components comprise this theme.

*Choice.* Outcomes associated with the cognitive area of choice with respect to type and setting of activity, and freedom of time to exercise, manifested in my interviewees reported inclinations to be more physically active. Some women were passionate about choosing where, when, and how to be active. Passions for exercising choice over where to walk came from the sensory pleasure and a sense of freedom from clockwatching that having choice facilitated. Likewise, choosing when to walk engendered and heightened feelings of liberation from work constraints reinforcing the positive aspects that choice provided. As women recounted walking experiences, voices rose and became stronger, indicating their strong positive feelings towards choosing where and when to walk. Women chose to walk in specific geographical areas, and to walk more often during holiday periods. As she enthused about walking frequently during holidays Evelyn acknowledged her choice to be active and regulate her frequency according to her available time. Evelyn told me she "... just did so

much more walking, felt so good, that's where I felt my best, when I was suiting myself what I did" (L. 797). Making choices involved attitude adjustments and planning to cope with competing time demands restricted physical activity choices and considerable effort was required to even prioritise physical activity. Changing from thinking that physical activity as a hobby to seeing it as a "necessity" had highlighted the need for greater "application" than anticipated to prioritise daily physical activity. For Evelyn the need to prioritise was specifically because "there are always other things you could do instead" (L.44). For instance, as her children grew up and began participating in after-school activities Evelyn described "doing all the chauffeuring" (Evelyn, L. 378) with frequent drives taking her children to sport. Before the intervention Evelyn did less physical activity as she watched others do more. Evelyn echoed strong parenting values as she reflected on how physically active she had been before assuming a parenting role that encouraged her children's physical activity.

I actually used to be quite happy [being physically active], and be involved in lots of things [PA] ...now I was sitting by the pool or sitting by a court watching them [the children] do things, so that meant I had less time to do them myself so, so I've realised that happened slowly. (Evelyn, L. 350)

Evelyn thought the parent's role demanded she "keep them active" (Evelyn, L. 391). Also, Evelyn was not alone in recognising how inactivity had occurred over long periods. Ironically, other women also reminisced about facilitating childrens or others' leisure interests while the women's inactivity gradually declined. It was notable that their realisation of their own inactivity had occurred slowly.

Understanding how women's multiple roles impinged on their freedom to be physically active, and information on the efficacy of internal and external motivation to be physically active, it was evident that two factors were influential triggers of a sense of freedom to be physically active. First, an absence of competing demands was required, and second, simultaneous access to some source of internal or external motivation to be physically active was needed. Unfortunately sometimes being time poor however and having sedentary interests, interfered with the women's freedom to focus on increasing physical activity and on continuity once they began. These women reported having to make tough choices between pursuing physical activity to benefit themselves and undertaking sedentary, yet community-enhancing activities. These choices were difficult for them to make because of the strong attraction to serve their community paired with enjoyment of sedentary hobbies. For example, Rebecca's quandary was to decide whether to play an instrument for a musical production or to be more physically active. To play music would entail forfeiting her regular morning walk in favour of instrument practice. To walk would mean forgoing a pleasurable, yet sedentary, hobby that also benefited the community. Identifying alternative physical activity that could be done for instance, at the weekends sometimes solved such dilemmas.

Restricted choices and common restraints were re-occurring themes and it is evident that freedom of choice was a crucial element in successful incorporation of physical activity to daily routines. Yet, many mid-life women are constantly engaged in multiple roles and find their families and competing demands restrain their freedom of choice. They described the way multiple roles worked against their desire

to be physically active by placing so many "...calls on time. It's a lot of pressure from all sorts of areas and not the least your family" (Sue, L. 532). Sue's comment indicated it was not simply the number of roles the women had that lead to feeling restricted and restrained about physical activity. Partners' attitudes also contributed to role pressures. Feeling restricted and restrained was sometimes exacerbated by unhelpful partners. The women found, however, that when responsibility for multiple roles was contained and shared between them and managing multiple roles was possible. The main difficulty for adding physical activity as a regular part of life was the attention roles required to balance them. In other words, being a super "physically active" woman, rather than simply a super woman required, attention to multiple roles and learning about strategies to cope with unbalanced demands arising from those roles. For instance, metaphorically the women were used to having all the hobs on a stovetop simmering away. The hobs could represent family, work, physical activity and leisure pursuits. In the stovetop hobs analogy if they all boiled up at the same time, immediate attention and effort was needed to turn down the heat. Consequently the women applied quick decision-making skills to decide which hob to turn off first. Often in a state of cognitive dissonance, the women wondered which pot to attend to first. Generally, in order to restore balance the physical activity pot would be turned off and attention given to the family pot. Unfortunately, with respect to women's physical activity the "back burner" strategy does not result in linear change in physical activity. It rather leads to sporadic attempts at change and patterns of relapse.

Another restraint to increasing physical activity was guilt. I was puzzled why the women I interviewed regularly yielded to competing demands rather than prioritising physical activity. I saw that some women had difficulty reducing the resultant pressures of guilt. They felt guilty for thinking about doing physical activity before caring about other people. They often blamed themselves for being physically inactive, while, like Yvonne, simultaneously believed themselves “at fault” by being “the ones that are caring most for the others and less for ourselves...” (Yvonne, L. 694). In one way Yvonne’s and the other women’s tendency to assume responsibility for people was a key factor in their low physical levels. In another way, it also appeared possible for Yvonne, for example, to put aside guilt sufficiently well to incorporate doctoral studies and employment. This tendency to sideline their guilt about low physical activity levels indicated that guilt is strongly associated with ranking of priorities. The level of guilt about the extent caring required for others, and the level of guilt about their physical inactivity was influential in the interviewees’ decision making for physical activity. Balancing these two components was difficult, especially, for women though who like Yvonne “try to keep everything together” (Yvonne, L. 758).

Clearly the attitudes of the women I interviewed appeared related to their willingness or unwillingness to prioritise their time between work, family, and social commitments, and physical activity. The women I interviewed spoke of a doubling up of responsibility following their entrance into the workplace. Annoyance was expressed about still thinking and feeling responsible to care for people’s health and

well-being generally. The lack of support or shared responsibility particularly annoyed Yvonne, who stated

It's still our responsibility to do all these other things ... just doesn't occur to them [other family members] that they need to think more about this, that or the other. They appear not to worry unless it really impacts on them. You sort of end up with more [chores] just because you feel it's your responsibility to do... you sometimes end up so much caring about the others we're trying to help ...others, but you end up losing some of the care for yourself (Yvonne, L. 581)

The Live It Up workshop led some women to increase their focus on their own needs for a while. In particular Evelyn had to focus when she needed unexpected surgery. The surgery conflicted with her plans to increase her physical activity levels, however, workshop-induced attitudes enabled a positive view of what was a temporary physical activity restriction. It was the attitude of "I'll just pick up and get back to it when I can" (Evelyn, L. 905) that saw a swift, stepped, return to increased activity.

During the intervention pressing priorities; balancing multiple roles; assuming responsibility for the care of others; guilt associated with putting their physical activity needs before others; as well as facing unexpected surgery all restrained the women from being more physically active. Thinking about the transience of feelings, however, and recognising patterns across a broader space of time than just a single day or week, released women to become and remain active.

*Flexible thinking.* Another factor that had a positive impact on increased physical activity levels was flexible thinking. The women I interviewed referred to

thinking differently about doing physical activity as a consequence of being involved in the intervention. Before participation, some of the women saw activity as something that had to be undertaken according to a particular pattern (e.g., twice a week on a Wednesday and Saturday), whereas, following the intervention, their views of physical activity were associated with the transience or temporal nature of feelings and events, and accepting “big picture thinking” about being physically active.

For some of the women thinking about how transient their feelings were helped them choose to be active, whenever they could, rather than condemn themselves for their physical inactivity. For instance, when faced with a cold, Evelyn found thinking about doing activity when the virus was over, overrode her previous negative thinking that her plan had failed. Thinking her low physical activity level was only temporary assisted her swift resumption of physical activity following short, unavoidable breaks. Similarly, big picture thinking also provided the perspective these sedentary women required to deal with interruptions and disruptions to their physical activity possibilities.

Comparing the outcomes of big picture thinking and “flexible thinking” with the women’s previously to held, “boxed thinking” or what could be termed “inflexible” thinking about doing physical activity clearly showed it was important to combat and relieve negative pressure by flexible thinking. Inflexible or boxed thinking lead in the short-term to strong degrees of frustration, but also in the long-term to guilt feelings about low levels of physical activity. The end result of these patterns of thinking was also feeling they were stuck going round in circles just like a horse on a merry-go-round.

Boxed thinking can be described as a way in which these women cognitively separated their life aspects of work, family, and physical activity. Attending to each in a linear way, yet coping with interruptions from each life aspect, they still thought about their responsibilities separately. Although perceived as a reasonable way of dealing with life, boxed thinking did not provide a whole of life strategy effectively enough to allow for integration of physical activity. Sue particularly thought of boxed thinking (or compartmentalising life issues) as “really it’s the only way to deal with it [life], in order to be able to get things done” (L. 700). Before Sue’s intervention participation, compartmentalising life issues or boxing her thinking, and subsequent feelings of being stuck on the merry-go-round horse were sustained primarily because when she attempted to increase her physical activity, there were “ramifications for more than yourself so you’ve always got to think wider than yourself, and that’s the whole reason why you do what you do, I suppose, in some ways” (Sue, L. 725). Boxing or compartmentalising life issues was largely unhelpful for increasing physical activity levels. Sue, however, remained committed to using the strategy but to a lesser extent. Compartmentalisation had been a strong feeling held by the women who had negative outcomes for physical activity, particularly because boxed thinking was one aspect that affected how they made their life choices. Poor life choices with respect to physical activity levels then lead to feelings of being stuck in a rut.

*Life metaphors.* The women I interviewed also looked at their life choices through several other life metaphors. They spoke of three life metaphors they related to physical activity. The first metaphor was thinking and feeling life was a collection of pots simmering on a stove, unpredictable and liable to boil up at any point; the

second metaphor was that they were on a horse on a merry-go-round; and the third metaphor was that life was like being an octopus with one dominating core activity and multiple tentacles flailing for attention. Each metaphor demonstrated where women saw physical activity fitting into their situations. So, in terms of the “stuck on a merry-go-round” metaphor, there were very real negative consequences, particularly a lack of motivation to engage in physical activity. In terms of feeling like an octopus where the head (the core) was high-level study demands for a PhD, and the tentacles were health issues, legal responsibilities, unhelpful partners, and friendships. This life metaphor demonstrated how every issue in life depended on demands of the head, the study core. Yvonne explained it this way,

The core is the PhD at the moment, and the study with that and everything else just has to be fitted in like, you know, I've got those tentacles going in and out...pulling, keep pulling, the tentacles have to go out further, or more up and one way than the other, to, to reach out...that that's difficult...so I'm trying to...keep everything together. (Yvonne, L. 718)

The women I interviewed reported dealing with life issues by using compartmentalisation and three life metaphors that had previously hindered their attempts to be physically active.

CHAPTER 5: THREE WOMEN'S INTERVENTION PERSPECTIVES –  
PA COGNITIONS AND PHYSICAL ACTIVITY LEVELS

Introduction

In this chapter, the interpretivist framework and thematic analysis applied to the interview data highlighted how the women I interviewed were (a) primarily influenced to do physical activity by people and environments, and, (b) how they experienced the intervention within the context of their busy lives. In this chapter, I address the findings from in-depth analysis of participants' cases drawn from the interview study particularly relating to sedentary women's cognitive and physical, aspects of change. I chose the three participants' perspectives presented in this section to provide further in-depth and rich understanding of physical activity perceptions and attempts to build activity into their daily lives. To elicit as much information and insights into the women's experiences (Denzin & Lincoln, 1998), I present the participation experiences of an adoption participant, a maintenance participant, and a waiting list control participant. Each intervention participant's experience is unique by virtue of their individuality, contexts, thoughts, and physical activity preferences. Nevertheless, a number of generalisable or common threads of change that were discussed in the study of themes (Chapter 4) are also evident.

The ideographic perspectives of women from each intervention condition were scrutinized for selection as one of three in-depth, case examples. One woman's case from each condition (adoption, maintenance, and control) was identified according to Denzin and Lincoln's (1998) guidelines about choosing cases that provide rich and deep understanding of the phenomena being studied, or that they exemplify particular characteristics. The selected women's interview transcripts were coded during the previous study then in this

additional analysis transcripts were scoured for deeper and contextualised understanding. In addition the 11 interviewees' specific intervention workshop and ejournal experiences were read for meaning.

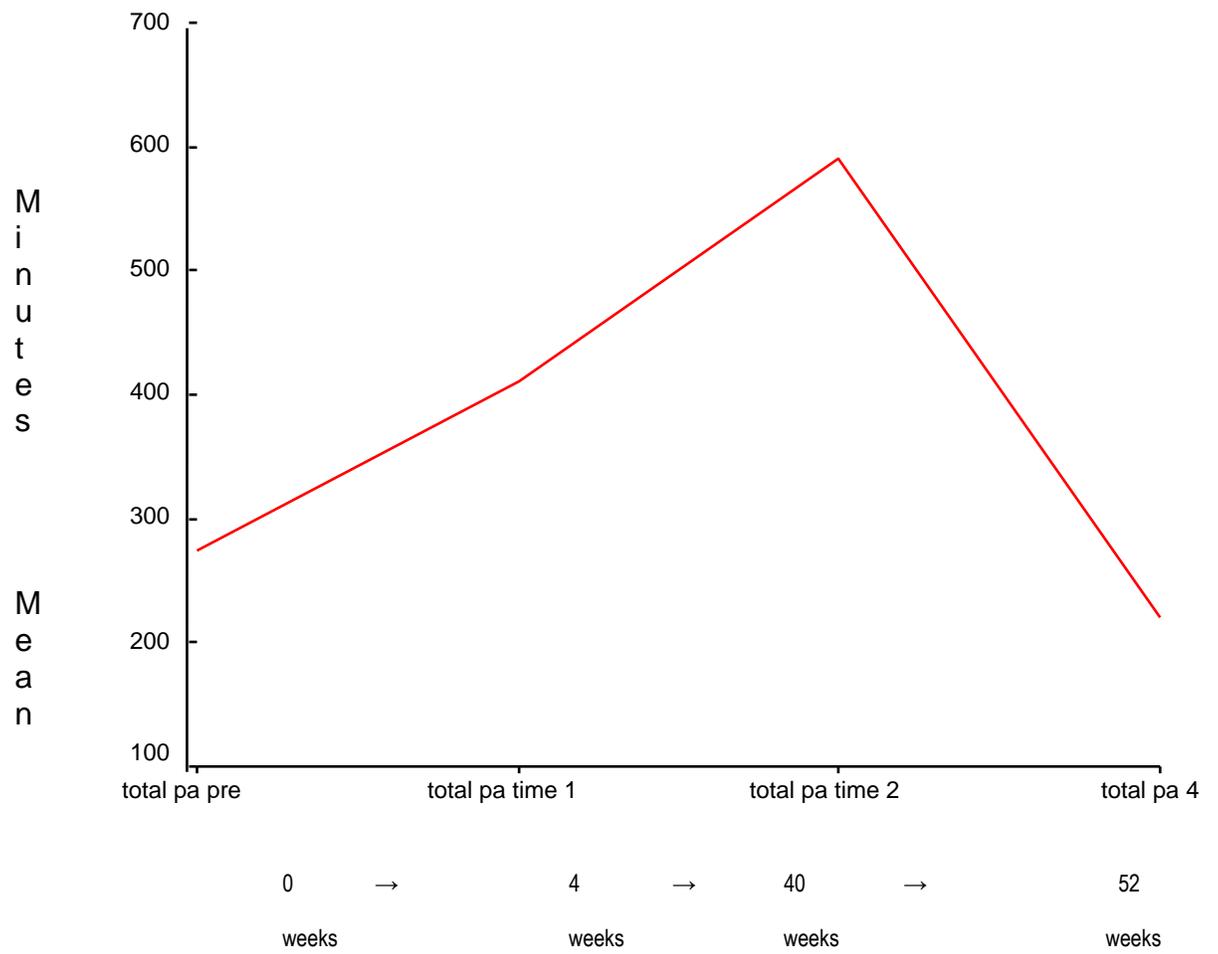
Helen was a waiting list control participant and her story reflects frustration about feeling ready to change, yet being unable to implement that change. Sue's account exemplifies the central role family can take in motivation for physical activity, and how multiple roles and high stress shape physical activity participation for a treatment condition participant. Finally, Julia's narrative demonstrates the effect that increased confidence can have on behaviour in a treatment condition participant. In this section, I document the blend and combination of beliefs and preferences of each woman by beginning with life context during the physical activity intervention year. During the intervention year participants explicitly tried to build more physical activity into their lives. Then, I explore the cognitive aspects of the women's physical activity experiences. After exploring the cognitive aspects I present the ways the women changed their behaviour. This systematic presentation format should allow the reader to make comparisons between each case and deals with important components of the change process (e.g., context, beliefs, and physical activity preferences). I have identified the prompts and individual combination of motivational components of each woman's particular blend of belief and preferences. Also, I illustrate how receiving the intervention differently affected the women's likelihood to change, and some important factors related to successfully increasing physical activity. My interpretations of these in-depth studies are drawn from interviews and ejournal responses across the intervention year. Each story begins with a quote indicative of the participant's experience, then I have also inserted a figure of physical activity levels drawn from the Scottish physical activity

questionnaire data (Lowther, Mutrie, Loughlan, & McFarlane, 1999) for each case study. For the references being taken from ejournals I have used an additional reference system in this section. For example Helen, 1/12 in parenthesis denotes the quote was from Helen, from her first ejournal, in response to question 12 and Helen, L 322 signifies the quote is from line 322 of her interview.

### *Helen's Roller Coaster Ride*

“For most of this year, I have felt quite defeated by the imbalance between my activity levels and my working life” (Helen, 12). Helen was in her early fifties, single, an academic and psychologist with a post-graduate higher education background. As a waiting list control participant, Helen received no intervention. Helen was only requested to attend a questionnaire completion session after which she participated in a short discussion about physical activity. Helen's physical activity level decreased over the intervention year (Figure 5.1). As we were settling into the private interview area, Helen quickly began to share what a shocking work year she had experienced.

My job is completely open-ended. Because of the demands I haven't done any research in the last six months, of any significance, and I've not taken on new jobs...if you just look at what you're expected to do it's not possible to do it. (Helen, L. 316)



*Figure 5.1.* Line graph representation of Helen's physical activity for one week (in minutes) on five occasions across the year.

Accordingly without taking on further academic responsibilities, or fitting in any research Helen's working hours were extremely long sometimes lasting until 2 or 3 o'clock in the morning. She explained how working as a full time academic and psychologist just getting through the year and during the year of research participation she felt like she was on a roller coaster ride. With each new major work task she began Helen kept thinking, with respect to physical activity that things would improve when the new task was completed. But when things did not improve she was disappointed with herself. Helen's final ejournal entry reflected this struggle with disappointment and her low mood. She wrote "For most of this year, I have felt quite defeated by the imbalance between my activity levels and my working life" (Helen, 1/12). The roller coaster for Helen was one of high workload, followed by extremely high workload, followed by a complete change of focus for the latter half of the year when she was travelling extensively and completely out of any routine while on a hobby tour.

Although Helen's single status meant in theory she was often able to please herself, Helen preferred to prioritise her work as an academic and psychologist above personal needs. Her workload became a lot heavier since our first meeting at the beginning of the study. Helen had believed she was in a strong position to be more physically active during the intervention year because she had long-service leave planned for the final six months. Specifically, Helen's main challenges were high workload that precluded taking on extra responsibilities, long sedentary periods seated at the computer, and responsibilities associated with being single. Commitment to her job was strong and the demands of her work were incessant. Also, as a full-time academic Helen worked at four different geographical locations in several different roles. Fulfilling these roles required high levels

of planning and extended unproductive travel time to simply reach her work places. Discharging her obligations also required an exceptionally high commitment to each role. All the preceding factors, combined with her mid-life transitions such as change in waist girth and incorporating incidental activity into daily life strongly influenced her ability in real terms to build in physical activity. Helen also had received no intervention that might have helped her to change her priorities or to fit physical activity into her life. Essentially, fitting activity into daily life remained a problem across the year, however, the last half of the year, whilst Helen was on a hobby tour, saw some break from her regular work pattern. Helen was disheartened to face the fact that physical activity participation came after higher priorities or was being fitted in at the edges of other commitments. In addition to the contextual factors already mentioned, and as a response to weight gained over the previous ten months Helen's doctor suggested that Helen walk for 45 minutes three to four times a week. Unfortunately, Helen and her doctor did not discuss ways to be more active or how Helen could fit physical activity into an already full schedule.

*Helen's Thoughts About Physical Activity*

When volunteering for research participation, Helen had hoped that the program would be a catalyst for increasing her physical activity.

I liked the idea of something that was going to be a catalyst for thinking a bit more about sort of exercise and change....that I need to do more and that I like it, when I do it but I just don't do it...I liked the idea of the Ejournal, just the idea. (Helen, L. 132)

Helen's response to being in the control group revealed some cognitive dissonance regarding physical activity when she said "...it was a slight relief to know that I was in the control group and actually didn't have to do anything very much." (Helen, L. 146). All

control participants had been asked to continue their normal patterns of physical activity. The cognitive dissonance was evident in Helen's "slight relief" related to being part of a control condition paired with her frustration with failed efforts to find time to be more active.

Helen thought research participation was "a bit strange – it's good to have a reminder that I did form an intention to make some changes, but it also reminds me of how far I am from seriously implementing anything in a routine way" (Helen, 3/3). Even though she had not received the intervention as such, Helen reported thinking that despite her increased awareness of low physical activity involvement, and a sense of accountability for her attempts to do more physical activity (provided by ejournal reporting), she was extremely disappointed when participation did not fulfill her desire to increase her physical activity. After the first meeting of the intervention year, Helen's cognitions revolved around being defeated by her lack of physical activity coupled with a sense of wanting to keep physical activity "on radar" (Helen, 1/3?).

Helen reflected on problems of sedentariness in relation to her friends and family. During my interview with Helen she recalled the circumstances of a friend who had died of a heart attack, aged 61 years. Helen recounted how she had noted her young friend's sedentariness and that her own belief was that more physical activity might have avoided the death of her friend, or that more activity might have helped her to live a healthier life. The death had caused Helen to reflect on her own sedentariness. Also, she thought about how the incidental activity of her parents was significantly greater than her own,

I've always assumed that I will get to about eighty because all my parents and grandparents did, ... they smoked and I don't smoke, so of course that's good enough

for me. But they didn't sit in front of a computer for fifteen hours a day. (Helen, L. 219)

The first and positive aspect of her parents' situation that Helen identified concerned the lack of technology in their lives. They had no car and few household appliances or housework aids. Her mother in particular was regularly and vigorously active. The second, but negative aspect of her parents' lives and their health concerned their heavy smoking habits. As a consequence of thinking about the negative aspects of her parents' generation in comparison to her own non-smoking status Helen felt secure about her future health, before her sedentary friend died. During the interview with me, however, she expressed the belief that a sedentary occupation alone, without all the hindrances of a demanding, responsible, professional occupation, was enough to have serious ill-health consequences. Helen strongly wanted to change her physical activity levels. Helen also confessed, however, that she was pleased to be in the control condition, because it released her from thinking she had to change. So wanting to change but being released from thinking she had to change because of the condition she was assigned to, may have contributed to some cognitive dissonance about becoming more physically active. Unfortunately, although participating in the study periodically reminded Helen of her intention to be physically active, it also emphasised the difficulty of routinely incorporating physical activity. Helen's physical activity dwindled to occasional intensive physical activity involved, for example, in moving house or the occasional 30 minute dog walk.

Helen's practical attempts to change involved thinking that having a dog would motivate her to walk regularly or that engaging in a formal fitness program with her sister might help increase her activity. Although it was difficult for Helen to keep a dog herself,

Helen having moved to live next door to her sister (who did keep a dog) reported occasionally walking her sister's dog. In particular Helen reported thinking about possible additional benefits of having regular contact with her sister who lived too far away to visit often. Although an idea that might have had double benefits of exercise while promoting family and social connections Helen discarded it because it was impractical in both time and effort. Despite Helen's good intentions she action did materialise. Helen reflected and expressed the thought that to change materialised partly because of an unproductive vicious cycle (attempt - failure – attempt). Explaining further Helen expressed the belief that her best motivation was to be physically active enough to actually begin feeling benefits. Demotivation was the main drawback of such a cycle because, the less physical activity she did, and the less benefits she felt resulted in the belief she should do more and begin the cycle again. Sadly, Helen's final ejournal comments reflected her overall defeat by an "imbalance of working life and physical activity levels" (Helen, 1/1).

During the middle of the intervention year, Helen's thoughts were engaged in tour preparations.

In the second half of the year, most of my energy has gone into the build to up for my forthcoming hobby tour of New Zealand – which has been a more positive energy than drowning in work projects, as happened in the first half of the year. But it's mostly mental energy, not physical – I may have lost a bit of weight in the process!

(Helen,1/4)

Evidently Helen's involvement in overseas travel was positive for producing energy for life, yet physical activity was still lacking. Helen's thoughts towards physical activity fluctuated between denial and optimism. For instance, Helen said that even doing "patchy" (Helen,

L.250) physical activity, however, made her feel good, but that she felt terrible, so much worse, when she was inactive. Feeling terrible led her to procrastinate about doing further physical activity. Perhaps her procrastination about doing physical activity was a key for her. Because she said;

I was thinking it, in a way with those, those patterns ... all those things that I mentioned in here like the, the occasional days activity or a bit of yoga, or a bit of gardening or whatever...in themselves they just kind of, I think they, enter the kind of futility I suppose that you know you, you try a lot of things and then in the end nothing works or you could say well I haven't done any of those things I think it might be a lot worse. (Helen. L.490)

Here Helen could be seen as being somewhat pessimistic about the worth of performing different types of physical activity, or the value of repeated attempts to do more physical activity. Taken at face value Helen's focus on small amounts of less intense physical activity could indicate a fundamental naiveté about the need to engage in serious energy or calorie burning activity. I suggest, however, that Helen's examples could simply reflect examples given of types of activity that might be reasonable starting points for sedentary people. In our brief discussion at the start of the study control participants talked about starter types of activity (e.g. taking stairs instead of lifts, parking further away from shops). I believe Helen's main point here was that one could think about such attempts to be a little more active as "futile" (Helen, L.488) or they could be considered better than nothing "it might be a lot worse".(Helen, L. 490). In response to interview questions about what she thought or felt about physical activity at the time of her interview and for her future Helen compared attempts to be more physically active with attempts to give up smoking. She said

In fact the more often you try the more often likely it is the eventually you'll quit [smoking] for good and I think it's probably true with that the exercise program... try and something's happening... it keeps the body a bit more in the forefront that's not a bad thing. (Helen, L. 498)

Signposts for change were also coming from my discussion with Helen about her very different experiences with doctors' approaches to physical activity advice. At the time of our interview Helen had begun visiting a new general practitioner, who was encouraging her to be more active. She liked the way her new GP treated her "she was a much better balance of hearing what I had to say without accepting any excuses [for inactivity]" (Helen, L. 613). Helen's new GP's attitude was a stark contrast to her previous doctor's approach to her weight and activity concerns, which was to say "do it [physical activity] three times a week...sort of tossing it off, ...it's sort of fairly routine...there's not much processing about what we might do or how" (Helen, L. 590). The previous doctor's off-hand approach to physical activity change contrasted with Helen's thoughts about physical activity. The off-hand approach perhaps reflects a variability of GPs scope or interest in physical activity. In Australia, it was only in 2007 that Medicare reimbursements for care plans that include exercise psychologists and physiologists have emerged. The new doctor's approach may reflect the Medicare changes or simply meet Helen's need for encouragement by virtue of her expertise or competence or personal variables. Whatever the reason was for the new GPs approach it suited Helen much more, and Helen's positive reaction to her new GP augers well for future physical activity increases.

Helen thought change was difficult to begin. Despite the difficulties associated with beginning her physical activity changes, and without any intervention, she had thought

deeply about how to begin change. She described how she had considered using a 7-minute principle to help her get started because it was a principle that had worked for some of her students when they were faced with difficult beginnings. For instance, Helen said, when they found it difficult to start writing, she would suggest simply sitting at the computer for seven minutes. Helen had considered using the same principle with walking the dog, and simply takes 7-minute walks. This is a good example of some of the thought processes of someone who did not receive a physical activity intervention, but wanted to achieve physical activity breakthrough for themselves.

*Helen's Physical Activity*

On her own initiative Helen fitted in some physical activity when, in the first half of the year, she regularly chose to walk up four flights of stairs at her workplace. In this physical activity, Helen believed there was an overall "slight rising of the water level" (Helen, L. 462) that was exemplified in her sporadic attempts at doing more physical activity. Helen's garden was another possible practical way she was still thinking about incorporating more physical activity.

The garden ... it's a way of making the house mine. It's [Helen's new home] got a lovely garden, but nothing I planted, so it doesn't feel like mine. Just the last two weeks I've planted, got rid of a few weeds. I actually bought some plants this week also for the first time since I've been in the house. Give it the feel of my own place.

After a year, it's about time. (Helen, L. 539)

Helen considered one other possible avenue of change was having access to a neighbour's lonely dog to walk between work periods at home. She said that, more recently, she had substituted yoga activity with dog walking when unable to get to yoga. Also, she lamented

that she often viewed physical activity as an optional extra. Despite her lamentations, long service leave gave her time and freedom to be physically active when she was touring overseas in the second half of the intervention year. Helen reported taking up the opportunity for activity, more than if she had remained in her usual routine. Touring overseas facilitated more physical activity than usual and provided her with some rare, but short-lived, motivation to change her activity levels through dance and review and reflect on, her own body image assumptions. Helen explained,

We also did quite a bit of physical activity on the tour in terms of trying a bit more... it was funny because actually in the last week I had two independent comments that I was a good dancer which ...it was very funny because it was quite the contrary to my view of my own body image. I thought maybe that, they kind of think that when you're 55 and you wouldn't be able to dance, and the fact that I could was impressive...and in the women's dinner somebody came out and taught us the salsa and the last thing I wanted to do, I thought it'd be embarrassing but I ended up being on the winning team. So all those ...little bits of feedback change assumptions about yourself, and some of those in New Zealand, of course just divine extraordinary movement, and they're huge...that's very encouraging (Helen, L. 513).

To sum up, using her own initiative, and for only very short periods (a couple of days at a time) during the year, Helen had occasionally increased her physical activity for instance. Such as moving house or learning to dance. This sporadic pattern of physical activity behaviour without any intervention to help her do otherwise was similar to all her other intermittent self-help attempts to do something about her body (her girth) and her physical health. That is, it was short-lived activity. Helen's experience typified many

women's frustration of intermittent attempts to do something differently that fail, and then lead to layer upon layer of discouragement and failure. Helen was at the mercy of her vicious cycle mentality.

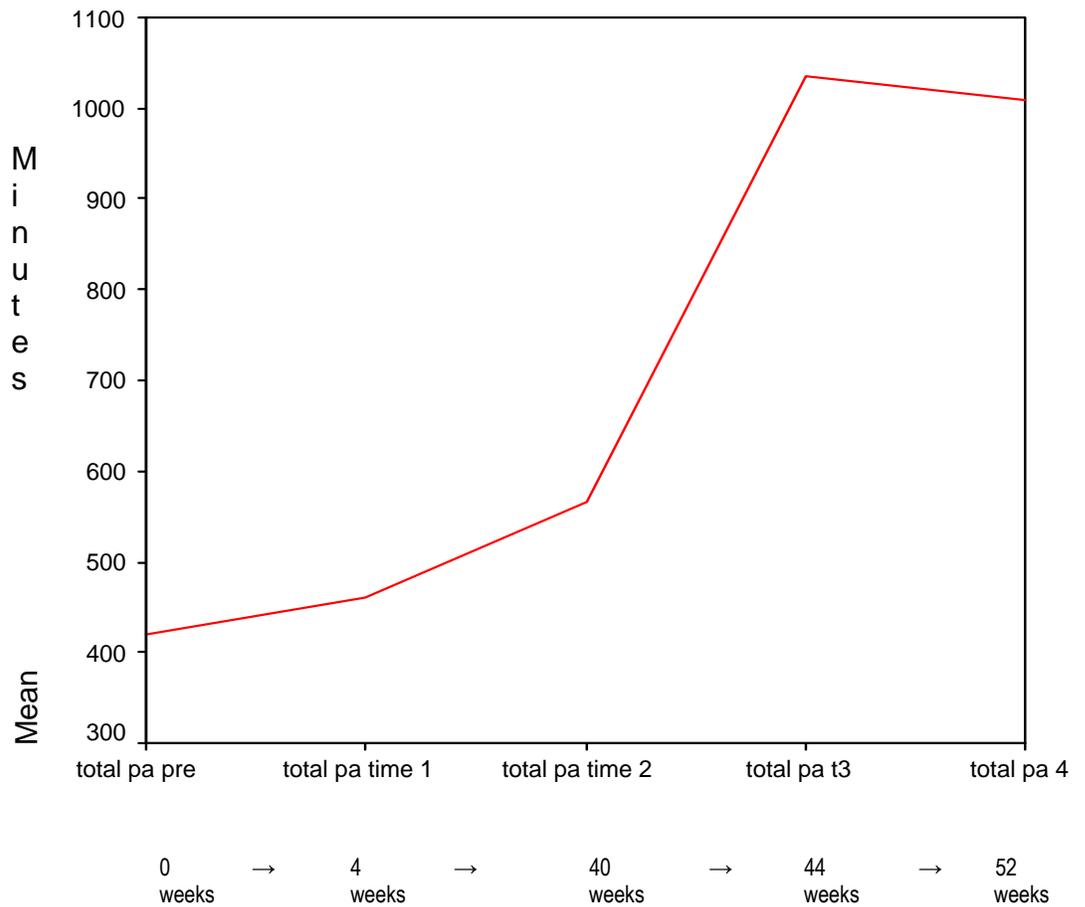
Helen reported that the minus 55 minutes of physical activity (in the last week of the intervention year) outcome of her year long roller coaster ride, was extremely frustrating. Even though she had made several attempts to incorporate more physical activity, they were unsuccessful in the long-term. When I last spoke with her, she planned to continue her efforts to be more physically active in the coming year. She admitted she was both pleased and frustrated to be in the waiting list control group. Helen's suggestion of using a 7-minute rule had not produced any lasting results for her. Supported and encouraged by her GP though, physical activity was likely to be kept on her personal agenda for the foreseeable future.

#### *Sue's Family Facilitation*

“Because you have so many things to do and so many calls on your time it's a lot of pressure from all sorts of areas and not the least your family.” (Sue, L. 532)

I interviewed Sue at her rural Victorian home. Sue smiled broadly as she welcomed me and we settled into the interview. Sue was in her mid to late 40s and lived with her husband and three sons. In addition to running her family and home, Sue was an office administrator. Having spent a lot of time engaged in these multiple roles, Sue was no stranger to interruptions in her day. Her physical activity (Figure 5.2) intervention year was also interrupted by low mood (that she attributed to hormonal fluctuations), and family issues. Added to interruptions across the year, Sue's other challenges were associated with living in a remote Victorian district, and having a self-employed husband who worked long

hours. Her husband's work meant that he was away for extended periods or working from home for days on end. I began to see the general challenges Sue faced in her daily life, and Sue believed these factors influenced her physical activity levels. Specifically, however, Sue engaged in the physical activity intervention following a particularly harrowing time at her previous workplace.



*Figure 5.2.* Line graph representation of Sue's physical activity for one week (in minutes) on five occasions across the year.

The tension in her workplace depleted many of her usual emotional resources, particularly her self-confidence. Sue began the interventions just as she specifically became increasingly stressed through troubles at work and faced several personal challenges. Sue felt her low self-confidence had badly affected her physical activity levels prior to the intervention. When she began the physical activity intervention Sue realised she disliked the work she had done for years. On her own initiative, she sought help from her son's school psychologist to actively working toward identifying other work opportunities.

Sue described her weight as another factor she believed affected her physical activity levels. At the beginning of the program she was in the doldrums regarding her weight and feeling she was getting nowhere. Feeling stuck in her weight loss efforts, Sue welcomed the timing of the physical activity intervention and viewed the intervention as a possible means of weight control. As far as the outcomes of the intervention went, Sue was delighted with her results. She said "Well I have lost some weight, I want to keep losing a bit more...and I have become fitter. I feel better because I'm fitter and a bit stronger than I was before. As far as being happier, I suppose in some ways I am happier" (Sue, L. 876).

#### *Sue's Reflections on Physical Activity*

Reflecting on her physical activity, Sue's thoughts primarily related to three aspects (a) the challenge of doing physical activity, (b) the need to think physical activity change is achievable and (c) that physical activity can be built-in to an already busy life. Sue first attempted to meet the challenge of doing physical activity in a rural area by starting Pilates with a friend. When the friend, who owned the Pilates DVD was unwilling to share it Sue decided to continue exercising by simply walking which was a way of escaping her demanding family sometimes. Also, walking helped to calm her when she was feeling

anxious because of hormonal turbulence. In addition to walking Sue decided to combine her desire to be physically active with meeting a physical activity gap in her children's lives. A strong practical motivator for Sue was her strong-held feeling that her boys should have some sport experience, however, her husband was disinterested in facilitating sport for their children. Thus, Sue decided to take on the facilitator's role. Prior to the intervention she had not considered her role in facilitating her children's activity a possibility. Sue chose to see that sport involvement provided her with vigorous activity rather than involvement as a purposeless chore. Sue took a proactive step by setting up a local soccer club. Having located a playing field and setting up the club business, Sue's role became physical. She began to play and coach her boys, thus being challenged physically by the activity. She said "I was feeling it [the effects of playing soccer] that was a big challenge, that was an eye opener for me...but I think I would've gone much worse if I hadn't been doing any physical activity" (Sue, L. 125).

Thinking about intervention involvement and keeping physical activity in mind was positive for Sue who said

I am thinking it [the intervention] was a good thing to do because it is in the back of my mind and helps me to have something to work towards. It was a way for me to start doing something more organised and concrete about my health. (Sue, 8/3).

Essentially, it appeared that the intervention gave Sue direction and a framework for her physical activity level change. She said "It's [changing physical activity level] a good idea and quite achievable if you are prepared to think outside the square a bit in terms of the way you think about exercise and how much difference it can make in your life" (Sue, 10/4). In addition to believing physical activity levels were changeable, Sue followed through on her

intentions to be more physically active by looking across the day for opportunities to be active. Changed physical activity cognitions lead to Sue's stronger focus on increasing her physical activity levels with both incidental and sport activity. They also helped her become proactive with respect to physical activity and weight issues, and be more organised in increasing her physical activity. Sue expressed satisfaction about her intervention participation

I appreciated doing the research project because it has helped me to consider what I want out of my life and that I need to put my health and well-being in a priority place in order to be happier within myself and, thus, a nicer and more effective person for my family and friends. (Sue, 10/3).

With respect to her physical activity aspirations, Sue talked about the issue of always wanting to excel. In particular she reflected on the drawback of being a perfectionist when wanting to increase her physical activity. Perfectionism led Sue to prefer attending to one issue at a time. This tendency makes her feel that other issues are being neglected such as feeling bad about dividing her attention between so many roles, including wife, mother, daughter, and worker. Sue found perfectionist thinking hindered her attempts to change her physical activity levels "because it doesn't work very well in reality [being a perfectionist]...I can't manage to have all the bits of my life working well...they should all be just so, they can't be, and I can't do it". (Sue, L. 828). Perfectionism led to a constant downsizing of expectations, which in turn led to feelings of powerlessness. Sue illustrated it this way

You know what reality you are in and you can't change it but you know in every way you'd like to 'cause you only have so much power, I suppose, over things....you just don't have control over things because everybody has an impact on you. (Sue, L. 910)

Sue speculated on how different it might be to be attempting to change physical activity without family. Her conclusion was that there would still be "controls on you that you can't change" (Sue, L. 916). Sue's ejournal entries reflected positive and negative times, where sometimes she felt she was getting nowhere, but at other times felt positive and enjoyed being more physically active. Consequently, always wanting to excel made it difficult to have all aspects of her life working well at the same time. Accordingly, there was a tension between what she wanted to do and what she was able to do the result of which was a constant lowering of expectations. Sue's cognitive approach to living life effectively was that of compartmentalising her life roles. She likened her multiple roles (wife, mother, administrator, and daughter) to "pots on the boil that need to be kept simmering away" (Sue, L. 400). As discussed previously, every so often, however, it seemed one, two, or even three pots [role demands] might boil at once, thus increasing the challenge to sustain physical activity.

### *Sue's Changes*

Despite the obstacles to change (perfectionism, family demands, and unpleasant work issues), Sue progressed through the intervention from being rarely physically active to regular activity. Her major physical activities became walking and soccer training with her children. Sue found smart and practical approaches to increasing her physical activity. The two-hour soccer sessions once or twice a week were very physically challenging for her. In practice, Sue was willing to reduce the time spent on other activities (like housework) in

order to personally achieve more physical activity. Yet in addition to increasing her own physical activity levels, and Saturday afternoons being usually set aside for housework, Sue realised that she was willing to sacrifice time doing housework to enable her boys to enjoy being physically active. Sue's choice to fill a gap and her attitude of readiness to change her housework routine resulted in her being more physically active through her participation in vigorous soccer activity. At the same time though, gap-filling and flexibility hindered her housework completion, thereby adding stress.

Three further practical ways Sue increased her physical activity were a) looking across the day for opportunities to be active rather than limiting physical activity to non-paid work hours b) seeking support from her GP, and enlisting the help of a friend at work to focus on making physical activity changes. Enlisting the help of a friend was a particularly useful strategy for Sue because she found her family's familiarity with her weaknesses did not always lead to constructive support and c) to become more organised about when and where physical activity took place.

Sue reported that the program helped her become proactive with respect to being physically active and with weight issues. Sue prioritised physical activity during the latter half of the program, fitting it in on most days. Overall the intervention was a good experience for Sue, although towards the end personal illness once again affected her physical activity level.

A vivid aspect of Sue's driving force for change was her husband's lack of interest in physical activity, and his unavailability for sport with the boys. It was the strength of emotional feeling Sue had about the importance of her children's physical activity that appeared influential for a change in focus for her physical activity. She moved from solely

walking for herself towards participating in the boys' soccer training sessions. The gap also served to extrinsically motivate Sue to provide sports opportunity for her boys by taking on the role of family sport convenor. Her vision in facilitating her children's soccer involvement while also providing an opportunity to be more active herself demonstrates a functional adaptiveness by Sue. Sue's soccer involvement also provided her with social liberation because she was an integral part of the soccer club and became involved in the club incorporation process.

Sue's intervention experience as reported in her ejournal showed how, despite interruptions across the year, she managed some kind of physical activity on most days. Sue also talked of her intervention experience as very beneficial, because she gained the self-assurance to review possibilities for her physical activity involvement, and extended her self-confidence to review her work life. "I feel it's [the intervention] been really positive and I said it had led to looking into other things...into other areas of my life, which maybe I wouldn't have thought about ... or had the interest or the confidence to go and look into it" (Sue, L. 1073).

To summarise, Sue's experience was of becoming active with her sons through the sport of soccer, and the stress relieving effect of walking during body cycle upheavals provided Sue with the largest increase in physical activity of the intervention participants. Sue's physical activity gain at the end of the study was 9 hours per week. Although having "pot's on the boil" and the need to excel hindered her incorporation of even more physical activity Sue appeared to be full of potential for maintaining her increased level of physical activity in the future. Despite parenting, having a self employed partner, lack of time, lack of motivation, work pressures, hormonal shifts, depression, and being part of an all-male

household Sue was able to establish regular physical activity in her daily life. Sue substantially increased her physical activity levels to nearly 10 hours a week by the end of the physical activity intervention year. Not only was this a terrific outcome for her, but Sue was able to sustain her physical activity despite her demanding daily schedule. Sue's intervention experience led first, to her discovering her physical activity preferences for walking because it was simple to perform and had a calming effect. Second, and most importantly for Sue, the intervention experience led her to fulfill her physical activity aspirations while still integrating her strongly held family values. At the initial workshop, reframing her thoughts about soccer allowed Sue to maintain her physical activity involvement over the soccer season and commit to being more active in the future. Sue's story provides insights into the benefits of a number of concepts, underlying the physical activity intervention direction and framework. The concepts that were successful for increasing physical activity were the early identification of practical ways to begin activity; discovering what was important to her (her family); and acting on the flow-on effect of self-confidence. In addition, acknowledging and holding the cognitive stance of "Everything I do counts" counteracted the negative influence of perfectionist thinking. Besides the challenge of multiple roles, the negative effects of turbulent hormones, and the need to excel following through on commitment to change physical activity levels was central to increasing physical activity. Despite periods of high personal stress, Sue went through a considerable process of self-discovery. To an extent the intervention for Sue became a vehicle for self-discovery and goal fulfillment. This was because, despite illness and family issues interrupting her achievement of even greater physical activity levels, the intervention

led Sue to meet the challenge to become more physically active, with self-confidence enough to “spillover” into other areas she believed needed to change.

*Julia’s Physical Activity Awakening*

“I had got myself into a rut where I knew what I needed to do but it was all too hard to do it and oh it’s not” (Julia, L. 584).

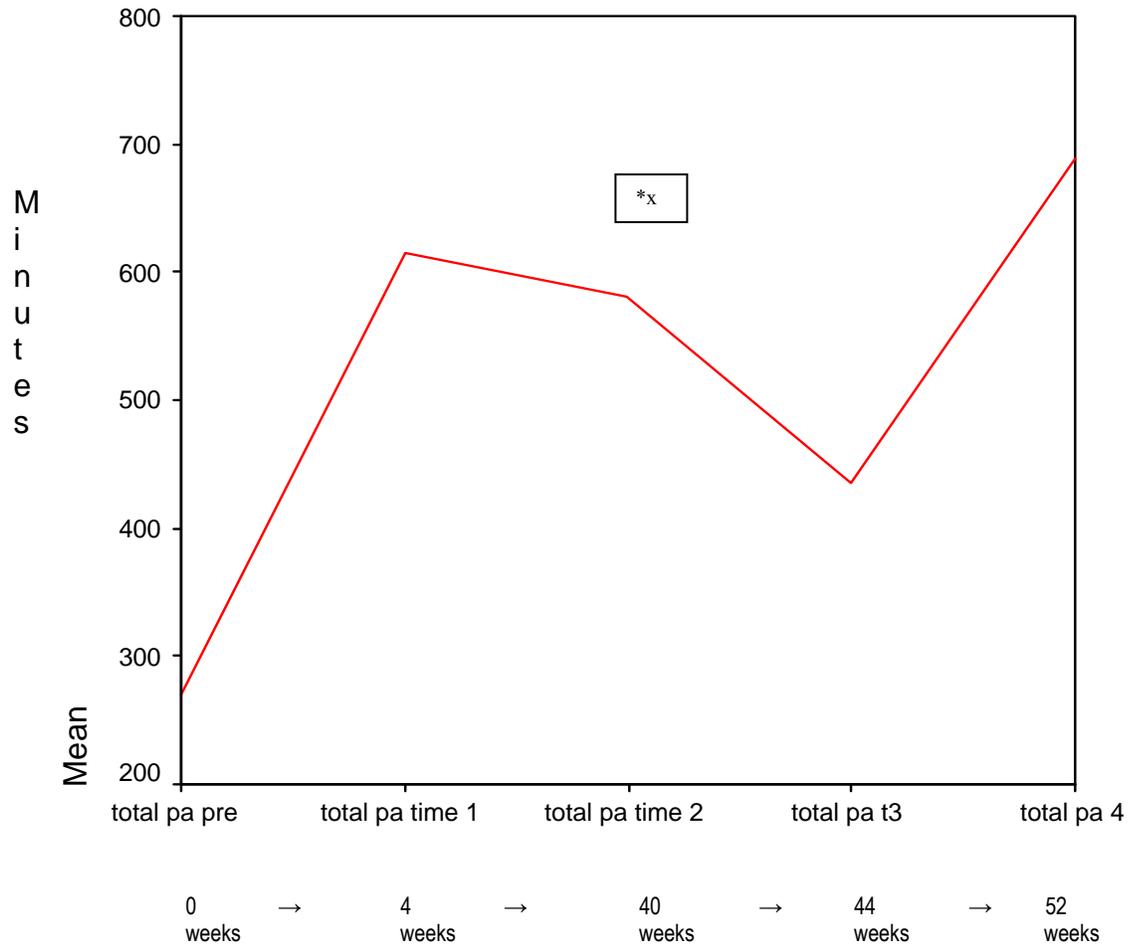


Figure 5.3. Line graph representation of Julia’s physical activity for one week (in minutes) on five occasions across the year.

Julia arrived at the University for our interview exuding life and enthusiasm that continued as she shared her physical activity intervention experiences. I already knew from reading her e-journals that improving health and fitness were important reasons for Julia's participation in this study. Julia was in her mid to late forties, live with her husband and two daughters, and worked as a university administrator. By the end of the intervention, Julia had increased her physical activity levels to gain almost 7 hours a week of physical activity.

Poor weather and lack of daylight hindered Julia's initial attempts to be more physically active. Julia also reported experiencing problems with nerve blockages in her neck, stemming from prolonged keyboard and mouse use. A physiotherapist had monitored the blockage for her. Despite the time required to attend all these issues, however, by the summer she reported walking her dogs regularly.

Now that it's light really early, when I take the dogs to the park, there are lots of other dogs there, off the lead, and my dogs ....I can't let them off the lead because they've got small dog syndrome and don't come back if they're called...It was actually easier when it was winter because there were hardly any dogs. (Julia, L. 327)

Despite reporting feeling psychologically low early in the intervention, Julia enjoyed the warmer weather and by several months after her initial workshop she was consistently achieving her physical activity goal. Nine months into the study, after Julia's maintenance

briefing meeting, Julia achieved her goal, and often more, through her intensive fitness program.

*Julia's Reflections on Physical Activity*

Julia changed her thinking about physical activity, as she increased her physical activity during the intervention. First, she reported that she had increased her activity levels enormously. Julie reported that as a consequence of increasing her physical activity she felt less stressed and more positive about other things, like the new job she was about to begin. As a direct result of her initial adoption and participation in the physical activity intervention Julia took her physical activity one step further. She began an exercise program provided at Victoria University through participating in another research project, about which Julia said "I probably wouldn't have gone into it [the other research program], if I hadn't already been awakened to the exercise through your program [Live It Up], so it's like the two dovetailed quite neatly, so I felt good." (Julia, L. 381).

Julia found social support through her willingness to participate in the second VU research program, where she had two personal trainers who were "tremendous...fun" (Julia, L. 69). From Julia's perspective the combination of the Life: Live It Up (LLIU) physical activity intervention and the exercise training research program were keys to the establishment of exercise as an achievable priority in her life. From my perspective, as researcher, I am aware that a participant's involvement in a second research program may have confounding effects. On balance, though in the context of this study where participants were urged to take up further physical activity Julia's new found self-efficacy for physical activity led to the establishment of a second layer of activity. The second layer involved vigorous and sustained activity undertaken with the support of others.

Overall, participation in the LLIU, especially the initial workshop raised Julia's belief in her ability to be physically active, particularly through exercise. Julia found principles of the program, leading her to change were relevant for her career too. These principles had a spillover effect, leading to possibility thinking. "I had got myself into a rut where I knew what I needed to do, but it was all too hard to do it and oh it's not. It is actually possible so that's really good for me" (Julia, L. 584). The rut Julia was explaining is a physical inactivity rut, whereby a person believes they know how to increase their activity, but consider the change is too hard to accomplish. Julia's rut comprised a situation where work was okay, but the "boss, relationship stuff was really hard" (Julia, L. 603). After successfully making physical activity changes Julia felt empowered to look for other work options. The short sessions of physical activity with her dogs gave Julia confidence to do more physical activity and to consider changing her job. Julia had assumed a different attitude towards activity by adopting the choice to be more physically active following the initial meeting of my intervention. She felt "it's [physical activity] easier to fit in to the day" (Julia, L. 619), even though she was just as busy as before. Julia adopted the thought that being active was "all a matter of choice" (Julia, L. 623). She chose to be active and to work because she felt it was her responsibility to be more physically active.

The success of the program for Julia was breaking away from all or nothing approaches to activity and moving towards two strong beliefs. The first belief she expressed related to thinking differently about how much exercise was needed to be effective. The second belief was connected with the type of activity she could do. Regarding how much exercise was needed to be effective Julia reported that at the beginning of the intervention she believed a lot of exercise was needed for it to be effective. She said "it's easy to

convince yourself you have to do a lot to make a difference, to actually make a difference” (Julia, L. 652). This frame of mind, however, was demotivating for her. The belief was an obstacle for Julia that had hindered previous attempts to do physical activity. Thinking differently about physical activity enabled Julia to begin and sustain physical activity in a new way. Her motivation for physical activity improved when she released herself from worrying about how much activity was done. Julia said “the success of it [the physical activity intervention] was that there was a fair bit of emphasis on it doesn't matter how much” (Julia, L. 642). The second belief that was influential for Julia's success related to the type of activity undertaken. It was positive for Julia to think and believe “a small amount [of activity] is better than nothing, and it was okay to start with a small amount... I didn't have to go to the gym five days a week” (Julia, L. 646). Relief from believing she could start her change outside of the confines of a gym appeared to increase her self-motivation for physical activity. I concluded that choosing to think that simply starting to be active was more important than how much was done and beginning small is acceptable, and giving herself permission begin activity outside a gym was helpful for Julia's adoption of physical activity. In addition, Julia's maintenance of physical activity was supported by regular ejournal contact with the LLIU intervention and support from others for vigorous exercise.

#### *Julia's Changes.*

Like Sue, Julia found several strategies made a practical difference to her beginning and maintaining physical activity. The first strategy Julia adopted when volunteering to be part of the LLIU physical activity intervention was commitment to being more physically active. The second strategy occurred during the initial workshop when Julia set a realistic

goal. "When I started this program with you I said I wanted to walk the dogs five times a week and I do that every morning" (Julia, L.79). The goal was achievable and motivational because of the reinforcement she received from her dogs. Her next practical strategy was to decide where to walk the dogs. Julia explained walking in the park allowed her to easily monitor the length of her walk and to forget about time while walking.

If there's nobody else in the park, we walk in the park. There is a big soccer field that we walk around and around. That's good because I know three turns around the soccer field is the right time for me...it's like I want to do it without wearing a watch. (Julia, L. 470)

Motivation from her dogs' enjoyment of their time out together impelled Julia to be physically active more often.

They [the dogs] get really hyper, if for some reason I get up and don't have time to take them for a walk, not that that happens very often now, but they need to walk as much as I do, so that's another reinforcement...how much they enjoy it and need it. (Julia, L. 192)

Julia built on the physical activity success with her dogs by responding to another physical activity research program that offered support for more vigorous and sustained physical activity. Extrinsic motivation came in the form of encouragement from student personal trainers who were conducting the exercise program.

I had two personal trainers that met me at the gym. It was very motivating to go to the gym...they were tremendous students, great fun, and when the project finished they wrote a program for me to take to my gym. (Julia, L. 66)

Although, at the time of interview, she still attended the gym about once a week, Julia's gym attendance was becoming irregular without the trainers' direct supervision. It is impossible to determine whether Julia's success in maintaining her increased physical activity hinged on the extra support and encouragement she received from trainers in the second research program. It is likely to have had a positive influence, however, because of the enjoyment experienced in the gym sessions. In addition, Julia reported feeling motivated to continue when she saw lowered blood pressure readings. Also, as she became fitter and felt better in herself, the feelings were enough reinforcement to increase her extrinsic motivation for physical activity. It is very likely that having personal trainers and biofeedback was motivational, but their involvement was also problematic. Although Julia was unusual in regard to getting involved in this second research study it was not against the spirit or consent conditions of my study as participants were given choice of the type, location, and intensity of their physical activity. Julia's involvement with a second research program was, however, problematic to an extent. Julia did not consult with me before her planned involvement in the other research. Despite the confounding of my data concerning maintenance of physical activity according to Julia her impetus to progress to the vigorous activity of the other program, came from involvement in my study. For instance, in her interview Julia attributed early physical activity increases to using self-talk and receiving the e-journals. These were two of the intervention strategies applied at the beginning of the intervention. Julia said she told herself "I have to walk" (Julia, L. 169) did it, then told herself "I'm enjoying it, and so it's easier" (Julia, L. 170). Also, Julia used the e-journals to remind herself to be active, and to encourage herself to keep going. Likewise, using the e-journals helped her keep track and reminds her to keep physically active, and reflect on her

commitment and progress. She explained it this way “The e-journals were a good reminder to me that I had made a commitment... and to force myself to think about it “because the weeks just fly by” (Julia, L. 513).

To summarise, for Julia, it was the small step approach, realistic goal setting, and finding enjoyment that led to improvements in physical activity levels. Regarding her future participation in physical activity Julia expressed her feelings of being over-extended at work, however, she was using a Monday morning weigh in as a reminder to be active, as well as telling herself “A small amount [of physical activity] is better than nothing so it was okay to start with a small amount” (Julia, L. 646). Despite the increased number of dog walkers around, Julia looked forward to the summer when it would be warmer and lighter outside. Overall, the period including the lack of daylight and some physical health issues were considerable barriers to Julia's maintaining her increased physical activity levels. Despite these difficulties her small beginnings led to increased motivation to participate and sustain more intense activity across the year. Julia often does her small goal plus other activity and said

I've started off small and that's good, and I feel better...I'm going to keep it up. I may want to do my walk when there's time, and I have changed my diet as well as my exercise. I try and be a lot better with diet, but I need to be a lot better, that will be my next focus. (Julia, L. 657)

Julia, thus finished the program determined to keep up her physical activity and also tackle her diet issues.

Cognitively, Julia adopted several different attitudes to physical activity, one of commitment to being more physically active and one of adopting the approach of

“Everything I do counts”. Specifically, making her choice to commit to being more physically active combined with the subsequent positive physical and mental results of her choice led to Julia knowing she could change. This new perspective opened up “possibility thinking” that in turn spilled over into making new decisions about her work life. Next, the physical activity intervention participation, that led Julia to commit to walking her dogs regularly and she experienced a physical activity awakening. This awakening gave her confidence and she began to enjoy exercise. From being in a mental and physical activity rut prior to the intervention Julia changed significantly. Ruts of physical inactivity began can change with a small-stepped approach. Possibility thinking about what she could do, rather than what others did, was the first step to Julia's change. The second step that was beginning activity led to the knowledge and belief that it was possible to change. Owning that change, planning, and doing what was required to implement that change, resulted in Julia feeling better. Julia found herself in a far different place with physical activity, both physically and psychologically, by the end of the intervention year.

Julia's process of physical activity change evidently began with a commitment to thinking about raising her awareness of physical activity, then doing physical activity in a non-structured way. Julia's physical activity levelled off remaining at a much higher level than before the intervention. The concept of self- confidence ‘spillover’, whereby the sense of changing one area of her life on another, emerged from Julia's awakening as she demonstrated how she got herself out of a physical inactivity rut, and a work rut. Julia's story highlights how confidence in being active can grow as someone begins doing things differently.

*Summary of Case Examples*

Helen, Sue and Julia's experiences exemplified three influential factors concerning physical activity. First, Helen's experience was clouded by frustration at failing in her self-initiated attempts to be physically active. Second, Sue's smart and practical strategies epitomised how family priorities, gap filling, and sacrifice were strong motivations for physical activity, self-confidence, spillover, and possibility thinking in a participant in the adoption condition. Third, Julia's awakening to physical activity and her commitment and the everything I do counts attitude cemented strong physical activity gains as an adoption and maintenance condition participant. There was a noticeable difference in the participation experience of Helen, Sue and Julia. Sue and Julia both reported double benefits attributed to their physical activity changes. For Julia the double benefits were enjoyment and achievement whereby she enjoyed time with her dogs while achieving her own personal realistic goal. For Sue the double benefits were achieving her activity goals while facilitating her boys engagement with sport. Without the intervention Helen did not enjoy the benefits treatment condition participants had, nor did Helen have the extrinsic support (reflective e-journals) or resources (LLIU booklet) of treatment condition participants.

In addition to gap filling, changing beliefs, and improving self-confidence, changing priorities to place physical activity higher, and possibility thinking, also helped Sue and Julia to "step out" of their physical inactivity rut. Possibility thinking meant looking at what physical activity could be done, then taking opportunities to be more active. A sense of empowerment to change resulted. Successful physical activity increases followed after owning change, planning for the change, implementing change and then maintaining change.

### Discussion

Since the mid-1990s, the frustration and difficulties associated with wanting to and attempting to change behaviour but ultimately failing to change have been studied from a number of new perspectives (e.g., Prochaska, Norcross, & DiClemente, 1994; Seligman, 1994). The primary purpose of my in depth-study was to extract further insights into the effectiveness of applying strategies drawn from psychological theories to promote changes in physical activity levels. In this discussion of my in-depth study findings I focus on how Helen, Julia, and Sue's respective experiences relate to other behaviour change research.

Regarding Helen's experiences, they were noteworthy with respect to the concept of a spiral nature of change proposed by Prochaska et al., (1994). The Transtheoretical Model (TTM) incorporated the new idea of the spiral nature of change and a number of strategies for application during different stages of change (see Chapter 2). The TTM transcended theories of predictability, such as the Theory of Reasoned Action (Ajzen & Fishbein, 1980), the Theory of Planned Behaviour, and Social Cognitive Theory (Bandura, 1997) in terms of addressing how people change. Particularly the promotion of tailoring strategies for people at different points in the process of change is an important component. As a frequent attempter of self-change Helen's experiences would fit closely into those of the contemplation and preparation categories. Therefore, with respect to changing physical activity the TTM spiral model of change and strategies of consciousness-raising or strategies to increase the advantages (pros) of exercise should be helpful. Helen reported a slight rising of the water level (i.e., raised conscious awareness of physical activity) when referring to her thoughts about physical activity. Her comments highlight the positive role that research participation can have even for control participants. Helen had attempted self-

change for many years prior to joining my study, and then during the study year without the aid of an intervention, she tried again. Her ongoing attempts at and failures were frustrating for her and keenly illustrated how some people experience the spiral nature of change.

Effectively Prochaska et al. recognised false starts, failures and relapses as an integral part of the change process. TTM researchers called this point of the change process "recycling" (rather than relapse). Even though researchers (e.g., Bandura, 1997) have promoted the idea that change is not linear, practitioners frequently fail to relay the recycling view of change to their patients or clients. The ensuing frustration may in part be because change is most often viewed as a linear process whereby people should be then maintain changes in a straightforward way. In their discussion of the spiral nature of change Prochaska et al. (1994) wrote

The vast majority of people struggle for years to find effective solutions to their problems. They try not to become demoralized by failure, although sometimes they feel they will never change. They feel embarrassed or frustrated when someone comes along and tells them, 'I quit smoking years ago. It was easy'. (p.48. 1994)

With respect to TTM's consciousness-raising component, it seemed with Helen the roller-coasting waiting list control participant by responding to questionnaires over a one-year period and receiving a brief ejournal (that was not returned each time) every month formed a basis for a slight "rising of the water level" regarding physical activity. The "rising of the water level" did not extend, though, to actually doing more physical activity! Helens experience raises three issues. The first issue relates to the need for further research into the minimum amount of contact required to prompt thinking about doing more physical activity. The second issue relates to identifying the minimum amount of contact necessary

to effect conscious awareness of the need for physical activity and the third issue is exploring how deeply low physical activity levels can be entrenched.

Levels of entrenched beliefs are the focus of depth and change theory whereby Seligman (1994) proposed that change happens according to three claims. First “To the extent that a psychological condition has biological underpinnings... it will be harder to change; to the extent that it is unprepared – simply a learned habit – it will be easier to change.” (p. 246, 1994). Second, “the easier a belief underlying a problem is to confirm and the harder it is to disconfirm, the harder it will be to change” (p. 246, 1994). Third, that “To the extent that the belief underlying a problem has high power, it will be hard to change; to the extent that it has low power, it will be easier to change. (p.246, 1994). Furthermore, Seligman (1994) stated depth and change theory thus “My theory says that it does not matter when problems, habits, and personality are acquired, their depth derives only from their biology, their evidence, and their power.” (p.246, 1994)

The three women I interviewed all mentioned their long-term dissatisfaction with physical activity levels experienced prior to the physical activity intervention. They were all keen to make changes. Enduring changes to physical activity levels were enabled, however, for Sue and Julia the intervention participants beginning to incorporate physical activity disabled the evidence the women were used to seeing before the intervention and decreased the power of habitual negative thoughts about physical activity. In addition, Sue and Julie identified practical and utilitarian methods of being active that led to double advantages being associated with their physical activity. Without the benefit of the intervention though Helen was stuck in an attempt-fail-attempt cycle.

Although Seligman's (1994) theory did not include direct reference to physical activity, he has applied the theory to weight. Seligman rated the issue of weight as deep because it is strongly controlled biologically and psychologically. According to Seligman the type of work done, the way we love, and our preferences for play are all reflected in our weight. Therefore, changing weight for the long-term is very hard compared to managing it in the short-term. Helen's story reflected similar types of difficulties in her attempts to change her physical activity levels in terms of her work and play preferences for sedentary work and hobbies that required extensive unproductive (for physical activity) work and travelling time.

Seligman's theory also refers to seasonal energies similar to those that affected Julia's dog walking. Julia walked more often in longer daylight hours. In line with Seligman's theory Julia made links between energy cycles seen in nature and her physical fluctuations. Julia noticed that whereas summer is an active winter is biologically a time of hibernation, slowing down, or conserving energy. Sue and Julia's stories both reflected ways in which changed thinking, changes actions that then can lead to what I have termed "spillover effects".

#### Future Research

Researchers could investigate methods designed to engage sedentary people in physical activity. To the degree that both Sue and Julia found the "everything counts" and "it doesn't matter how much" approaches positive credos for their motivation to be more physically active, these notions and others could be tested against more prescriptive approaches. This type of research is particularly important because physical activity choice and preferences appear to be powerful self-motivators. People could benefit by interventions

that provide immediate evidence with which to dispute entrenched beliefs. Seligman's (1994) theory raises issues about the depth of beliefs about physical activity. Thus, research examining physical activity beliefs of men and women could be helpful in uncovering the depth of physical activity beliefs. The stepped approach of the LLIU assisted some participants to deal with interruptions to their physical activity, for instance when unexpected surgery was required. Research to identify the effectiveness of a modified LLIU (in line with conclusions from the two present studies) could be a useful follow up to the LLIU. Furthermore, research into the "recycling" view of behaviour change (Prochaska et al., 1994) could usefully explore whether long-term change is generally achieved as a succession of short-term increases in physical activity interspersed with times of lower physical activity. Exploring the nature of physical activity change as suggested here could reduce the likelihood of non-compliance with physical activity change occurring through demotivation. Demotivation can occur when health practitioners continue to advocate physical activity prescriptions while perceiving people to be, or labelling them, "failures" at long-term behaviour change. As such, the messages and fundamental understanding of exercise behaviour change by medical practitioners warrant investigation. In many cases medical practitioners' advice is sought first in the intention to change process, therefore they need to be informed and helpful change agents. Despite the extensive literature in the area of exercise prescription the range and extent of information, the understanding practitioners have for their patients, or the level of change they promote to their patients is not clear.

### Conclusion

Essentially, the case examples showed study participation for Sue, and Julia was positive and provoked thought and focus on physical activity for one year. For Sue,

participation in the adoption treatment condition resulted in more physical activity in the forms of walking and playing soccer. Julia's intervention participation experience within the maintenance treatment condition led to an awakening, first to physical activity by walking her dogs, and second, to exercise in a gym setting. For Helen, participation in the waiting list control condition did not lead to anything more than thinking a little more about doing physical activity, and sporadic, brief periods of physical activity. The major finding from this in-depth study is that physical activity attitudes and levels changed primarily as a result of identifying and utilising practical and utilitarian strategies. In addition, potent physical activity change was seen when internal and external motives were met. Commitment, also termed self-liberation in the Transtheoretical Model and possibility thinking resulting from family influences, gap-filling, and sacrifice, led to more physical activity in both treatment conditions. Spillover effects of thinking positively about physical activity, increased efficacy for physical activity, and improved confidence, permeated the women's physical activity arenas and into work parameters. The outcomes were the desired goal of beginning to be more physically active, and the spillover effect across other areas. Future research could focus on developing effective engagement strategies for sedentary people, the depth of physical activity beliefs, variability in gender beliefs about physical activity, and patterns of change across the long-term.

## CHAPTER 6: THESIS DISCUSSION

## Overall Conclusions

The adoption and maintenance of physical activity in sedentary, mid-life women involved a 12 month intervention, whereby 76 participants were invited to join a program entitled the Life: Live It Up (LLIU). Applying strategies drawn from four major psychological theories previously applied with physical activity interventions, resulted in many participants experiencing increased vitality and lowered negative affect. The effectiveness of the LLIU intervention was assessed with a mixed-methods approach, whereby quantitative assessments of intervention effectiveness were followed up with in-depth interviews (Henderson, Ainsworth, Stolarczyk, Hootman & Levin, 1999). The results were inconclusive largely because of the high attrition rate. The high attrition rate was likely attributable to the longitudinal nature of the study or the minimal use of strategies to keep people engaged in the research. The qualitative component of the mixed-methods design yielded responses that varied considerably in depth. Some participants were attempting to become physically active in contexts that were often pressured and variously demanding. In addition several participants reported compartmentalising aspects of their lives including physical activity. Partitioning off aspects of their lives was perceived as useful despite the conflicts that arose from doing so.

As a consequence of the inconclusive results derived from the Scottish Physical Activity Questionnaire, Medical Outcomes Short Form 36, Positive Affect Negative Affect Schedules questionnaires and ejournal data, I proceeded to

conduct supplementary interview and case examples investigating the influence of the LLIU intervention's influence with a number of the original participants from a qualitative perspective. The identification and application of strategies with practical aspects were perceived as helpful for physical activity in the short and long term. Furthermore, the transtheoretical model-based aspects of the spiral nature of change and consciousness-raising were pertinent to repeated self-change attempts. Consciousness-raising, however, was not enough to change behaviour for people in the contemplation stage of change such as Helen, a control condition participant. Increasing the advantages (pros) associated with physical activity and undertaking specific types of activity that provided double benefits was helpful for a number of participants. In addition, for some of the women change and progression occurred for a range of time periods. For others, injury, illness or depression interrupted their flow causing them to put physical activity "on the back burner" until circumstances changed for the better. Also, participants described how changed attitudes improved their self-motivation, such as thinking everything they did incrementally counted towards their physical activity, change was thus a matter of choice with small amounts of activity being considered as better than no activity.

In this final chapter, I endeavour to draw overall conclusions relating to a range of issues. First, I consider the issues arising from the use of strategies to increase physical activity that were drawn from the psychological theories (SET, TPB, SDT, & TTM). Second, I discuss the effectiveness of the LLIU intervention. Third, I explore several unexpected outcomes of research participation relating to

control condition participants. Fourth, I examine methodological issues particularly relating to physical activity measures and problems regarding research with sedentary people. I conclude with recommendations for future research and implications for the application of interventions aimed at increasing physical activity for sedentary people in the long term.

#### Major Issues Arising From Theory-Based Strategies

Conclusions regarding the participants' experiences are limited because of high attrition and some unexpected outcomes discussed later in this chapter. Much of the physical activity reported by treatment condition participants appears to be related to the theory-based strategies learned in the intervention, for example, goal-setting and action choice. The sporadic and intermittent attempts at physical activity reported by control condition participants, however, appeared more related to temporary environmental changes, such as fluctuating work commitments or holidays. The theory-based strategies applied with participants in both treatment conditions at the start of the intervention were goal-setting, including elements of planning and commitment (SET), action choice (TPB/TTM/SDT), positive self-talk; social support (SDT/TTM/SCT), situational and visual cues (SDT), and verbal persuasion (SET). Some strategies were clearly more influential for physical activity than others.

#### *Influential strategies for treatment condition participants*

Findings from the reflective journals and the interviews showed that goal-

Table 6.1

Strategies perceived as successful for physical activity for treatment condition participants

Strategy	Theory Link
Goal Setting	Self-Efficacy /reciprocal determinism & mastery Transtheoretical Model
Action Choice	Transtheoretical Model Theory of Planned Behaviour Self-Determination Theory/locus of causality & volition
Re-evaluation	Transtheoretical Model
Positive Review & Reframing	Theory of Planned Behaviour/ positive attitude formation & task adaptation

setting and action-choice were perceived to be the most influential strategies for improving physical activity levels (Table 6.1). First goal setting is a strategy previously shown to be effective for physical activity in relation to both self-efficacy theory and the transtheoretical model. Goal setting is related to the second key aspect of self-efficacy theory that is having and developing self-efficacy to perform specific tasks (Bandura, 2000). Goal setting in terms of self-efficacy is behaviour relating to reciprocal determinism, being the interaction between a person, specific behaviour, and the environment. Goal setting was included as a strategy in the LLIU program because Bandura specifically

proposed goal setting as likely to lead to task mastery and subsequent maintenance of new behaviour. I found that goal setting was welcomed by some participants yet other participants were not convinced of its utility and hence were somewhat resistant. Certainly for some participants identifying goals that were realistic in the context of their lives was straightforward and led to mastery. In addition the women who experienced mastery began to see “spillover effects” whereby physical activity changes extended into their workplaces and relationships. The spillover effect reflects a positive intervention outcome that is somewhat contrary to the findings of other self-efficacy research in the physical activity domain. According to Bandura (1997) increasing self-efficacy for one specific task is not readily generalisable to other tasks, however, the spillover effect reported by LLIU participants is promising for the development of a generalised sense of confidence about meeting the challenges of mid-life. Spillover effects were evident when the women gained self-efficacy for physical activity yet also began to experience self-confidence in the workplace and in family relationships. After examining the experience of those who were not convinced about using goal setting I found that realistic goal setting was prematurely dismissed as futile and false. Specifically, to set small goals was akin to pretending to change, rather than actually changing for these women.

*Action Choice.* The second strategy that was influential for the physical activity of sedentary women related to three of the four theories under discussion here. Choice, specifically “Action Choice” was applied as a strategy that features in the Theory of Planned Behaviour, Transtheoretical Model, and Self-

determination theories, in both the adoption and maintenance conditions. Across the duration of the intervention participants exercised action choice where people decide themselves which action to undertake. Option choice is where people choose to act according to one of several predetermined alternatives. Reeve, Nix, and Hamm (2003) showed action choice can be influential for increasing intrinsic motivation. Reeve et al., performed several studies with the aim of extending self-determination theory knowledge about choice. Initial work was focussed on finding a “best-fit” model for internal locus of causality, volition, and perceived choice. Perceived choice was not, however, a good fit in the best model. In each of the seven proposed models internal locus of causality and volition were most influential for intrinsic motivation. In self-determination theory, enjoyment relates to the absolute influence of intrinsic motivation in propelling people into action. In the current research, I found that the enjoyment experienced while being active typified the influence of intrinsic motivation on the adoption and maintenance of physical activity. For example, Sue’s experience with her family would certainly indicate the presence of motivational strength associated with relationships and physical activity. My findings concerning meaning and enjoyment associated with specific tasks are consistent with O’Connor and Chamberlain (1996).

Investigating possible sources of meaning for people at mid-life O’Conner and Chamberlain found relationships and nature to be strongly influential. Some of the women interviewed by O’Conner and Chamberlain commonly spoke of relationships as “concentric rings” where the partner was in the centre, children were in the next ring, and then rings spread out to include many types of

relationships (e.g., work colleagues and acquaintances). The treatment case examples in the present study lend weight to the importance of relationships in exercise motivation. Regarding the influence of nature O'Connor and Chamberlain found that over half their participants found meaning that related to nature whereby participants spoke of the enjoyment and pleasure they found in nature, for example when watching a river flow over stones, or paddling in mud. Despite this evidence and that in the LLIU motivation to walk for some stemmed from the sensory enjoyment experienced during routes that included flora. For others though, the motivation to walk was enhanced by practical aspects of the activity. For instance, walking the dog was both beneficial for both animal and owner.

In terms of relationships, the LLIU outcomes indicated mid-life women are often set in behaviour patterns that complicate working to other people's timetables. Yet, the motivation provided by physical activity linked with benefits for the participants and others that are important to them was strong. Thus, although the motivational strength of relationships for increasing physical activity has been established in some sub-populations such as younger people, the current findings are inconsistent with previous research with younger people.

#### *Less Influential Strategies for Treatment Condition Participants*

Positive self-talk, social support, situational and visual cues and verbal persuasion appeared to be less useful strategies for participants in the treatment conditions. These findings contrasted with outcomes from physical activity research based on the Transtheoretical Model (Gorely & Gordon, 1995).

*Positive self-talk.* Using positive statements to increase perceived competence, and, thus, motivating themselves to do more physical activity, was apparently of no value to most of these women. Dislike of positive self-talk may have arisen because the process was not adequately explained during the workshop or because as one participant remarked positive self-talk was “too American”.

*Social support.* The strategy of social support had been applied in previous research based on the Transtheoretical Model, the Theory of Planned Behaviour and Self-efficacy Theory. Social support was encouraged for both treatment condition participants. Social support, also known as forming helping relationships, had also been applied successfully with other sub-populations. Success with social support in previous physical activity interventions with younger people has also been reported. Similarly to Eyster, Brownson, Donatelle King, Myller and Sallis (2001), I found social support was not strongly influential on physical activity. Whereas, Eyster et al. found social support somewhat influential for regular exercise my cohort did not find this. In fact in some cases social support from family was actually negative.

Social support was not an effective motivational strategy, however, for most of the women in the LLIU study. It appeared that time constraints for the 45 to 59 year old age range cohort were such that fitting in with another person was almost impossible even if the other person’s intention was to support the participant. Difficulties in fitting in with others related to entrenched loyalty to support and fit in with partners, parents, children, grandchildren, or needing to plan around

holidays, work, hobbies, and other commitments. Consistent with the conclusions of Van der Bij (2002) and Wilcox, King, Brassington and Ahn (1999) age appears to have a negative effect for social support from groups or individuals finding that people over 40 prefer solitary forms of exercise.

*Situational and Visual Cues.* Identification of cues was discussed briefly in the workshop and in some reflective journal responses participants commented on using cues, such as putting dog leads by the door or having walking shoes at their workplace. At the workshop and in the maintenance briefing sessions participants took a couple of A4 sized posters that contained short statements for use as situational or motivational cues. For instance, the posters (sourced from the Alberta Centre for Active Living) included messages like small steps make big differences, step up to a healthier lifestyle, and the victory is not always to the swift, but to those who keep moving.

*Verbal Persuasion.* Although it is a key strategy in Self-efficacy Theory verbal persuasion was difficult to assess. Verbal persuasion could have been evidenced from any of three areas of LLIU intervention. Contrary to expectations, there were only a few comments about the video that was used as a VP strategy in the LLIU. Some women commented in their journals and interviews about experiencing enjoyment from attending the workshops with like-minded women, but again the comments could not be directly associated with verbal persuasion. Positive comments were made in journals and interviews about the attitude and general approach of the facilitator being helpful for changing their thinking about what constitutes physical activity. But contrary to expectations participants did

not comment directly on how persuaded they were to do more physical activity. Possibly the facilitator (myself) was not sufficiently regarded as an “important other” in the way a doctor or other exercise professional may have been perceived.

#### Maintenance Meeting Strategies

The maintenance strategies of re-evaluation, self-reinforcement, positive review and reframing, countering (task adaptation), environment control and positive attitude formation were implemented at 40 weeks, with maintenance condition participants. The strategies that were most influential for physical activity according to the reflective journals and interviews were re-evaluation (TTM) and positive review and reframing (TPB). It should be noted that the implementation of these strategies was of necessity at one level quite superficial for several reasons. First, I had a limited budget for the study and second, the intention was to provide a range of strategies to appeal to as many participant preferences as possible while acknowledging that participants could use a combination of strategies.

#### *Influential Strategies for Maintenance Condition Participants*

*Re-evaluation.* Self re-evaluation was one of the first activities covered in the maintenance meeting, however, re-evaluation was also encouraged across the year for participants who completed ejournals. Based on the Theory of Planned Behaviour (TPB), re-evaluation is one of the strategies influential for physical activity. Although not a physical activity theory per se TTM strategies were included partly because of the consistent reports of their influence on behaviour

change (Marcus, Banspach, Lefebvre, Rossi, Carleton, & Abrams, 1992). Specifically, previous research undertaken with people in the contemplation and preparation stages of physical activity change, self re-evaluation was strategy provoking for behaviour change (Courneya & Bobick, 2000). Ejournal responses from some of the women clearly spoke of the benefits they felt from reviewing their physical activity during the previous month and engaging prospectively with the next month's planned physical activity. In their accounts about aspects of the motivational workshop, some of the women reported habitually reflecting on where they wanted to be physically active, such as walking outside. The act of reflecting in the ejournals about their positive physical activity experiences may also have enabled them to re-experience those sensations vicariously.

*Positive review and reframing.* During interviews and from the information provided by ejournal responses, the review aspects of ejournaling appeared to lead to renewed efforts to meet planned goals. As such, the role of ejournals as a positive form of review and in terms of the reframing they promoted, particularly enhanced the participants' abilities to meet their planned goals. Strengthened positive review of previous month's thoughts and activities reportedly also helped keep participants involved in the research.

Sue's reports in particular exemplified the positive influence that reframing chosen activity could have.

*Countering.* The TTM-based strategy of countering is where alternative behaviours are adopted in place of problem behaviours or where task adaptation takes place. For instance in the LLIU program participants' described how, they

changed routine behaviours such as shopping habits to facilitate more walking, used bathroom facilities farther from their office or used a manual lawn mower rather than a ride-on mower.

*Less Influential Strategies for Maintenance Condition Participants*

Verbal Persuasion was delivered to participants in the maintenance meeting as a video segment featuring an Australian athlete and fitness expert (Sue Stanley). Verbal persuasion was not particularly influential for LLIU participants. Although considered interesting at the time of viewing the level of influence for physical activity attributed to this strategy appeared to be negligible. Self-talk was also included in the LLIU and could be categorised as a form of self verbal-persuasion. Consistent with previous research into the efficacy of self-talk in sports (Van Raalte, 1997) the efficacy of various types of self-talk remains unclear. Self-talk can include covert, silent internal experiences to overt vocalizations, and from spontaneous self-expression to statements induced by others” (Van Raalte, 1997). In the LLIU self-talk in the form of spontaneous self-expression was not particularly evident. Of the few who reported using self-talk several reported feeling more positive in their approach to behaviour change.

*Positive Attitude Formation.* Phrases delivered during workshops and in text that accompanied the ejournal delivery served to bolster positive attitude formation. From the interviews it was clear that when treatment condition participants perceived every activity counted towards being physically active they experienced self-liberation, or what I termed “licence to change.” Positive attitude formation was closely associated with reduced guilt. The strategy of positive

attitude formation was drawn from the Theory of Planned Behaviour. Positive attitude formation is influenced by a person's beliefs and their outcome expectancy (Biddle, Hagger, Chatzisarantis, & Lippke, 2007). In line with Courneya and Bobick's (2000) findings that attitude was influential on physical activity when intention and self-efficacy were combined it appeared that positive attitude formation also generated a level of "licence to change" in the current cohort. The "licence to change" also appeared to be produced by guilt reduction and again that generated for some participants, the motivation to change their physical activity levels. Although some of the increased physical activity levels were not sustained, self-liberation appeared helpful for people in the initial stages of change. Subjective reports from LLIU participants contrasted with the findings of Prapavessis, Maddison, Ruygrok, Bassett, Harper and Gillanders (2005) where attitudes did not influence physical activity as much as subjective norm or perceived behavioural control. These contrasting findings may occur because the clinical nature of the sample tested by Prapavessis et al., or could indicate the limitation of qualitative findings generalisability.

I conclude that goal setting, action choice, re-evaluation, reflection (journals), reframing (task adaptation), and positive attitude formation (reduction of guilt) were the most positively influential for physical activity. Conversely, positive self-talk, social support, planning, consciousness-raising, and self-reinforcement, were perceived as less influential.

There are several other important issues related to the use of theory, that with hindsight might have added to the research. Specifically, self-efficacy for

physical activity was not measured. When choosing measures, I considered a range of factors including the time measures take to complete and their reliability and validity. Other researchers have explored self-efficacy for physical activity both as a correlate and outcome of physical activity in previous research (Bandura, 1997; Glanz & Rimer, 2002; McCauley & Courneya, 2002). A key concept of SET is that personal beliefs about the capability to be physically active have a greater influence on activity than the actual capability to perform the behaviour. That LLIU women sought to increase their physical activity through the LLIU may indicate readiness to contemplate changing physical activity levels rather than the presence of positive beliefs about their self-efficacy for physical activity. Without specific measurement of readiness and self-efficacy, however, I can draw no inference. Unlike, participants in many other studies these LLIU participants had very low levels of physical activity and no history of consistently mastering regular physical activity. Self-efficacy as an outcome of the LLIU was evident from both the ejournal and interview findings. I found that according to participants' responses, in relation to strategies drawn from the SET, the personal mechanisms of performance accomplishments, mastery experiences, and self-efficacy for physical activity were the most influential elements in relation to physical activity. In addition, regarding the Transtheoretical Model, consciousness-raising, countering (task adaptation) and re-evaluation were considerably helpful for physical activity adoption and maintenance. Regarding self-determination theory-based strategies, volition and enjoyment featured

largely in ejournal and interview data. Each of these findings was consistent with previous research.

### Unexpected Outcomes

Although the baseline scores of the control condition participants were similar at baseline, it was somewhat surprising that several control participants engaged in physical activity for extended periods. Possibly the control condition activity level increases can be attributed to the tendency for people to participate in areas they are interested in as a sign of psychological readiness. Competition is another possible reason why several control condition participants may have increased activity. They perhaps took on a type of challenge mentality and wanted to compare favourably with intervention group participants. The combined effect of the increased and sustained activity of the several control condition participants with high attrition rates worked against demonstrating quantitative differences between groups. At the time of volunteering potential participants did not know which condition they would be randomly assigned to. Possibly the control participants with increased physical activity were prepared to change and simply continued with their plan for change. Other control participants mostly carried out sporadic and intermittent physical activity largely driven by external events. These sporadic attempts likely reflect natural or spontaneous fluctuations in physical activity levels rather than sustained long-term changes to their low levels of physical activity.

## Methodological Issues

### *Strengths of the Studies*

The strengths of the intervention study included identification and application of theoretical foundations as content focussed, use of mixed-methods, and the capacity to improve the self-motivation of previously sedentary women to focus on increasing their physical activity across the year. The interview study elicited deeper reflections on physical activity than the journal responses provided during the intervention study. In addition, by focussing on case examples of three particular participants drawn from the original intervention study, it was possible to gain further insight into the specific experiences of adoption, maintenance, and control condition participants. The case examples of the specific experiences of the two treatment condition participants show how creative use of time can result in double benefits in physical activity. Conversely, the control condition participant generally remained in a state of frustration about her physical activity levels, and made intermittent and sporadic attempts to be physically active.

*Mixed Methods.* The use of mixed methods proved advantageous for several reasons. Mixed-methods, that is linking qualitative and quantitative data allows the blending of information that adds to the veracity of social science research (Henderson, Ainsworth, Stolarczyk, Hootman & Levin, 1999). While it is important to acknowledge that quantitative and qualitative data may have traditionally been valued differently, qualitative approaches are accepted nowadays more as a bona fide approach suitable to exploring various research questions. Henderson, et al. described three approaches to mixed method data

collection termed (i) antecedent or sequential, where qualitative data forms the basis of quantitative instrument development and qualitative data provides contextual background, (ii) primary and secondary combinations where quantitative data provides the bulk of information, and (iii) encapsulated or nested data linkages, where in-depth interviews embedded in a quantitative study provide additional evidence for the validity of quantitative findings and contextual information.

The encapsulated approach to data gathering adopted in the current study has added useful information regarding the context of sedentary, mid-life women's attempts to change and maintain their physical activity. For instance, new information about both positive and negative aspects of physical activity behaviour change has resulted. In relation to positive aspects of physical activity behaviour change, a number of women reported strong guilt feelings and how guilt was a considerable obstacle to the adoption and maintenance of increased physical activity. They also reported how guilt was reduced through changed thinking. The decrease or removal of guilt was substantially motivating. I identified two main types of guilt in relation to behaviour change, namely guilt connected with family perceptions of mother's role and guilt associated with perceptions of being physically inactive. In the LLIU intervention positive attitude formation was delivered in two ways. One mode of delivery was the workshops the other was through messages of encouragement sent in conjunction with reflective journals. Positive attitude formation was exemplified in the use of positively targeted phrases, for example "everything you do counts towards your

physical activity”. When treatment condition participants perceived all they did, in their roles of partner, mother, and worker as counting towards being physically active they experienced a sense of liberty. I termed this liberty “licence to change” on the basis of the language an interview study participant used.

Negative effects from research participation arose in relation to instrumental aspects. For instance, disappointment at being assigned to the control condition was negative for some participants. Consistent with Mutrie (2007), I acknowledge the challenge that randomisation poses for researchers and their participants. Researchers aim to be as rigorous as possible with their recruitment and assignment to conditions, yet this often means participants in control conditions are disadvantaged. Achieving rigour in laboratory or experimental psychology settings can sometimes minimise randomisation problems but the situation is quite different in research with non-clinical participants. The difficulties associated with randomisation to control conditions can intensify to the extent that participants may drop out, or may become demotivated from participating in further research. Negative effects associated with research interventions were evidenced by feelings of frustration or worthlessness experienced when an action plan had been formed but not implemented. With respect to research participation in the present study new information was identified concerning the guilt that some women may feel after receiving intended motivational messages.

Adopting quantitative and qualitative approaches can be more time consuming than a single method approach. The time to ensure rigour and engage in feedback from participants, be reflexive as interviews are in progress, and

analyse all data with integrity is not required for single method quantitative studies (Fielding & Fielding, 1986; Henderson et al.). Nevertheless, qualitative data yielded rich information that adds to our understanding of the day-to-day struggles, obstacles, or breakthroughs of mid-life sedentary women as they attempted to adopt and maintain physical activity in their life contexts.

#### *Limitations of the Studies*

The primary limitations of these studies were methodological. The weaknesses of the present studies included a lack of statistical power, issues arising from working with sedentary mid-life women who proved to be a difficult population to work with and a lack of context-specific measures of physical activity.

*Lack of statistical power.* Sufficient power to detect medium effect size (effect size of .5) was calculated to be 72 participants, that is 24 participants randomly assigned to each condition. This power calculation was based on the identification of alpha level at .05, and .75 power that is appropriate for behavioural sciences (Cohen, 1988; Thomas & Nelson, 1996). Faced with difficulties accessing sufficient numbers of participants in the available time frame I was aware of the importance of specific strategies (e.g. reflective journals) to keep participants engaged with the study. Greater than anticipated attrition, however, led to insufficient statistical power to detect medium effects.

Assessment of many physical activity interventions could be, and often is measured primarily by the amount of physical activity undertaken before, during, and after an intervention. In many situations, objective measurement of physical

activity is helpful. Quantitative data can provide factual information that is valid, reliable and generalisable (Henderson, Ainsworth, Stolarczyk, Hootman & Levin, 1999). Two of the distinct advantages of collecting quantitative data are found in the generalisability to a wider population and the identification of significant differences within and between groups. In the LLIU intervention study these potential advantages did not eventuate, primarily because of a larger than expected dropout. The limitations and practical realities of quantitative research methods quickly became apparent. Most intervention studies in the physical activity area have involved younger, more active participants, who were attempting larger changes in physical activity than my participants. In essence, the first study in this dissertation became seriously underpowered. When I realised the first study was under-powered, I considered how to address the problem. During discussions with my supervisor I recognised one of the key limitations of previous physical activity intervention studies was an absence of participants' voices and views relating to their perceptions of attempting to change their physical activity levels. At that early point in my research (2002) it appeared that physical activity researchers favoured self-report measures in frequency (number of days they were active), duration (how long they were active), and intensity (how much physical activity they did). From the largely cross-sectional, quantitative data relating to physical activity interventions available in 2002 a sense of the day-to-day struggles, or barriers, that research participants encountered was missing. Thus, from the literature, it became clear that the context in which physical activity behaviour change is attempted could be influential for physical activity gains.

Furthermore, initial reading around behaviour change and theoretical approaches to behaviour change indicated the largely negative effects that sedentary lifestyles can have on health. There was a large body of literature establishing the benefits of physical activity for physical and mental health. Subjective accounts of women's attempts to change physical activity levels were, however, scarce. Realising the need for information on participants' contexts for and perceptions of change and research participation led to the second study in this dissertation. Since embarking on the dissertation physical activity intervention research has become and remained topical. Previously limited understanding about behaviour change interventions has resulted to an extent some aspects of the current study now being redundant. Physical activity measures sensitive to the content and context of women's lives were also relatively limited in 2002. I commenced a pilot study to develop a physical activity measure titled the Perceived Physical Activity Measure (PPAM). The pilot version of the PPAM is a 5-item measure designed to be simple, relevant to women's work (paid and unpaid), recreation, carer duties, and interests (Morris, Seedsman, Morse, & Morris, 2002). Work on the measure progressed to the point of sending drafts of the measure to an expert panel of 11 expert academics. Panel experts' evaluations of the PPAM's levels were of simplicity (8/10) rapid completion (8/10) clarity (6/10) and physical activity global coverage (6/10). Furthermore, the panel provided additional feedback on how to improve the measure. Based on the extent of panelists' comments and with time constraints of doctoral studies, I decided to suspend development of the PPAM. I chose to use the Scottish Physical Activity

Questionnaire (SPAQ) to assess the physical activity outcomes of the LLIU program assessment. The SPAQ was one of the few validated measures available then that recorded a wide range of physical activities. I expect to extend work on the PPAM following submission of this dissertation.

#### *Research Issues Related to Working with Sedentary Participants*

The high attrition in the LLIU in part testifies to the extent of the problem of keeping participants who are both sedentary and in mid-life in engaged in a longitudinal study. It appears that at mid-life many women may be locked into patterns of behaviour whereby they are “other-focussed” and changing personal physical activity patterns is very difficult. To ask people to commit to a year of research participation especially where they have low self-efficacy for that activity probably requires more direct support than was available in the LLIU intervention used here. During the design phase on the LLIU very little research with sedentary mid-life people was available. Similarly there has been little longitudinal research that has successfully engaged more than 50% of research participants in the physical activity domain. Clearly, people who are physically inactive are reluctant to take up opportunities to be more active, whereas physically active people are often keen to do more physical activity. The affect of these attitudes is that recruitment is far more difficult than for people who are already active (Lowther, Mutrie & Scott, 2002). While acknowledging there might be difficulties in recruitment, I was unprepared for the severe extent of this problem. Thus recruitment was extremely difficult and furthermore keeping sedentary people in the research project was equally difficult. Recruitment of

sedentary participants is difficult because they are unlike typical study volunteers for physical activity research. Volunteers for physical activity studies are frequently already active and are often attracted by opportunities to become more active. This contrasts with the experience of many sedentary people who may actively avoid opportunities to carry out physical activity and this resistance to becoming physically active diminishes the likelihood of research participation. In addition, research participation can be tempered when participants are asked to commit to longitudinal involvement. Finally, there are issues in relation to the definition of the term sedentary. Researchers have applied numerous definitions adding confusion to our understanding, and subsequent ability to compare intervention outcomes. Sedentary and low level physical activity can mean anything from being seated for long periods to doing less than 150 minutes of moderate intensity physical activity across a week. These issues add considerably to the complexity of recruiting and sustaining sedentary participants for motivation research interventions.

Typical informed consent emphasises the right of participants to withdraw. Hence, although a high number of participants withdrew I was ethically bound to refrain from attempts to retain them and was thus was consigned to losing them.

#### Implications for Future Research

I agree with Mutrie's (2007) observation that approaches to change behaviour such as physical activity should take a broad contextual approach. I recommend that future research with sedentary participants is designed with life contexts in view, for example implementing research where physical activity is

explored as one of multiple key factors that influence “energy balance” within life contexts. There are reasonable arguments for continuing research into individual determinants of health such as physical activity and obesity. The separation of components combined with multiple public health messages such as those relating to activity levels like walking or healthy eating, however, have not resulted in widespread healthy behaviours. Perhaps in a similar way to participants in the current research finding double benefits to being physically active, researchers should explore the double benefits associated with action choice and dual component research. I use the term dual component research in LLIU to refer to investigating the combined effects of sedentariness and mid-life on physical activity levels. For instance, instead of looking at physical activity in isolation I explored physical activity within several life contexts (sedentariness and age). Specifically, when investigating sedentary mid-life women I suggest two key considerations. First, recruitment phases should be substantially longer than for younger or more active sub-populations. From the experience gained in the present study rolling recruitment may be required for a year or longer. Wherever possible, over-recruitment is justifiable and perhaps necessary. Second, additional social support for the duration of the intervention is advised in order to minimise attrition. For instance, additional social support could include the establishment of regular telephone contact. Also, appropriate incentives for completed data and for remaining in the research for its duration could be offered, although this may have direct effects on motivation that consequently change outcomes. Further work is needed with respect to what constitutes sedentariness, or even whether other terms

are more appropriate for physical activity literature. Unlike previous research interventions, many of which were with younger participants where supervised exercise sessions were included and resulted in better short-term retention, the current study was conducted with minimal funding. From the in-depth interview findings and journal reflections it was evident that supervised or socially based exercise sessions are less practical for mid-life women. Few of the LLIU participants sustained any group or social sessions as part of their action plans. Moreover, other participants had strong objections to being physically active with their partners or others largely because it was difficult to marry their commitments with potential physical activity partners.

Longitudinal interventions are important in the physical activity area because to date short interventions can be successful but often gains dissipate over time. Future research should therefore be planned around either or both more intensive interventions and longitudinal designs. In addition consistent with Mutrie's (2007) suggestions, I found from the present studies that the close links between task mastery, self-efficacy for physical activity and self-confidence were factors warranting deeper exploration. In particular, self-efficacy and self-confidence seemed to considerably improve LLIU participants' follow through on intentions to be more physically active. Specifically further research to refine and develop the LLIU program could concentrate on the identification, inclusion, and assessment of a range of strategies to minimise attrition. Also, capitalising on the more influential strategies of goal-setting, action choice, and planning is particularly important for engaging with and commitment to the program. Further

development of the LLIU program into an intervention that minimises attrition and maximises the effects of motivational strategies for women would be to incorporate greater interaction between participants and researcher. A more interactive and personally supportive approach within the framework might also reap particular benefits for sedentary mid-life cohorts. For example, a more comprehensive program with rolling recruitment that provides more frequent feedback for participants may substantially improve retention and engagement in the longer term, thus providing the still elusive sustainable physical activity changes urgently needed for mid-life, women. Finally, in view of the utility of a well-supported personal trainer regimen that Julia experienced, further research could explore the value of the LLIU program as a transitional platform for sedentary women. The present study has provided a basis for future research in terms of sedentary mid-life women's physical activity, however, in view of the large number of men who struggle to achieve sufficient physical activity future research could similarly explore the theory-based strategies that men prefer.

#### Implications for Practice

Health professionals, often enter their fields with a view to helping people. Before long they are bombarded with a succession of messages to evaluate and disseminate to clients. In their appropriate zeal to promote the most recent messages health professionals can overlook the life contexts of their patients and clients. Overlooking contexts can lead to the false impression that people are ignoring health promoting messages. Health professionals may become discouraged about promoting physical activity and in the long-term could burnout

or suffer other adverse consequences. Mid-life sedentary women can easily be discouraged. For example, Sue felt stuck on a “merry-go-round”, and her comments led to the conclusion about mid-life women’s physical activity where Sue said there are always “for more than yourself so you’ve always got to think wider than yourself” (L, 725). In connection with physical activity thinking beyond self is complex for sedentary mid-life women, and I suspect for many others. We live in a culture where many platitudes trivialise deeper issues.

Platitudes like “I did it so can you” and “you can do it if you try hard enough or want it enough” or “just do it” are frequently cited in the Australian media. These types of platitudes are echoed across multiple cultures (e.g., school, families, organisations, churches) and leave many people struggling to meet societies high expectations and guilty about their lack of moral fortitude. The overall culture in many western countries can be characterised by a poor understanding of people who are overweight. Overweight people may be labelled lazy or overeaters and the cultural messages often reinforce the ideal of thinness. Bitter contrasts in western society co-exist whereby women are encouraged by some to be physically active and others resent women’s physical activity. Success along the rutted road to behavioural change, particularly in small amounts of physical activity should be applauded. Regarding physical activity any success is hard won, and is often the result of true perseverance that is sometimes generated by the capability to follow through on previous decisions and the smart application of the double benefits principle to succeed.

### Concluding Remarks

Designing, developing, and assessing the LIFE: Live It Up program and the follow-up studies, has honed my understanding of motivation for physical activity and several associated theories of motivation. Through this research, I have contributed subjective information to the extremely limited body of knowledge and evidence base about mid-life women's attempts to change their physical activity levels. Despite the high attrition in the first study that reduced the veracity of quantitative evidence for the effectiveness of multi-theory approaches for increasing physical activity the current research represents support for the application of psychological theories for mid-life women's development of their motivation to be physically active. Particularly in relation to the liberation women experience when guilt is reduced. Second study findings considerably expanded the evidence base concerning the debilitating effects of guilt and the usefulness of strategic thinking for motivation for physical activity. In addition, this study provides new understanding of the evidence for motivation for physical activity change being strengthened through workshops and reflective journals. Each of these findings highlight the crucial role of context in mid-life women's motivation for physical activity. In particular, I identified family values, specialist support, and readiness to change as highly motivational for increased physical activity. In addition promising outcomes from this research relate to the effectiveness of the LLIU program in increasing vitality and stimulating positive attitudes towards the spiral and cyclical nature of change with respect to varying types of physical activity and coping with activity following illness or injury. This spiral pattern is

not limited to physical activity change but is recognised across other health behaviour changes (Prochaska, Norcross, & DiClemente, 1994). The trends towards family values, specialist support and readiness to change were particularly positive. The trends were promising because the intervention engaged minimal contact and minimal cost, yet with greater support and resources women may find this type of theory-based intervention useful for increasing their capacity to change their physical activity levels in a sustainable way. Consistent with O'Brien-Cousins and Gillis (2005) conclusions physical activity interventions aimed at people who want to be active yet have no established physical activity patterns may have better outcomes, than interventions with people who are simply contemplating beginning physical activity (e.g., like those in the LLIU program). A large proportion of sedentary mid-life women remain who need to determine sustainable ways of becoming more physically active. Consensus for attention to life contexts as multidimensional and integrated is gaining more attention. The results of the present studies lend support to the importance of identifying and integrating ways of generating sustainable physical activity in non-clinical populations. As expected, some participants in the LLIU program succeeded in making incremental changes in perspectives and behaviour in relation to physical activity. Unexpected double benefits occurred whereby some of the changes in perspectives led to sustained changes in physical activity. Participants reported changes in their awareness of opportunities for physical activity, in adaptability, in willingness to change and in physical activity levels.

Throughout my doctoral journey there were some similarities between the women participating in the research and myself. Like me, for many years prior to making small changes and small shifts in thinking about physical activity, they often lived obstructed by guilt about being sedentary. As a result of my research I now believe that women can forget the joy of living in the moment. Instead we often capitulate to the media and advertorial claims that bombard our daily lives, and tell ourselves to “just do it”, “you’re just lazy”, when it is not so simple. People vary hugely in the kinds of activities they enjoy and have individual likes and dislikes. I contextualise this doctoral work as personally challenging and challenging to my participants as we live influenced by challenges to our commitment to physical activity, and research participation.

In this research the sedentary, mid-life participants’ perspectives provided an original and unique glimpse into the world of behaviour change. The results of this research provide key perspectives for researchers working to help sedentary mid-life women to be physically active during the particularly demanding time of mid-life. The theoretical perspective applied through the LLIU program was a vehicle for behaviour change applying a combination of strategies drawn from multiple behaviour change theories. My personal perspective derived and generated in the dissertation process is of having undertaken an epic journey. The journey has led to understanding followed by dead ends, more understanding, revisions, and hindsight. The combination of these perspectives provides what I trust is a guilt-reduced licence to change for sedentary mid-life women, and myself.

## References

- Abramson, L., Y. Seligman, & M. Teasdale (1978). Learned Helplessness in Humans: Critique and Reformulation. *Abnormal Psychology*, 87 (1), 49-74.
- Acevedo, E., & Ekkekakis, P (Eds.) *Psychobiology of physical activity*. Champaign, Il.: Human Kinetics.
- Ades, P.A., Waldmann, M.L., McCann, W.J., & Weaver, S.O. (1992). Predictors of cardiac rehabilitation participation in older coronary patients, *Archives of Internal Medicine*, 152, 1033.
- ADNFS. (1992). *Allied Dunbar National Fitness Survey (ADNFS)*. London: UK Sports Council and Health Education Authority.
- Ajzen, I. (1988). *Attitudes, personality & behaviour*. Milton Keynes: Open University Press.
- Ajzen, I., & Driver, B.L. (1992). Application of the theory of planned behavior to leisure choice. *Journal of Leisure Research*, 24 (3), 207-224.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ: Prentice-Hall.
- Albright, C. L., Cohen, S., Gibbons, L. Miller, S. Marcus, B., Sallis, J., et al. (2000). Incorporating physical activity advice into primary care: physician-delivered advice within the activity counseling trial. *American Journal of Preventive Medicine*, 18, 225–234
- Alfermann, D., & Stoll, O. (1997). Exercise and self-concept in middle-aged adults. In R. Lidor & M. Bar-Eli (Eds.), *Innovations in Sport Psychology: Linking theory with practice. Proceedings of the International Society of Sport Psychology IX world congress of Sport Psychology (pp.68-70)*. Netanya, Israel: International Society of Sport Psychology.
- American College of Sport Medicine (1998). Position stand. *Medicine and Science in Sports and Exercise*, 6, 975-991.
- Anspaugh, D.J., Hunter, S., & Dignan, M. (1996). Risk factors for cardiovascular disease among exercising versus non-exercising women. *American Journal of Health Promotion*, 10 (3), 171-174.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual version IV*. Washington, DC: American Psychiatric Association.

- Armitage, C. J., & Conner, M. (2000). Social cognitive models and health behaviour: A structured review. *Psychology and Health, 15* (2), 173-190.
- Armitage, C.J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Educational Psychology, 40*, 471-499.
- Armstrong, T., Bauman, A., & Davies, J. (2000). *Physical activity patterns of Australian adults: Results of the 1999 National Physical Activity survey*. Canberra: Australian Institute of Health and Welfare.
- Australian Bureau of Statistics. (2004). *Causes of death in Australia, (3303.0)*. Canberra: Australian Government Publication.
- Australian Bureau of Statistics. (2005). *Annual Report. 1001.0*. Canberra: Australian Government Publication.
- Australian Institute of Health and Welfare (AIHW) (2006). *Diabetes: Australian Facts*. AIHW cat. no CVD 20. Canberra: Commonwealth Department of Health and Ageing.
- Bandura, A. (1977a). Self-Efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191-215.
- Bandura, A. (1977b). *Social Learning Theory*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.
- Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, New Jersey: Prentice-Hall Inc.
- Bandura, A. (1997). *Self-Efficacy: The exercise of control*. New York: W.H. Freeman & Co.
- Bandura, A. (2000). Health promotion from the perspective of social cognitive theory. In P. Norman, C. Abraham, & M. Conner (Eds.), *Understanding and changing health behaviour* (pp. 299-339). Reading, UK: Harwood Publishers.
- Bandura, A. Blanchard, E.B., & Ritter, B. (1969). Relative efficacy of desensitization and modeling approaches for inducing behavioral, affective, and attitudinal changes. *Journal of Personality and Social Psychology, 13* (3), 173-199.
- Bauman A., Ford, I., & Armstrong, T. (2001), *Trends in population levels of reported physical activity in Australia, 1997, 1999, 2000*. Canberra: Australian Sports Commission.

- Bauman, A., Smith, B., Stoker, L., Bellew, B., & Booth, M. (1999). Geographical influences upon physical activity participation; evidence of a 'coastal effect'. *Australian and New Zealand Journal of Public Health*, 2 (3), 322-324.
- Beck, J.S. (1995). *Cognitive therapy. Basics and beyond*. New York: Guilford Press.
- Becker, M. H. (1974). The health belief model and sick role behaviour. *Health Education Monograph*, 2, 324-508.
- Becker, M. H., Haefner, D. P., Kasl, S. V., Kirscht, J. P., Maiman, L. A., & Rosenstock, I. M. (1977a). Selected psychosocial models and correlates of individual health-related behaviors. *Medical Care*, 15 (Supplement), 27-46.
- Benditt, R. (2004). *Depression as a barrier to older adult participation in physical activity*. Research Update, Alberta Centre for Active Living, retrieved March 12, 2004 from [www.centre4activeliving.ca/Research/ResearchUpdate/2004/ActiveLivingMarch.html](http://www.centre4activeliving.ca/Research/ResearchUpdate/2004/ActiveLivingMarch.html).
- Bennett, J.A., Winters-Stone, K., Nail, L.M., & Scherer, J. (2006). Definitions of sedentary in physical-activity trials: a summary of the literature. *Journal of Aging and Physical Activity*, 14 (4), 456-477.
- Berger, B.G. (1996). Psychological benefits of an active lifestyle: What we know and what we need to know. *Quest*, 48 (3), 330-353.
- Berger, B.G. (2004). Subjective well-being in obese individuals: The multiple roles of exercise. *Quest*, 56, 50-76.
- Berger, B.G., Pargman, D., & Weinberg, R.S. (2007). *Foundations of exercise psychology*. Chicago, Il.: Human Kinetics.
- Bernstein, M.S., Morabia, A., & Sloutskis, D. (1999). Definition and prevalence of sedentarism in an urban population. *American Journal of Public Health*, 89 (6), 862-868.
- Biddle, S. (1995). Exercise and psychosocial health. *Research Quarterly for Exercise and Sport*, 66 (4), 292-298.
- Biddle, S., & Fox, K.R., & Boutcher, S.H. (2000). *Physical activity and psychological well-being*. London: Routledge.

- Biddle, S., Hagger, M., Chatzisarantis, N., & Lippke, S. (2007). Theoretical frameworks in exercise psychology. In G. Tenenbaum, & R. Eklund (Eds.), *Handbook of Sports Psychology* (pp. 537-599). (3rd ed.), New York: Wiley.
- Biddle, S.J.H., Markland, D., Gilbourne, D., Chatzisarantis, N., & Sparkes, A. (2001). Research methods in sport and exercise science: Quantitative and qualitative issues. *Journal of Sports Sciences*, 19, 777-809.
- Biddle, S., & Mutrie, N. (2001). *Psychology of physical activity: determinants, well-being and interventions*. London: Routledge.
- Biddle, S., & Nigg, C. R. (2000). Theories of exercise behaviour. *International Journal of Sport Psychology*, 31, 290-304.
- Biddle, S., Soos, I., & Chatzisarantis, N. (1999). Predicting physical activity intentions using goal perspectives and self-determination theory approaches. *European Psychologist*, 4 (2), 83-89.
- Blair, S.N. (2001). Foreword. In S. J. H. Biddle & N. Mutrie (Eds.), *Psychology of Physical Activity: exercise determinants and interventions*. London: Routledge.
- Blissmer, B., & McAuley, E. (2002). Testing the requirements of stages of physical activity among adults: The comparative effectiveness of stage-matched, mismatched, standard care, and control interventions. *Annals of Behavioral Medicine*, 24(3), 181-189.
- Bock, B.C., Marcus, B.H., Pinto, B.M., & Forsyth, L.H. (2001). Maintenance of physical activity following an individualized, motivationally tailored intervention. *The Society of Behavioral Medicine*, 23 (2), 79-87.
- Bodin, T., & Martinsen, E.W. (2004). Mood and self-efficacy during exercise in clinical depression. A randomized controlled study. *Journal of Sport and Exercise Psychology*, 4, 623-633.
- Booth, M.L. (2000). Assessment of Physical Activity: An International Perspective. *Research Quarterly for Exercise and Sport*, 71 (2): s114-20.
- Booth, M.L., Owen, N., Bauman, A., Clavisi, O., & Leslie, E. (2000). Social-cognitive and perceived environment influences associated with physical activity in older Australians. *Preventive Medicine*, 31, 15-22.
- Boreham, C. (2006). Physical activity for health. *Journal of Sports Sciences*, 24 (9), 917-918.

- Brenes, G.A., Strube, M.J., & Storandt, M. (1998). Exercise, older adults and the theory of planned behavior. *Journal of Applied Social Psychology, 28* (24), 2274 -2290.
- Brown S., & Conn, V. (1995). Self-efficacy and walking post-CABG. *Rehabilitation Nursing Research, 4*, 64-71.
- Buckworth, J. (2000). Exercise determinants and interventions. *International Journal of Sport Psychology, 31*, 305-320.
- Buckworth, J., & Dishman, R. (2002). *Exercise Psychology*. Chicago, IL: Human Kinetics.
- Buckworth, J., Lee, R.E., Regan, G., Schneider, L.K., & DiClemente, C.C. (2006). Decomposing intrinsic and extrinsic motivation for exercise: Application to stage of motivational readiness. *Psychology of Sport and Exercise, 8* (4), 441-461.
- Callery, P., & Morris, T. (1997). Imagery, self-efficacy and goal kicking performance. In R. Lidor and M. Bar-Eli, (Eds.), *Innovations in Sport Psychology: Linking theory with practice. Proceedings of the International Society of Sport Psychology IX world congress of Sport Psychology* (pp.169-171). Netanya, Israel: International Society of Sport Psychology.
- Campbell, P.G., MacAuley, D., McCrum, E., & Evans, A. (2001). Age differences in the motivating factors for exercise. *Journal of Sport and Exercise Psychology, 23*. 191-199.
- Canadian Fitness and Lifestyle Research Institute (CFLRI). (2000). *2000 physical activity monitor*. Retrieved 2001, from <http://www.cflri.ca/cflri>
- Cardinal, B.J., & Sachs, M.L. (1995). Prospective analysis of stage-of-change for exercise movement following mail-delivered, self-instructional exercise packets. *American Journal of Health Promotion, 9*, 430-432.
- Carels, R.A., Darby, L.A., Cacciapaglia, H.M., & Douglass, O.M. (2004). Reducing cardiovascular risk factors in postmenopausal women through a lifestyle change intervention. *Journal of Women's Health, 4*, 412-426.
- Case-Smith, J., Sainato, D., McQuaid, J., Deubler, D., Gottesman, M., & Taber, M. (2007). IMPACTS project: Preparing therapists to provide best practice early intervention services. *Physical and Occupational Therapy in Pediatrics, 27* (3), 73-90.
- Chesnut, C.H. (1993). Bone mass and exercise. *The American Journal of Medicine, 95* (5A), 34s-36s.

- Charmaz, K. (1995) Grounded Theory. In J.A. Smith, R. Harre, and L.V. Langenhove. (Eds.), *Rethinking Methods in Psychology*. London: Sage.
- Cheng, Y.J., Macera, C.A., Addy, C.L., Wieland, D., & Blair, S.N. (2003). Effects of a physical activity on exercise tests and respiratory function. *British Journal of Sports Medicine*, 37 (6), 521-528.
- Choi, P. Y. L. (2000). *Femininity and the Physically Active Woman*. London: Routledge.
- Choi, P. Y. L., & Mutrie, N. (1997). The psychological benefits of physical exercise for women: Improving employee quality of life. In J. Kerr, A. Griffiths, & T. Cox (Eds.). *Workplace Health: Employee Fitness and Exercise*. London: Taylor & Francis.
- Choi, P. Y. L., & Salmon, P. (1995). Menstrual cycle change in competitive sports-women, keep fitters, and sedentary women. *British Journal of Clinical Psychology*, 34, 447-460.
- Clark, D.O., & Nothwehr, F. (1999). Exercise self-efficacy and its correlates among socioeconomically disadvantaged older adults. *Health Education Behaviour*, 26 (4), 535-546.
- Conn, V. (1998). Older adults and exercise: Path analysis of self-efficacy related constructs. *Nursing Research*, 47 (3), 180-189.
- Conn, V. (1997). Older women: Social cognitive theory correlates of health behavior. *Women and Health*, 26 (3), 71-84.
- Connor, M., & Armitage, C.J. (1998). Extending the Theory of Planned Behaviour: A review and avenues for further research. *Journal of Applied Psychology*, 28 (15), 1429-1464.
- Cooper, A.R., Moore, L.A., McKenna, J., & Riddoch, C.J. (2000). What is the magnitude of blood pressure response to a programme of moderate intensity exercise? Randomised controlled trial among sedentary adults with unmedicated hypertension. *British Journal of General Practice*, 50, 958-962.
- Courneya, K. (2004). Antecedent correlates and theories of exercise behaviour. In T. Morris & J. Summers, *Sport Psychology: Theory applications and issues*, (2nd ed.). Milton, Queensland: John Wiley & Sons.

- Courneya, K.S., & Bobick, T.M. (2000). Integrating the theory of planned behavior with the processes and stages of change in the exercise domain. *Psychology of Sport and Exercise*, 1 (1), 41-56.
- Courneya, K.S., & McAuley, E. (1995). Reliability and discriminant validity of subjective norm, social support, and cohesion in an exercise setting. *Journal of Sport & Exercise Psychology*, 17, 325-337.
- Courneya, K. S., Vallance, J. K. H., Jones, L. W., & Reiman, T. (2005). Correlates of exercise intentions in non-Hodgkin's lymphoma survivors: An application of the theory of planned behavior. *Journal of Sport & Exercise Psychology*, 27 (3), 335-349.
- Cox, K.L., Burke, V., Beilin, V.A., Grove, L.J., Blanksby, B.A., & Puddey, I.B. (2001). Blood pressure rise with swimming versus walking in older women: The Sedentary Women Exercise Adherence Trial 2 (SWEAT 2). *Journal of Hypertension*, 24 (2), 307-314.
- Craft, L.L. (2005). Exercise and clinical depression: Examining two psychological mechanisms. *Psychology of Sport and Exercise*, 6, 151-171.
- Crews, D.J., & Landers, D.M. (1987). A meta-analytic review of aerobic fitness and reactivity to psychosocial stressors. *Medicine and Science in Sports and Exercise*, 19 (5: supplement), S114-S120.
- Crombie, I.K., Irvine, L., Williams, B., McGinnis, A.R., Slane, P.W., Alder, E.M., et al. (2004). Why older people do not participate in leisure time PA: A survey of activity levels, beliefs and deterrents. *Age and Ageing*, 33 (3), 287-292.
- Crone, D. (2002). *Physical activity and health - A qualitative investigation into the experiences of participants on exercise referral schemes*. Unpublished doctoral dissertation. University of Leeds, United Kingdom.
- Crotty, M. (1998). *The Foundations of Social Research, Meaning and Perspective in the Research Process*. London: Sage.
- Dacey, M., Baltzell, A., & Zaichkowsky (2008). Older adults' intrinsic and extrinsic motivation toward physical activity. *American Journal of Health Behavior*, 32 (6). 570-582.
- DeCharms, R. (1968). *Personal causation: The internal affective determinants of behavior*. New York: Academic Press.
- Deci, E. L., & Ryan, R. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

- Deci, E.L., & Ryan, R., (1985a). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality, 19*, 109-134.
- Deci, E.L., & Ryan, R., (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11* (4), 227-268.
- Deci, E.L., & Ryan, R. (2002). *Handbook of Self-Determination research*. Rochester, NY: University of Rochester Press.
- Demark-Wahnefried, W., Clipp, E.C., McBride, C., Lobach, D.F., Lipkus, I., Peterson, B., et al. (2003). Design of FRESH START: A Randomized Trial of Exercise and Diet among Cancer Survivors. *Medicine and Science in Sports and Exercise, 35* (2), 415-424.
- Dishman, R. K. (2000). Introduction. *International Journal of Sport Psychology, 31*, 103-109.
- Drinkwater, B. (1994). Physical activity, fitness and osteoporosis. In C. Bouchard, R.J., Shephard, & T. Stephens (Eds.), *Physical activity, fitness, and health* (pp. 724-736). Champaign, Il.: Human Kinetics.
- Dunn, A. L., Marcus, B. H., Kampert, J. B., Garcia, M. E., Kohl, H. W., & Blair, S. N. (1999). Comparison of lifestyle and structured interventions to increase physical activity and cardiorespiratory fitness: A randomized trial. *The Journal of the American Medical Association, 281* (4), 327-340.
- Dunn, A.L., Trivedi, M.H., Kampert, J.B., Clark, C.G., & Chambliss, H.O. (2005). Exercise treatment for depression. Efficacy and dose-response. *American Journal of Preventive Medicine, 28* (1), 1-8.
- Dyment, J.E., & O'Connell, T.S. (in press). Journal writing in experiential education: Possibilities, problems and recommendations.
- Dzewaltowski, D. (1989). Toward a model of exercise motivation. *Journal of Sport and Exercise Psychology, 11*, 251-269.
- Dzewaltowski, D., Noble, J., & Shaw, J. (1990). Physical activity participation: Social cognitive theory versus the theories of reasoned action and planned behaviour. *Journal of Sport and Exercise Psychology, 12*, 4, 388-405.
- Ellis, A (1958). Rational psychotherapy. *Journal of General Psychology, 59*, 35-49.

- Ellis, A. (1998). *How to control your anxiety before it controls you*. Secaucus, NJ: Carol Publishing.
- Erlichman, J., Kerbey, A.L., & James, W.P.T. (2002). Physical activity and its impact on health outcomes. Paper 1: The impact of physical activity on cardiovascular disease and all-cause mortality: An historical perspective. *Obesity Reviews*, 3, 257-271.
- Ewart, C.E. (1992). Role of physical self-efficacy in recovery from heart attack. In R. Schwarzer (Ed.), *Self-efficacy: Thought control of action*, (pp. 287-304). Bristol, PA: Taylor & Francis.
- Ewart, C.K., Taylor, C.B., Reese, L.B., & DeBusk, R.F. (1983). Effects of early postmyocardial infarction exercise testing on self-perception and subsequent physical activity. *American Journal of Cardiology*, 51 (7), 1076-1080.
- Feltz, D.L., (1992). Understanding motivation in sport: A self-efficacy perspective, in G.C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 93-105). Champaign, IL: Human Kinetics,.
- Fielding, N.G., & Fielding, J.I. (1986). *Linking data*, Beverley Hills: Sage.
- Fisher, K.J., Li, F., Michael, Y., & Cleveland, M. (2004). Neighbourhood-level influences on physical activity among older adults: a multilevel analysis. *Journal of Aging and Physical Activity*, 11, 45-63.
- Fitzsimmons, P.A., Landers, D.M., Thomas, J.R., & Van der Mars, H. (1991). Does self-efficacy predict performance in experienced weight-lifters? *Research Quarterly for Exercise and Sport*, 62, 424-431.
- Ford, E. S., Giles, W.H., & Dietz, W.H., (2002). Prevalence of the metabolic syndrome among US adults: Findings from the Third National Health and Nutrition Examination Survey. *Journal of the American Medical Association*, 287, 356–359.
- Frank, L.L., Sorensen, B.E., Yasui, Y., Tworoger, S.S., Schwartz, R.S., Ulrich, C.M., et al. (2005). Effects of exercise on metabolic risk variables in overweight postmenopausal women: A randomized clinical trial. *Obesity Research*, 13 (3), 615-625.
- Frederick-Racascino, C.M., & Morris, T. (2004). Intrinsic and extrinsic motivation in sport and exercise. In T. Morris, and J. Summers (Eds.), *Sport Psychology: Theories, applications and issues* (2nd ed.), (pp. 121-151). Milton, Qld: John Wiley & Sons Australia, Ltd.

- Frederick, C.M., & Ryan, R.M. (1993). Differences in motivation for sport and exercise and their relations with participation and mental health. *Journal of Sport Behaviour*, 16 (3), 124-147.
- Frederick, C.M., & Ryan, R.M. (1995). Self-determination in sport: A review using cognitive evaluation theory. *International Journal of Sport Psychology*, 26, 5-23.
- Freud, S. (1923). The ego and the id. In J. Strachey's *On metapsychology: The theory of psychoanalysis*, (1984). London: Penguin.
- Fruin, D.J., Pratt, C., & Owen, N. (1991). Protection motivation theory and adolescents' perceptions of exercise. *Journal of Applied Social Psychology*, 22 (1), 55-69.
- Fukuharu M., Sato, J., Ohsawa, I, Oshida, Y., Kuriki, K., Shibata, K. et al. (2001). Effects of lifestyle factors on ultrasonographically determined bone health in Japanese women. *Public Health*, 115, 146-151.
- Geleijnse, J.M., Kok, F.J., & Grobbee, D.E. (2004). Impact of dietary and lifestyle factors on the prevalence of hypertension in Western populations. *European Journal of Public Health*, 14 (3), 235-239.
- Gilliat-Wimberley, M., Manore, M.M., Woolf, K., Swan, P.D., & Carroll, S.S. (2001). Effects of habitual physical activity on the resting metabolic rates and body compositions of women aged 35-50 years. *Journal of the American Dietetic Association*, 101, 1181-1188.
- Glanz, K., & Rimer, B.K. (2002). *Theory at a glance: Application to health promotion and health behavior*. US: National Cancer Institute. Retrieved from <http://www.cancer.gov/theory.pdf>.
- Godin, G. (1993). Theories of reasoned action and planned behavior: Usefulness for exercise promotion. *Medicine and Science in Sports and Exercise*, 26, 1391-1394.
- Godin, G. (1994), 'Social-cognitive models'. In Dishman, R. K. (Ed.), *Advances in Exercise Adherence* (pp. 113-136), Champaign, Il.: Human Kinetics.
- Godin, G., & Kok, G., (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion* 11 (2), 87-98.
- Godin, G., & Shephard, R.J. (1986a). Psychosocial factors influencing intentions to exercise of young students from grades 7 to 9. *Research Quarterly for Exercise and Sport*, 57 (1), 41-52.

- Godin, G., & Shephard, R.J. (1986b). Importance of type of attitudes to the study of exercise behavior. *Psychological Reports*, 58 (3), 991-1000.
- Godin, G., & Shephard, R.J. (1990). Use of attitude-behaviour models in exercise promotion. *Sports Medicine*, 10 (2), 103-121.
- Godin, G., Shephard, R.J., & Colantonio, A. (1986). The cognitive profile of those who intend to exercise but do not. *Public Health Reports*, 101 (5), 521-526.
- Godin, G., Valois, P., Shephard, R.J., & Desharnais, R. (1987). Prediction of leisure-time exercise behavior: A path analysis (LISREL B) model. *Journal of Behavioral Medicine*, 10 (2), 145-158.
- Gollwitzer, P.M., & Oettingen, G.O. (1999). Implementation intentions. Strong effects of simple plans. *American Psychologist*, 54, 493-503.
- Gorely, T., & Bruce, D. (2000). A 6-month investigation of exercise adoption from the contemplations stage of the transtheoretical model. *Psychology of Sport & Exercise*, 1, 89-101.
- Greenberger, P. (1998). What works for women: Outcomes research. *Journal of Women's Health*, 7 (1), 11-14.
- Greene, S. (2000) Chapter 3: Choosing a lifespan developmental orientation. In J. Ussher (Ed.), *Women's health: Contemporary international perspectives*. Leicester, UK: British Psychological Society
- Guthrie, J. R., Smith, A. M. A., Dennerstein, L., & Morse, C. (1995). Physical activity and the menopause experience: A cross-sectional study. *Maturitas, Journal of the Climacteric & Menopause*, 20 (2), 71-80.
- Gutin, B., & Casper, M.J. (1992). Can vigorous exercise play a role in osteoporosis prevention? A review. *Osteoporosis International*, 2, 55-69.
- Hagger, M.S., Chatzisarantis, N.L.D., & Biddle, S.J.H. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity. *Journal of Sport and Exercise*, 24 (1), 3-32.
- Haskell, W.L., Lee, I.M., Pate, R.R., Powell, K.E., Blair, S.N., Franklin, B.A., et al. (2007). Physical activity and public health. Updated recommendations for adults from the American College of Sports Medicine and the American Heart Association. *Circulation* 117. <http://circ.ahajournals.org>. Accessed August 19 2007.

- Hausenblas, H.A., Carron, A.V., & Mack, D.E. (1997). Application of the theories of reasoned action and planned behaviour to exercise behaviour: A meta-analysis. *Journal of Sport and Exercise Psychology, 19*, 36-51.
- Hays, K.F. (1999). Overcoming inertia: Exercise and depression. In K.F. Hays (Ed.) *Working it out: Using exercise as psychotherapy* (pp. 75-85). Washington, D.C.: American Psychological Association.
- Henderson, K.A., Ainsworth, B.E., Stolarczyk, L.M., Hootman, J.M., & Levin, S. (1999). Notes on linking qualitative and quantitative data: The cross-cultural physical activity participation study. *Leisure Sciences, 21* (3), 247-255.
- Hodge, A.M., Dowse, G.K., Koki, G., Mavo, B., Alpers, M.P., & Zimmet, P.Z. (1995). Modernity and obesity in coastal and highland Papua New Guinea. *International Journal of Obesity Related Metabolic Disorders, 19* (3), 154-161.
- Hoffman-Goetz, L., & Husted J. (1994). Exercise and breast cancer: Review and critical analysis of the literature. *Canadian Journal of Applied Physiology, 19* (3), 237-252.
- Hofstetter, C.R., Hovell, M.F., Macera, C., Sallis, J.F., Spry, V., Barrington, E., et al. (1991). Illness, injury and correlates of aerobic exercise and walking: A community study. *Research Quarterly for Exercise and Sport, 62*, 1-9.
- Hu, F.B., Manson, J.E., Stampfer, M.J., Colditz, G., Liu, S., Solomon, C.G., et al. (2001). Diet, lifestyle, and the risk of type 2 diabetes mellitus in women. *New England Journal of Medicine, 345* (11), 790-797.
- Hull, C.L. (1943). *Essentials of behavior*. New York: Appleton-Century-Crofts.
- Iso-Ahola, S.E., & Clair, B. (2000). Toward a theory of exercise motivation. *Quest, 52* (2), 131-147.
- Jakicic, J.M., Marcus, B.H., Gallagher, K.I., Napolitano, M., & Lang, W. (2003). Effect of exercise duration and intensity on weight loss in overweight, sedentary women: A randomized trial. *Journal of the American Medical Association, 290* (10), 1323-1330.
- Jakicic, J.M., Winters, C., Lang, W., & Wing, R.R. (1999). Effects of intermittent exercise and use of home exercise equipment on adherence, weight loss, and fitness in overweight women: A randomized trial. *Journal of the American Medical Association, 282* (16), 1554-1565.
- Janis, I. L., & Mann, L. (1977). *Decision-making: A psychological analysis of conflict, choice and commitment*. New York: Collier Macmillan.

- Jette, A.M., Rooks, D., Lachman, M., Lin, T.H., Levenson, C., Heislein, D., Giorgetti, M.M., & Harris, B.A. (1998). Home-based training: Predictors of participation and adherence. *The Gerontologist*, 38 (4), 412-421.
- Johnson, T. R. (1995). The significance of religion for aging well. *American Behavioral Scientist*, 39 (2), 186-208.
- Johnson, C.A. Corrigan, S.A., Dubbert, P.M., & Gramling, S.E. (1990). Perceived barriers to exercise and weight control practices in community women. *Women & Health*, 16 (3/4)177-191.
- Jonker, J.T., Peeters, A., Laet, C., de Mackenbach, J., Franco, O.H., & Nusselder, W.J. (2006). Physical activity and life expectancy with and without diabetes: Life table analysis of the Framingham Heart Study. *Diabetes Care*, 29 (1), 38-43.
- Kaplan, R.M., Atkins, C.J., & Reinsch, S. (1984). Specific efficacy expectations mediate exercise compliance in patients with COPD. *Health Psychology*, 3 (3), 223-242.
- Karageorghis, C.I., & Terry, P.C. (1997). The psychophysical effects of music in sport and exercise: A review. *Journal of Sport Behavior*, 20, (1), 54-68.
- Kelly, R.B., Zyzanski, S.J., & Alemagno, S.A. (1991). Prediction and behavior change following health promotion: Role of health beliefs, social support, and self-efficacy. *Social Science & Medicine*, 32 (3), 311-320.
- Kennedy, C., DeVoe, D., Michel, B., & David, B. (2001). Examining health locus of control and corresponding stage-based physical activity in the elderly. *Research Quarterly Exercise Science*, March Supplement, A-102.
- King, A.C., Baumann, K., O'Sullivan, P., Wilcox, S., & Castro, C. (2002). Effects of Moderate-Intensity Exercise on Physiological, Behavioral, and Emotional Responses to Family Caregiving: A Randomized Controlled Trial. *Journal of Gerontology Series A: A Biological and Medical Sciences*, 57, M26-M36.
- King, A.C., Blair, S.N., Bild, D.E., Dishman, R.K., Dubbert, P.M., Marcus, B.H., et al. (1992). Determinants of physical activity and interventions in adults. *Medicine and Science in Sports and Exercise*, 24 (6), s221-s236.
- King, W. C., Brach, J.S., Belle, S., Killingsworth, R., Fenton, M., & Kriska, A.M. (2003). The Relationship between Convenience of Destinations and Walking Levels in Older Women. *American Journal of Health Promotion*, 18, 74-80.

- King, A., Rejeski, W.J., & Buchner, D.M (1998). Physical activity interventions targeting older adults: A critical review and recommendations. *American Journal of Preventative Medicine*, 15 (4), 316-333.
- Kingi, D., Towers, A., Seebeck, R., & Flett, R. (2005). Pacific women's decisions about exercise adoption: Utilising the stage-of-exercise-adoption model. *New Zealand Medical Journal*, 118 (1216), 1-9.
- Koestner, R., Losier, G.F., Vallerand, R.J., & Carducci, D. (1996). Identified and introjected forms of political internalization: Extending self-determination theory. *Journal of Personality and Social Psychology*, 70 (5), 1025-1036.
- Krummel, D.A., Koffman, D.M., Matson, D., Bronner, Y. Davis, J., Tessaro, I., et al. (2001). Cardiovascular health interventions in women. *Journal of Women's Health & Gender-Based Medicine*, 10 (2), 117-136.
- Kull, M. (2002). The relationships between physical activity, health status, and psychological well-being of fertility-aged women. *Scandinavian Journal of Medicine and Sciences in Sports*, 12, 241-247.
- Lacey, A., & Luff, D. (2001). Trent focus for research and development in primary health care: An introduction to qualitative analyses. Trent Focus. UK.
- Landers, D. (2005). Exercise relative to other treatments for reduction of anxiety/depression: Overcoming the principal of least effort. In T. Morris, P. Terry, L. Ievleva, S. Gordon, S. Hanrahan, G. Kolt, & P. Tremayne. (Eds.). *Promoting performance and health: Proceedings of the ISSP XIth World Congress of Sport Psychology*. CD-ROM. Sydney, Australia: International Society of Sport Psychology.
- Latimer, A. E., & Martin Ginis, K. A. (2005). Change in self-efficacy following a single strength training session predicts sedentary older adults' subsequent motivation to join a seniors' strength training program. *American Journal of Health Promotion*, 20, 135-139.
- Lawlor, D.A., & Hopker, S.W. (2001). The effectiveness of exercise as an intervention in the management of depression; Systematic review and meta-regression analysis of randomised controlled trials. *British Medical Journal*, 322 (7289), 1-8.
- Lees, F.D., Clark, P.G., Nigg, C.R., & Newman, P. (2005). Barriers to exercise behaviour among older adults: A focus group study. *Journal of Ageing and Physical Activity*, 13, 323-33.

- Lemaitre, R.N., Siscovick, D.W., Raghunathan, T.E., Weinmann, S. Arbogast, P., & Lin, D.Y. (1999). Leisure-time physical activity and the risk of primary cardiac arrest. *Journal of Musculoskeletal Medicine*, 159, 686-690.
- Leslie, E., Fotheringham, M.J., Owen, N., & Bauman, A. (2001). Age-related differences in physical activity levels of young adults. *Medicine & Sciences in Sports and Exercise*. 33 (2), 255-259.
- Lippke S., Ziegelmann, J.P., & Schwarzer, R. (2005). Stage-specific adoption and maintenance of physical activity: Testing a three-stage model. *Psychology of Sport and Exercise*, 6 (5), 585-603.
- Litt, M.D., Kleppinger, A., & Judge, J.O. (2002). Initiation and maintenance of exercise behavior in older women: Predictors from the social learning model. *Journal of Behavioral Medicine*, 25 (1). 83-97.
- Lowe, R., Eves, F., & Carroll, D. (2002). The influence of affective and instrumental beliefs on exercise intentions and behavior: A longitudinal analysis. *Journal of Applied Social Psychology*, 32, (6), 1241-1252.
- Lowther, M., Mutrie, N., Loughlan, C., & McFarlane, C. (1999). Development of a Scottish physical activity questionnaire: A tool for use in physical activity interventions. *British Journal of Sports Medicine*, 33 (4), 244-249.
- Lowther, M., Mutrie, N., & Scott, E. (2002). Promoting physical activity in a socially and economically deprived community: A twelve month randomised control trial of fitness assessment and exercise consultation. *Journal of Sports Sciences*, 20 (7), 577-588.
- Luszczynska, A., & Sutton, S. (2006). Physical activity after cardiac rehabilitation: Evidence that different types of self-efficacy are important in maintainers and relapsers. *Rehabilitation Psychology*, 51 (4), 314-321.
- Marcus, B.H., Banspach, S.W., Lefebvre, R.C., Rossi, J.S., Carleton, R.A., & Abrams, D.B. (1992). Using the stage of change model to increase the adoption of physical activity among community participants. *American Journal of Health Promotion*, 6, 424-429.
- Marcus, B.H., Bock, B.C., Pinto, B.M., Forsyth, L-A. H., Roberts, M.B., & Traficante, R.M. (1998). The impact of behavioral counseling on stage of change in fat intake, physical activity, and cigarette smoking in adults at increased risk of coronary heart disease. *Annals of Behavioral Medicine*, 20, 174-180.

- Marcus, B.H., Eaton, C.A., Rossi, J.S., & Harlow L.L. (1994). Self-efficacy, decision-making and stages of change: An integrative model of physical exercise. *Journal of Applied Social Psychology, 24*, 489-508.
- Marcus, B.J., King, T.K., Bock, B.C., Borrelli, B., & Clark, M.M. (1998) Adherence to physical activity recommendations and interventions. In S.A. Schumaker, E.B. Schron, J.K. Ockene., & W.L. McBee (2nd ed.) *The Handbook of Health Behavior Change* (pp. 189-212) New York: Springer Publishing Co.
- Marcus B. H., & Nurius P. (1986). Possible Selves. *American Psychologist, 41*, 954-969.
- Marcus, B.H., & Simkin, L. (1994). The transtheoretical model: Applications to exercise behavior. *Medicine and Science in Sports and Exercise, 26*, 1400-1404.
- Marcus, B.H., & Stanton, A. L. (1993). Evaluation of relapse prevention and reinforcement interventions to promote exercise adherence in sedentary females. *Research Quarterly for Exercise and Sport, 64* (4), 447-454.
- Marshall, A.L., & Biddle, S. (2001). The transtheoretical model of behavior change: A meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine, 23* (4), 229-246.
- Martinsen, E.W. (2005). Exercise and depression. *International Journal of Sport and Exercise Psychology, 3* (4), 469-483.
- Masse, L.C., Ainsworth, B.E., Tortolero, S., Levin, S., Fulton, J., Henderson, K.A., et al. (1998). Measuring physical activity in midlife, older, and minority women: issues from an expert panel. *Journal of Women's Health / the Official Publication of the Society for the Advancement of Women's Health Research, 7*(1), 57-67. Retrieved February 1, 2007 from MEDLINE database.
- Mathes, S. A. & Battista, R.(1985). College men's and women's motives for participation in physical activity. *Perceptual & Motor Skills, 61* (6), 719-726.
- Mayo Clinic Staff (2005). Cardiovascular disease 101: Know your heart and blood vessels from <http://www.mayoclinic.com/health/cardiovascular-disease/HB00032>).
- Meichenbaum, D. (1977). *Cognitive behavior modification: An integrative approach*. New York: Plenum Press.

- McAuley, E. (1992). Understanding exercise behavior: A self-efficacy perspective. In G.C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 107-127). Champaign Il.: Human Kinetics.
- McAuley, E., & Courneya, K.S. (1993). Adherence to exercise and physical activity as health-promoting behaviors: Attitudinal and self-efficacy influences. *Applied & Preventive Psychology*, 2 (2), 65-77.
- McAuley, E., Courneya, K.S., & Lettunich, J. (1991). Effects of acute and long-term exercise on self-efficacy responses in sedentary, middle-aged males and females. *The Gerontologist*, 31 (4), 534-542.
- McAuley, E., Courneya, K.S., Rudolph, D.L., & Lox, C.L. (1994). Enhancing exercise adherence in middle-aged males and females. *Preventive Medicine*, 23 (4), 498-506.
- McAuley, E., & Jacobson, L. (1991). Self-efficacy in exercise participation in sedentary adult females. *American Journal of Health Promotion*, 5 (3), 185-191.
- McAuley, E., Pena, M.M., & Jerome, G.J. (2001). Self-efficacy as a determinant and an outcome of exercise. In G.C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 235-261). Champaign, Il.: Human Kinetics.
- McAuley, E., Wraith, S., & Duncan, T. (1991). Self-efficacy, perceptions of success, and intrinsic motivation for exercise. *Journal of Applied Social Psychology*, 21, 139-155.
- McCombs, B.L., & Marzano, R.J. (1990). Putting the self in self-regulated learning: The self as agent in integrating will and skill. *Educational Psychologist*, 25 (1), 51-69.
- McCready, M.L., & Long, B.C. (1985). Locus of control, attitudes toward physical activity, and exercise adherence. *Journal of Sport Psychology*, 7, 346-359.
- McElmurry, B.J., Norr, K.F., & Spreen-Parker, R.S. (1993). *Women's health and development a global challenge*. Chicago, Il.: Jones & Bartlett.
- McElroy, M. (2002). *Resistance to exercise: A social analysis to inactivity*. Champaign, Il.: Human Kinetics.
- McInnis, K., Franklin, B., & Rippe, J. (2003). Counseling for physical activity in overweight and obese patients. *American Family Physician*, 67 (6), 1249-1256.

- McMurdo, M.E.T. (2000). A healthy old age: Realistic or futile goal? *British Medical Journal*, 321, 1149-1151.
- McQuaide, S. (1998). Discontent at midlife: Issues and considerations in working towards women's well-being. Families in Society. *Journal of Contemporary Human Services*, 79 (5), 532-542.
- Mensink, M., Feskens, E.J., Saris, W.H., De Bruin, T.W., & Blaak, E.E. (2003). Study on Lifestyle Intervention and Impaired Glucose Tolerance Maastricht (SLIM): preliminary results after one year. *International Journal of Obesity Related Metabolic Disorders*, 27 (3), 377-384.
- Merriam-Webster, (2007) *On-line dictionary*. www.merriam-webster.com
- Michelson, W. (1994). Everyday life in contextual perspective. In I. Altmann & A. Churchman (Eds.), *Women and the environment*. New York: Plenum Press.
- Miller, E.R., Erlinger, T.P., Young, D.R., Charleston, J., Rhodes, D., Wasan, S.J., et al. (2002). Results of the diet, exercise, and weight loss intervention trial (DEW-IT). *Hypertension*, 40 (5), 612-618.
- Moore, B. (1999). *The Australian Pocket Oxford Dictionary*. (4th ed.). Melbourne: Oxford University Press.
- Moore, K.A., Babyak, M.A., Wood, C.E., Napolitano, M.A., Khatri, P., Craighead, W.E., et al. (1999). The association between physical activity and depression in older depressed adults. *Journal of Aging and Physical Activity*, 7, 55-61.
- Moreau, K.L., Degarmo, R., Langley, J., McMahan, C., Howley, E.T., Bassett, D.R., et al. (2001). Increasing daily walking lowers blood pressure in postmenopausal women. *Medicine & Science in Sports and Exercise*, 33, 1825-1831.
- Morris, F.A., & Choi, P.Y.L. (2005). Changing physical activity and exercise patterns. In C.J. Browning & S.A. Thomas (Eds.) *Behavioural Change: An evidence based handbook for social and public health* (pp. 115-125). Sydney: Elsevier Churchill Livingstone.
- Morris, F.A., Seedsman, T., Morse, C., & Morris, T. (2002). Development of a self-report questionnaire to reflect the diversity of women's physical activity. *Australian Conference of Science and Medicine in Sport 2002: Sports Medicine and Science at the Extremes*.

- Morris, T., & Koehn, S. (2004). Self confidence in sport and exercise. In T. Morris & J. Summers (Eds.), *Sport Psychology: Theory, applications and issues*, (2nd ed). Milton, Queensland: John Wiley & Sons.
- Motl, R.W., Snook, E.M., McAuley, E.S., & Gliottoni, R.C. (2006). Are physical activity and symptoms correlates of functional limitations and disability in Multiple Sclerosis? *Rehabilitation Psychology* 52 (4), 463-469.
- Murdoch, L. (2006). Health needs of women following heart event: What are the issues and strategies aimed at addressing these? In *Proceedings of the 16th Annual Australian Cardiac Rehabilitation Association (ACRA), Choices and Challenges.*)
- Mutrie, N. (2002). Healthy body, healthy mind? *The Psychologist*, 18 (8), 411-413.
- Mutrie, N. (2007). Applied exercise psychology: Promoting activity and evaluating outcomes. In T. Morris, P. Terry, & S. Gordon (Eds.), *Sport and Exercise Psychology: International perspectives* (pp. 69-79). Morgantown, WV.: Fitness Information Technology.
- Nagi, D. (2005). *Exercise and sport in diabetes*, (2<sup>nd</sup> ed.). Chichester, UK: John Wiley & Sons.
- National Heart Foundation of Australia. (1996). *Heart and Stroke Facts*. Canberra, Australia: National Heart Foundation of Australia.
- National Institutes of Mental Health. (2001). *The numbers count, mental disorders in America*. <http://www.nimh.gov>.
- National Heart, Lung, and Blood Institute. (2007). *The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7)*. US Department of Health and Human Services. Retrieved January 2007 from <http://www.nhlbi.nih.gov/guidelines/hypertension>.
- New South Wales Health Department. (1997). *NSW Health Survey: HOIST. Epidemiology and Surveillance Branch*. Retrieved July 31, 2000. <http://www.health.nsw.gov.au/public-health/epi>.
- Nies, M.A., Hepworth, J.T., Wallston, K.A., & Kershaw, T.C. (2001). Evaluation of an instrument for assessing behavioral change in sedentary women. *Journal of Nursing Scholarship*, 33 (4), 349-354.

- Nies, M.A., & Partridge, T. (2006). Comparison of 3 interventions to increase walking in sedentary women. *American Journal of Health Behavior, 30* (4), 339-352.
- Nies, M.A., Reisenberg, C.E., Chruscial, H.L., & Artibee, K. (2003). Southern women's response to a walking intervention. *Public Health Nursing, 20* (2), 146-152.
- Nigg, C.R., Burbank, P.M., Padula, C., Dufresne, R., Rossi, J.S., Velicer, W.F., et al. (1999). Stages of change across ten health risk behaviors for older adults. *The Gerontological Society of America, 39* (4), 473-482.
- Norman, P., & Connor, M. (2005). The theory of planned behavior and exercise: Evidence for the mediating and moderating roles of planning on intention-behavior relationships. *Journal of Sport and Exercise Psychology, 27*, 488-504.
- Nutbeam, D., & Harris, E. (2004). *Theory in a nutshell: A guide to health promotion theory*. Sydney: The McGraw-Hill Companies.
- O'Brien, S.J., & Vertinsky, P.A. (1991). Unfit survivors: Exercise as a resource for aging women. *The Gerontologist, 31* (3), 347-357.
- O'Brien-Cousins, S. (1996). Exercise cognition among elderly women. *Journal of Applied Sport Psychology, 8*, 131-145.
- O'Brien-Cousins, S. (1997). Elderly tomboys? Sources of self-efficacy for physical activity in late life. *Journal of Ageing and Physical Activity, 5*, 229-243.
- O'Brien-Cousins, S. (1998). *Exercise, aging and health: Overcoming barriers to an old age*. Bristol, PA: Bruner/Mazel.
- O'Brien-Cousins, S. (2001). Thinking out loud: What older adults say about triggers for physical activity. *Journal of Aging and Physical Activity, 9*, 347-363.
- O'Brien-Cousins, S. (2003). Grounding theory in self-referent thinking: Conceptualizing motivation for older adult physical activity. *Psychology of Sport and Exercise, 4* (2), 81-100.
- O'Brien-Cousins, S., & Gillis, M.M. (2005). "Just do it before you talk yourself out of it" the self-talk of adults thinking about physical activity. *Psychology of Sport and Exercise, 6*, 313-334.

- O'Connor, K., & Chamberlain, K. (1996). Dimensions of life meaning: A qualitative investigation at mid-life. *British Journal of Psychology*, 87 (3), 461-477.
- O'Connor, P.J., Raglin, J.S., & Martinsen, E.W. (2000). Physical activity, anxiety and anxiety disorders. *International Journal of Sport Psychology*, 31 (2), 136-155.
- O'Connor, B.P., & Vallerand, R.J. (1990). Religious motivation in the elderly: A French-Canadian replication and an extension. *Journal of Social Psychology*, 130 (1), 53-59.
- O'Connor, B.P., & Vallerand, R.J. (1994). Motivation, self-determination and person-environment fit as predictors of psychological adjustment among nursing home residents. *Psychology and Ageing*, 9, 189-194.
- Oldridge, N.B., Guyatt, G.H., & Fischer, M.E. et al. (1988). Cardiac rehabilitation after myocardial infarction: combined experience of randomised clinical trials. *Journal of the American Medical Association*, 260, (7), 945-950.
- O'Neal, H.A., Dunn, A.L., & Martinsen, E.W. (2000). Depression and exercise. *International Journal of Sport Psychology*, 31, 110-135.
- Owen, N., & Bauman, A. (1992). The descriptive epidemiology of a sedentary lifestyle in adult Australians. *International Journal of Epidemiology*, 21, 305-310.
- Paffenbarger R.S., Jr., Wing, A.L., & Hyde, R.T. (1978). Physical activity as an index of heart attack risk in college alumni. *American Journal of Epidemiology*, 108 (3), 161-175.
- Paffenbarger, R., Wing A, Hyde R, & Jung, D. (1983). Physical activity and incidence of hypertension in college alumni. *American Journal of Epidemiology* 117, 245-257.
- Papaioannou, A. (1995). Differential perceptual and motivational patterns when different goals are adopted. *Journal of Sport & Exercise Psychology*, 17 (1), 18-34.
- Pasman, L., & Thompson, J. K. (1988). Body image and eating disturbance in obligatory runners, obligatory weightlifters, and sedentary individuals. *International Journal of Eating Disorders*, 7 (6), 759-769.
- Pate, R.R., Pratt, M., & Blair, S.N., Haskell, W.L., Macera, C.A., Bouchard, C., et al. (1995). Physical activity and public health: A recommendation from the Centers for Disease Control and Prevention and the American College of

- Sports Medicine. *Journal of the American Medical Association*, 273, 402-407.
- Patton, M.Q. (1980). *Qualitative evaluation methods*. Beverley Hills: Sage
- Pelletier, L.G., Dion, S., Tuson, K., & Green-Demers, I. (1999). Why do people fail to adopt environmental behaviours? Toward a taxonomy of environmental amotivation. *Journal of Applied Social Psychology*, 29, 2481-2504.
- Pelletier, L.G., Fortier, M.S., Vallerand, R.J., Tuson, K.M., Briere, N.M., & Blais, M.R. (1995). Towards a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: The Sport Motivation Scale (SMS). *Journal of Sport and Exercise Psychology*, 17, 35-53.
- Peterson, J.A., Yates, B.C., Atwood, J.R., & Hertzog, M. (2005). Effects of a physical activity intervention for women. *Western Journal of Nursing Health*, 27 (1), 93-110.
- Pinto, B., Clark, M.M., Maruyama, N.C., & Feder, S.I. (2003). Psychological and fitness changes associated with exercise participation among women with breast cancer. *Psycho-Oncology*, 12 (2), 118-126.
- Prapavessis, H., Maddison, R., Ruygrok, P.N., Bassett, S., Harper, T., & Gillanders, L. (2005). Using Theory of Planned Behavior to understand exercise motivation in patients with congenital heart disease. *Psychology, Health & Medicine*, 10 (4), 335-343.
- Pratt, M., Macera, C.A., & Wang, G. (2000). Higher direct medical costs associated with physical inactivity. *Physician and Sportsmedicine*, 28 (10), 63-70.
- Prochaska, J., Norcross, J., & DiClemente, C. (1994). *Changing for good: a revolutionary six-stage program for overcoming bad habits and moving your life positively forward*. New York: Avon Books.
- Rejeski, W. (1992). Motivation for exercise behavior: A critique of theoretical directions. In G.C. Roberts (Ed.), *Motivation in sport and exercise*, (pp. 129-158). Champaign, IL: Human Kinetics.
- Resnick B. (2002). The impact of self-efficacy and outcome expectations on functional status in older adults. *Topics in Geriatric Rehabilitation*, 17 (4), 1-10.
- Rhodes, R.E., & Matheson, D.H. (2005). Discrepancies in exercise intention and expectation: Theoretical and applied issues. *Psychology and Health*, 20 (1), 63-78.

- Richardson, C., Faulkner, G., McDevitt, J., Skrinar, G., Hutchinson, D., & Piette, J. (2005). Integrating physical activity into mental health services for persons with serious mental illness. *Psychiatric Services, 56*, (3), 324-331.
- Riddle, P.K. (1980). Attitudes, beliefs, behavioral intentions, and behaviors of women and men toward regular jogging. *Research Quarterly for Exercise and Sport, 51*, 4, 663-674.
- Ried, L.D., & Planas, L.G. (2002). Aging, health, and depressive symptoms: Are women and men different? *Journal of Women's Health, 11* (9), 813-824.
- Roberts, G.C. (2001). Understanding the dynamics of motivation in physical activity. In G.C. Roberts (Ed.), *Advances in motivation in sport and exercise (pp.1-50)*. Champaign, IL: Human Kinetics.
- Rogers, R. W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In B.L.C. & L.L. Petty (Eds.), *Social Psychophysiology: A sourcebook* (pp. 53-176). London, UK: Guilford.
- Rogers, W.M., & Brawley, L.W. (1991). The role of outcome expectancies in participation motivation. *Journal of Sport and Exercise Psychology, 13*, 411-427.
- Rodgers, W. M., & Gauvin, L. (1998). Heterogeneity of incentives for physical activity and self-efficacy in highly active and moderately active women exercisers. *Journal of Applied Social Psychology, 28*, 1016–1029.
- Rogerson, M., & Morris, T. (2006). Life after cardiac rehabilitation: Motivators and barriers to being physically active for people with depression and heart disease. In *Proceedings of the 16th Annual Australian Cardiac Rehabilitation Association (ACRA)*.
- Rotter, J.B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80*, (1), 609.
- Rotter, J.B. (1973). *Social learning and clinical psychology*. New York: Johnson Reprint Corp.
- Ryan, R.M., & Deci, E.L. (2002). An overview of self-determination theory: An organismic-dialectical perspective. In E.L. Deci, & R.M. Ryan (Eds.) *Handbook of self-determination research*. Rochester, NY: The University of Rochester Press.

- Ryan, R.M., & Deci, E.L. (2007). Active human nature: Self-determination theory and the promotion and maintenance of sport, exercise, and health. In, M.S. Hagger, & L.L.D. Chatzisarantis (Eds.). *Intrinsic Motivation and Self-Determination in Exercise and Sport*. Champaign, Il.: Human Kinetics.
- Ryan, R. M., Frederick, C. M., Lepas, D., Rubio, N., & Sheldon, K. M. (1997). Intrinsic motivation and exercise adherence. *International Journal of Sport Psychology*, 28, 335-354.
- Ryan, R.M., Vallerand, R.J., & Deci, E.L. (1984). Intrinsic motivation in sport: A cognitive evaluation theory interpretation. In W.F. Straub, & J.M. Williams (Eds.). *Cognitive Sport Psychology*, Lansing, NY: Sport Science.
- Sallis, J.F., Haskell, Fortmann, S.P., Vranizan, K., Taylor, C.B., & Solomon, D. (1986). Predictors of adoption and maintenance of physical activity in a community sample. *Preventive Medicine*, 15, 331-341.
- Santrock, J.W. (1997). *Life-span development*. Madison, W.I.: Brown & Benchmark.
- Schuster, P.M., & Waldron, J. (1991). Gender differences in cardiac rehabilitation patients. *Rehabilitation Nursing*, 16, 248.
- Schwartz, H. (1989). How does treatment work? On the modes of therapeutic action of psychoanalytic psychotherapy. *American Journal of Psychiatry*, 146, 1343-1344.
- Schwartz, R. (1992). Self-efficacy in the adoption and maintenance of health behaviors: Theoretical approaches and a new model. In R. Schwarzer (Ed.), *Self-efficacy: Thought control of action* (pp. 217-243). Bristol, PA: Taylor & Francis.
- Schwarzer, R., & Fuchs, R. (1995). Self-Efficacy and health behaviours. In M. Conner and P. Norman (Eds.), *Predicting health behaviour: Research and practice with social cognition models*. Buckingham: Open University Press.
- Selye, H. (1976). *The Stress of Life*. New York: McGraw Hill.
- Selye, H. (1982). History and present status of the stress concept. In L. Goldberger, & S. Breznitz, (Eds., *Handbook of stress*) New York: Free Press.
- Seligman, M. (1994). *What you can change and what you can't*. New York: Knopf.

- She, W., & Morris, T. (1997). Imagery, self-confidence, and baseball hitting. In R. Lidor and M. Bar-Eli, *Innovations in Sport Psychology: Linking theory with practice: Proceedings of the International Society of Sport Psychology IX world congress of Sport Psychology* (pp. 626-628). Netanya, Israel: International Society of Sport Psychology.
- Sheeran, P. (2002). Intention-behaviour relations: A conceptual and empirical review. *European Review of Social Psychology*, *12*, 1-36.
- Shephard, R. (1995). Physical activity, health, and well-being at different life stages. *Research Quarterly for Exercise and Sport*, *66* (4), 298-302.
- Shepherd, J. (2005). Raising HDL cholesterol and lowering CHD risk: Does intervention work? *European Heart Journal*, *7*, (Sup. F), F15-F22.
- Simkin-Silverman, L.R., Wing, R.R., Boraz, M.A., & Kuller, L.H. (2003). Lifestyle intervention can prevent weight gain during menopause: Results from a 5-year randomized clinical trial. *Annals of Behavioral Medicine*, *26* (3), 212-220.
- Sjosten, N., & Kivela, S. (2006). The effects of physical exercise on depressive symptoms among the aged: A systematic review. *International Journal of Geriatric Psychiatry*, *21*, 410-418.
- Smith, J.R., Owen, N., Leslie, E., & Bauman, A. (1999). *Active for life: physical activity patterns and health impacts in Victoria 1998*. Melbourne: Victorian Department of Human Services.
- Snell, P.G., & Mitchell, J.H. (1999). Physical inactivity: An easily modifiable risk factor? *Circulation*, *100* (1), 2-5.
- Sniehotta, F.F., Scholz, U., & Schwarzer, R. (2005). Bridging the intention-behavior gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology and Health*, *20* (2), 143-160.
- Sparling, P.B., Owen, N., Lambert, E.V., & Haskell, W. (2000). Promoting physical activity: The new imperative for public health. *Health Education Research*, *15* (3), 367-376.
- Spence, J.C., Courneya, K.S., Blanchard, C., Wilson, P., & Becker, B.J. (2001). The theory of planned behavior and physical activity: A meta-analysis. *Annals of Behavioral Medicine*, *23*, S45.
- Spencer, L., Adams, T.B., Malone, S., Roy, L., & Yost, E. (2006). Applying the transtheoretical model to exercise: A systematic and comprehensive review of the literature. *Health Promotion Practice*, *7*, 428-443.

- Spiriduso, W. (1995). *Physical dimensions of aging*. Champaign, IL: Human Kinetics.
- Stanley, M.A., & Maddox, J.E. (1986). Cognitive processes in health enhancement: Investigation of a combined protection motivation and self-efficacy model. *Basic & Applied Social Psychology*, 7 (2), 101-113.
- Stephenson, J., Bauman, A., Armstrong, T., Smith, B., & Bellew B. (2000). *The costs of illness attributable to physical inactivity in Australia: A preliminary study*. Canberra: Population Health Division Publications, Commonwealth of Australia
- Stevens, V.J., Obarzanek, E., Cook, N.R. Lee, I.M., Appel, L.J., Smith West, D., et al. (2001). Long-Term Weight Loss and Changes in Blood Pressure: Results of the Trials of Hypertension Prevention, Phase II. *Annals of Internal Medicine*, 134 (1), 1-11.
- Stewart, A. L., Verboncoer, C.J., McLellan, D.E., Gillis, S.R. Mills, K.M., King, A.C., et al. (2001). Physical activity outcomes of CHAMPS II: A physical activity promotion program. *Journal of Gerontology: Biomedical Sciences & Medical Sciences*, 56, M465-M470.
- Taylor, A.H., Cable, N.T., Faulkner, G., Hillsdon, M., Narici, M., & Van Der Bij, A.K. (2004). Physical activity and older adults: A review of health benefits and the effectiveness of interventions. *Journal of Sports Sciences*, 22, 703-725.
- Thompson, S. (1999). *Mother's Taxi: Sport and women's labor*. Albany, NY: State University of New York.
- Toobert, D.J., Stryker, L.A., & Glasgow, R.E. (1998). Lifestyle change in women with coronary heart disease. *Journal of Women's Health*, 7 (6), 685-699.
- Titze, S., Martin, B.W., Seiler, R., Strongegger, W., & Marti, B. (2001). Effects of a lifestyle physical activity intervention on stages of change and energy expenditure in sedentary employees. *Psychology of Sport and Exercise*, 2 (2), 103-116.
- Trost, S.G., Owen, N., Bauman, A.E., Sallis, J.F., & Brown, W. (2002). Correlates of adults' participation in physical activity: Review and update. *Medicine & Science in Sports and Exercise*, 34 (12), 1996-2001.
- UK National Office of Statistics, (2002). [www.statistics.gov.uk](http://www.statistics.gov.uk).

- Ulrich, C.M., Georgiou, C.C., Gillis, D.E., & Snow, C.M. (1999). Lifetime physical activity is associated with bone mineral density in premenopausal women. *Journal of Women's Health, 8* (3), 365-375.
- United States Department of Health and Human Services (USDHHS) (1996). *Physical activity and health: A report of the Surgeon General*. Atlanta, Georgia: Department of Health and Human Services, Center for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion. Pittsburgh, PA: Superintendent of Documents.
- Vallerand, R.J. (2001). A hierarchical model of intrinsic and extrinsic motivation in sport and exercise. In G.C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 263-319). Champaign, IL: Human Kinetics.
- Vallerand, R.J., (1997). Intrinsic and extrinsic motivation in sport: Implications from the hierarchical model. In R. Lidor, & M. Bar-Eli, *Innovations in Sport Psychology: Linking theory with practice. Proceedings of the International Society of Sport Psychology IX world congress of Sport Psychology*(pp. 45-47). Netanya, Israel: International Society of Sport Psychology.
- Vallerand, R.J., Deci, E.L., & Ryan, R.M. (1987). Intrinsic motivation in sport. *Exercise and Sport Science Reviews, 15*, 389-425.
- Vallerand, R.J., & Losier, G.F. (1999). An integrative analysis of intrinsic and extrinsic motivation in sport. *Journal of Applied Sport Psychology, 11*, 142-169.
- Vallerand, R.J., & Reid, G. (1990). Motivation and special populations: Theory, research, and implications regarding motor behavior. In G. Reid (Ed.), *Problems in movement control*, (pp. 159-197). North-Holland: Elsevier Science Publishers.
- Van Gool, C.H., Kempen, G.I., Pennix, B.W., Deeg, D.J., Beekman, A.T., & Van Eijk, J.T. (2003). Relationship between changes in depressive symptoms and unhealthy lifestyles in late middle aged and older persons: Results for the Longitudinal Aging Study Amsterdam. *Age and Ageing, 32*, 81-87.
- Verloop, J., Rookus, M., van der Kooy, D., & Van Leeuwen, F. (2000). Physical activity and breast cancer risk in women aged 20-54 years. *Journal of National Cancer Institute, 92* (2), 128-135.
- Vertinsky, P. (1998). Run, Jane, run: Central tensions in the current debate about enhancing women's health through exercise. *Women & Health, 27* (4), 81-109.

- Vlachopoulos, S.P., Karageorghis, C.I., & Terry, P.C. (2000). Motivation profiles in sport: A self-determination theory perspective. *Research Quarterly for Exercise and Sport*, 71 (4), 387-397.
- Wagner, P., Brehm, W., & Sygush, R. (2004). The seven-sequence intervention: Sedentary adults on their way to fitness and health. *Research in Sports Medicine*, 12, 265-282.
- Wankel, L.M., & Mummery, W.K. (1993). Using national survey data incorporating the theory of planned behaviour: Implications for social marketing strategies in physical activity. *Journal of Applied Psychology*, 5 (2) 158-177.
- Wannamethee, S.G., & Shaper, A.D. (2001). Physical activity in the prevention of cardiovascular disease. *Sports Medicine*, 31 (2). 101-114
- Warburton, D.E., Nicol, C.W., & Bredin, S.S. (2006). Health benefits of physical activity: The evidence. *Canadian Medical Association Journal*, 174 (6), 801-809.
- Ware, J.E. (2004). *SF-36 Health Survey Manual and Interpretation Guide*. Lincoln, RI: Quality Metric Inc.
- Ware, J.E., Kosinski, M., & Dewey, J.E. (2000). How to score version 2 of the SF-36® Health Survey. Lincoln, RI: QualityMetric Incorporated.
- Ware, J.E., Kosinski, M., & Gandek, B. (2003). SF-36 Health Survey: Manual and interpretation guide. Lincoln, RI: QualityMetric Incorporated.
- Whaley, D.E. (2003). Future oriented self-perceptions and exercise behaviors in middle-aged women. *Journal of Aging and Physical Activity*, 11 (1), 1-17.
- Whaley, D.E., & Redding, T. (2001). Turning want into will do: The role of future-oriented plans in exercise behaviour. *Melpomene Journal*, 20 (3), 22-27.
- Whaley, M.H., Kampert, J.B., Kohl, H.W., & Blair, S.N. (1999). Physical fitness and clustering of risk factors associated with the metabolic syndrome. *Medicine & Science in Sports and Exercise*, 31, 287-293.
- Whitehead, J.R., & Corbin, C.B. (1997). Self-esteem in children and youth: The role of sport and physical education. In K.R. Fox (Ed.). *The physical self: from motivation to well-being* (pp. 175-203), Champaign, Il.: Human Kinetics.

- White, R.W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, 66, 279-333.
- Wilcox, S., King, A., Brassington, G. S., & Ahn, D. K. (1999). Physical activity preferences of middle-aged and older adults: A community analysis. *Journal of Aging and Physical Activity*, 7, 386-399.
- Williams, G.C., Freedman, Z.R., & Deci, E.L. (1998). Supporting autonomy to motivate patients with diabetes for glucose control. *Diabetes Care*, 21 (10), 1644-1651.
- Williams, G.C., McGregor, H.A., Zeldman, A., Freedman Z.R., & Deci, E.L. (2004). Testing a self-determination theory process model for promoting glycemic control through diabetes self-management. *Health Psychology*, 23 (1), 58-66.
- Wise, J.B., & Trunnell, E.P. (2001). The influence of sources of self-efficacy upon efficacy strength. *Journal of Sport and Exercise Psychology*, 23 (4), 269-280.
- World Cancer Research Fund & American Institute for Cancer research. (2007). *Food, Nutrition, Physical Activity, and the Prevention of Cancer: A global perspective*. Washington DC: American Institute for Cancer Research.
- World Health Organisation WHO (2007). *Blood Pressure. WHO global infobase online*, retrieved 2 February 2007 from <http://www.who.int/ncd-surveillance/infobase/web/InfoBaseCommon/Shared>
- Wurtele, S.K., & Maddux, J.E. (1987) Relative contributions of protection motivation theory components in predicting exercise intentions and behaviour. *Health Psychology*, 6 (5), 453-466.
- Yach, D., Leeder, S.R., Bell, J., & Kistnasamy, B. (2005). Global chronic diseases. *Science*, 307 (5708), 317-318.
- Yan Lan, L., & Gill, D.L. (1984). The relationships among self-efficacy, stress responses, and a cognitive feedback manipulation. *Journal of Sport and Exercise Psychology*, 6 (2),
- Yoon, G. (1996). Psychosocial factors for successful ageing. *Australian Journal of Ageing*, 15 (2), 69-72.
- Younis, N., Soran, H., & Farook, S. (2004). The prevention of type 2 diabetes mellitus: Recent advances. *QJM: An International Journal of Medicine*, 97 (7), 41-455.

- Yoshimura, N., (2005). Intervention in lifestyle factors for the prevention of osteoporosis and osteoporotic fractures. *Clinical Calcium*, 15 (8), 1399-1408.

**Appendix A:**  
**Overview of Active Lifestyle  
Interventions**

Title	Author(s)	Duration	Description	Outcomes
Health Promotion by encouraged use of stairs	Blamey, A., Mutrie, N., Aitchison, T. (1995)	16 weeks	22,275 Observations (1 week, baseline, 3 weeks of sign up, 2 weeks after sign removal, & 4 <sup>th</sup> and 12 <sup>th</sup> week after sign removal) between 8.30 and 10am 3 days per week. INT: Signage Men & Women	Baseline stair use = 8% ↑ to 15-17% during Int. Women 5%- 12% during Int. Men 12%-21% during Int.
Six month observational study of prompted stair climbing	Kerr, J., Eves, F., & Carroll, D (2001)	6 months	45,361 Observations (2 week baseline, 12 week signs up, 2 weeks follow up, then removal of signs. INT: Signage Men & women	Stair use increased significantly
Promoting stair use in a US-Mexico border community	Coleman, K., Gonzalez, E. (2001)	6 months	Four sites observed., 115,153 observations 5 phases (baseline – no signs, intervention – signs up, follow up – no signs) INT: Signage Men & Women	Reported per site (x 4 locations) Women's stair use ↑ at each location. Stair use ↑ 3%-9% Airport and bank stair use ↑ most. Baseline stair use very low at these sites. (some decreases in men's stair use at some locations)

Title	Author(s)	Duration	Description	Outcomes
Using signs, artwork, and music to promote stair use in a public building	Boutelle, K., Jeffrey, R., Murray, D., Schmitz, K. (2001)	15 weeks	35,475 observations at University location. Baseline – 3 weeks, 2 interventions – 4 weeks, and follow up – 4 weeks. INT: Floor stand notice plus Artwork changed weekly, Music changed daily. Men & Women	Women (13.7%) more likely to use stairs than men (12.71%) More downward (14.92%) travel than upward (11.58%)
Can motivational signs prompt increases in incidental physical activity in an Australian health care facility?	Marshall, A., Bauman, A., Patch, C., Wilson, J., Chen, J., (2002)	12 weeks	15,8350 observations. Mechanical counter infrared observations validated each day by visual observations. Baseline – 3 weeks, intervention – 2 weeks, control – 2 weeks, 2 <sup>nd</sup> intervention – 2 weeks, 2 <sup>nd</sup> control – 2 weeks. Self report surveys also collected weeks 1 and 6	No significant results. Self-report indicated baseline stair use was 66%
Walk in to work out: a randomized trial of a self help intervention to promote active commuting	Mutrie, N., Carney, C., Blamey, A., Crawford, F., Aitchison, T., Whitlaw, A.	Pack receipt	295 participants, mean age 38 Int: written interactive materials pack (diary, wallchart, map, and local info. Reflective safety accessories) TTM theory-base Baseline, 6 and 12 months – Focus groups at 6 months Matched distance to work – randomised to control or intervention	Successful increasing walking not cycling. Int grp 25% changed active commuting stage (regularly actively commuting)at 12 months Indicated female car owners may be good targets for future interventions

**Appendix B:**  
**The Scottish Physical Activity  
Questionnaire (SPAQ)**

# SCOTTISH PHYSICAL ACTIVITY QUESTIONNAIRE

The following questionnaire is a simple way of measuring the amount of physical activity you have done over the last week. The questionnaire is strictly confidential so try and answer all questions as honestly as you can. Obviously, the overall accuracy depends on the accuracy of individual answers. It is not a test so there is no pass or fail.

1

The following questions relate to your physical activity. Be as accurate as possible with your answers. For example, if you only spent half that time dancing, add only half the time to the dancing section and not both.

(3) In the past week how many minutes did you spend each day:

1. In the past week how many minutes did you spend each day:

2. In the past week how many minutes did you spend each day:

3. In the past week how many minutes did you spend each day:

4. In the past week how many minutes did you spend each day:

5. In the past week how many minutes did you spend each day:

6. In the past week how many minutes did you spend each day:

7. In the past week how many minutes did you spend each day:

8. In the past week how many minutes did you spend each day:

9. In the past week how many minutes did you spend each day:

10. In the past week how many minutes did you spend each day:

11. In the past week how many minutes did you spend each day:

12. In the past week how many minutes did you spend each day:

13. In the past week how many minutes did you spend each day:

14. In the past week how many minutes did you spend each day:

15. In the past week how many minutes did you spend each day:

16. In the past week how many minutes did you spend each day:

17. In the past week how many minutes did you spend each day:

18. In the past week how many minutes did you spend each day:

19. In the past week how many minutes did you spend each day:

20. In the past week how many minutes did you spend each day:

21. In the past week how many minutes did you spend each day:

22. In the past week how many minutes did you spend each day:

23. In the past week how many minutes did you spend each day:

24. In the past week how many minutes did you spend each day:

25. In the past week how many minutes did you spend each day:

26. In the past week how many minutes did you spend each day:

27. In the past week how many minutes did you spend each day:

28. In the past week how many minutes did you spend each day:

29. In the past week how many minutes did you spend each day:

30. In the past week how many minutes did you spend each day:

TOTAL  
165 mins



i:

ii:

PERSONAL DETAILS

W;g:~t<t~~~f)!{~til ",,..!'&~ii~~~" . :~~S

***END OF QUESTIONNAIRE - THANK YOU***

This questionnaire was developed by Glasgow University, Forth Valley Health Board and East Ayrshire Council.

*Any correspondence should be addressed to:* Dr. Nanette Mutrie, .  
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Biomedical Systems and Departments of Medicine  
64 Oakfield Avenue, Glasgow G12 8IT, Scotland.  
FOR OFFICE USE (*please do not complete*)

Appendix C:  
Positive and Negative Affect Scale  
(PANAS)

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AM:---  
c-\_\_

## The PANAS

This scale *consists* of a number of words that describe different feelings and emotions. Read each *item* and then mark the appropriate answer **in** the space next to that word. Indicate to **what** extent you have felt this way .during the past few weeks

Use the following scale to record your answer

1 very slightly or not at all

2 a little

4 quite a bit

5 extremely

Interested

Excited

Strong

Guilty

Scared

Hostile

Proud

Irritable

Alert

Ashamed

Inspired

**Nervous**

Determined

**Attentive**

Jittery

**Active**

Afraid

Pre T1 1'2 1'3 T4 15

AppendixD:  
The Medical Outcomes Study  
Survey Short Form 36 (SF-36)

SF36 Health Survey (See original for correct layout)

Instructions: This set of questions asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Answer every question by marking the answer as indicated. If you are unsure about how to answer a question please give the best answer you can.

1. In general, would you say your health is: (Please tick one box)

Excellent  D

Very Good  D

Good  D

Fair  D

Poor  D

2. Compared to one year ago, how would you rate 'Much worse now than one year ago' your health in general now? (Please tick one box.)

Much worse now than one year ago  E

Somewhat worse now than one year ago  D

About the same as one year ago  D

Much better now than one year ago  D

3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much? (Please circle one number on each line)

Yes, Yes, Not

Limited limited A limited

Activities A Lot Little At All

3(a) Vigorous activities, such as running, lifting heavy objects, 1 2 3

Participating in strenuous sports

3(b) Moderate activities, such as moving a table, pushing a vacuum 1 2 3

cleaning house, or lawn mowing

3(c) Lifting or carrying groceries 1 2 3

3(d) Climbing several flights of stairs 1 2 3

3(e) Climbing one flight of stairs 1 2 3

3(f) Bending, kneeling, or stooping 1 2 3

3(g) Walking more than a mile 1 2 3

3(h) Walking several blocks 1 2 3

3(i) Walking one block 1 2 3

3(j) Bathing or dressing yourself 1 2 3

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

(Please circle one number on each line Yes No)

4(a) Cut down on the amount of time you spent on work or other activities 1 2

4(b) Accomplished less than you would like 1 2

4(c) Were limited in the kind of work or other activities 1 2

4(d) Had difficulty performing the work or other activities (for example, it took extra effort) 1 2

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (e.g. feeling depressed or anxious)?

Please circle one number on each line.

5(a) Cut down on the amount of time you spent on work or other activities 1 2

5(b) Accomplished less than you would like 1 2

5(c) Didn't do work or other activities as carefully as usual 1 2

6. During the past 4 weeks to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups? (Please tick one box.)

Not at all  0

Slightly  0

Moderately  0

Quite a bit  0

Extremely  0

7. How much pain have you had during the past 4 weeks? (Please tick one box.)

None  0

Very Mild  0

Mild  0

Moderate  0

Severe  0

Very Severe  0

8. During the past 4 weeks how much did m!n interfere with your normal work (Including both work outside the home and housework)? (Please tick one box)

Not at all 0

A little bit Moderately 0

Quite a bit Extremely

9. These questions are about how you feel and how things have been with you during the past 4 weeks.

Please give the one answer that is closest to the way you have been feeling (or each item).

All of Most A Good Som. A little None

th. of the bit of the of the of the

Please circle one number on each line. Time TIm. TIm. TIm. TIm. Time

Sea) Did you feel full of Ufe? 1 , 3 4 5 6

9(b) Have you been a very nervous person? 1 , 3 4 5 6

9(e) Have you felt so down In the dumps that

nothing could cheer you up? 1 , 3 4 5 6

9(d) Have you felt calm and peaceful? 1 , 3 4 5 6

S(e) Old you have a lot of energy? 1 , 3 4 5 6

9(n) Have you felt downhearted and blue? 1 , 3 4 5 6

9(9) Did you feel worn out? 1 , 3 4 5 6

~~~~) Have you been a happy person? 1 , 3 4 5 6

Did you feel tired? 1 , 3 4 5 6

10 During the past 4 weeks how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.) (Please tick one box.)

All of the time 0

Most of the time 0

Some of the time 0

A Utile of the time None of the time

11. How TRUE or FALSE is ~of the following statements for you?

(Please circle one number on each line.) Definitely Mostly Don't Mostly Definitely

True True Know False" False

11(a) I seem to get sick a little easier than 1 , 3 4 5  
other people

11(b) I am as healthy as anybody I know 1 , 3 4 5

~i~~~ I expect my health to get worse 1 , 3 4 5

11 d My hearth is excellent 1 , 3 4 5

THANK YOU!

Office Use only

Pre T1 1'2 1'3 T3 TS

Office Use only

# Appendix E: Example of Ejournal for Treatment Condition Participants

VICTORIA ~  
UNIVERSITY

## **LIFE: LIVE IT UP**

JOURNAL NUMBER 1

La Trobe 1 Sept 2003

(intervention date was 23 Aug 2003)

Well, here it is, time to put the first entry in your journal.

"Please use the following pages and questions to .  
tell me anything you want me to know about. Your  
thoughts, impressions and feelings are all important  
to our understanding what you are going through.

"Please write whatever you feel comfortable writing  
about. I am very interested to hear how you are  
going. Positive and negative thoughts are equally  
important.

Is there anything else you'd like me to know?

Please - enter your response! here \_ .

- You'll probably wish you never asked. Well because in  
the past I have tended to have slightly high blood-  
pressure I took your advice and got myself checked out  
with my doctor. News not good. my blood pressure  
higher and now I have three months to lose weight,  
exercise and get it down or I have to take medication.  
He probably wouldn't be quite so concerned but I have  
sleep apnoea too. He has been very helpful, given me a  
diet sheet developed by a physician at the LRH hospital  
and he is going to weigh me and take my blood  
pressure every fortnight (luckily he will bulk bill me cos  
I'm on a tight budget, it makes all the difference). He .  
- says I need support to do this. I have been on the "cut  
your throat diet" I call it, for 1 week and have lost 2 kg.

So for the moment I ain feeling very pleased with myself and the fact that I have to weigh in again next - Monday is keeping me motivated. My. participation in the Research will spur me on to be more active which will also help with getting the blood- pressure down. Considering this particular neWs from my doctor my mood is relatively positive. I have to make it work because I want to be fit in the years to come. Working here at the hospital I see so many sick people coming and going, I've already had a brush with cancer and I aim NOT to be one of those patients. So there it is, Life .Live It Up;

Appendix E:  
Example of Ejournal for Waiting  
List Control Condition Participants

**VICTORIA  
UNIVERSITY**

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o  
o

C2-7

**LIFE: LIVE IT UP**

JOURNAL NUMBER 6 c7

8 March 2004

Well, here it is, time to put the sixth entry in your journal.

v" Please use the following pages and questions to tell me anything you want me to know about. Your thoughts, impressions and feelings are all important to our understanding what you are going through.

¥ Please write whatever you feel comfortable writing about. I am very interested to hear how you are going. Positive and negative thoughts are equally important.

v" As mentioned at our first meeting, any information you give me will be handled with the utmost discretion and confidentiality. '

v" Expressing your thoughts, feelings, and emotions is an important in the change **process.**

So.....

How have you, been feeling about activity this month?

I'm feeling positive, washed some windows and some extra cleaning around the house. I like spending time at home. I also like going to the beach each weekend which we have done most weekends this year. I did spend iast weekend home though.

How active do you feel at present?

I'm feeling'good about getting up and about. I don't like staying in bed past 9 even on the weekends. I particularly like to get into the garden in the early mornings.

What would you like to happen with respect to yoLir activity this coming month?

I would like to be able to walk away from the computer. I.waste too much time on it and then feel frustrated that I have wasted all thattime when it could have beeh used for a purpose.

How does it feel to be participating in research this way?

rhe research makes me stop and think about how I am feeling, and maybe I can work out why when 'it is not so positive. Working where I do helps me get over my angry thoughts and get on with life. I tend to hold grudges and I'm working on that.

Is there anything else YOU'd like me to know?

I seem to go through stages where I can be. very nasty to people close to me with just a word or two. And I can alsb take offence by things said.

# Appendix F: Screening Checklist

## Screening Checklist .

The researcher checks and notes the participants name here

**Criterion 1 - must be aged between 45 and 59 years old.**

**Yes No**

**Criterion 2 - inability to maintain regular physical activity**

**Have you maintained any kind of physical activity or exercise .  
program for more than 6 months in the past three years?**

**Yes**

circle as appropriate

**No**

**Have you done any exercise more than three times a week over  
the  
last three months?**

**Yes**

Circle as appropriate

**Criterion 3 - mainly seated occupation**

**No**

**Does your current main occupation involve extended periods of  
time  
where you're sitting down?**

**Yes No**

circle as appropriate

**How long have you been in this occupation**

**.....months/ .....years**

insert number of months or years as appropriate)

Leisure Time physical activity relates to leisure time physical activity  
and exercise (Titze, Martin, Seiler, Stronegger & Marti, 2001).

**Do you do any physical activity during your leisure time?**

**Yes Occasionally**

circle as appropriate

**No**

**Criterion 4 - being generally healthy .**

The Researcher will complete the Physical Activity Readiness Questionnaire as  
she talks with the interested participant and assess whether

1 has your doctor has ever said you have a heart condition and that you  
should only do physical activity recommended by a doctor

2

3

activity

do you feel pain in your chest when she does physical activity

in the past month, have you had chest pain when not doing physical

4 do you lose her balance'because of dizziness or do you ever lose  
consciousness.

5 . do you have a bone or joint problem that could be made Worse by a  
change in her physical activity

6 her doctor is currently prescribing drugs (for example water pills) for her blood pressure or a heart condition?-

7

activity?

do you know of any other reason why you should not do physical

If the interested participant indicates the above concerns do not relate to her situation she will be invited to participate in the study.

If, however, the interested participant indicates yes to any of the above issues she will not be eligible for inclusion into the project and will be advised to talk with her doctor, when she is' ready, about Changing her physical activity level, and to ask the doctor which community programs are safe and helpful for her.

Invite to participate (ITP) 0

Decline invitation to participate and advise re doctor. (DITP) 0

Appendix G:  
**LIFE: Live It Up Booklet**  
(including copies of information for  
participants and informed consent forms)

See original booklet for layout etc.  
For Life: Lifestyle Initiatives For Everyone  
Guidelines for Planned Lifestyle Change  
The journey begins.....

Welcome.

First of all thank you for taking part in this research. Being involved in research as a participant is not easy but it is hoped that you will find the process very helpful in your efforts to change. We appreciate that it may have been quite a challenge to even consider taking part in such a program. You have taken a significant step changing towards making some change in your life.

This program has been designed to help you plan change and aims to assist your the process of change. Everyone taking part in this research leads very busy lives and everyone involved has a lot of things happening often all at once. This busyness of life and the desire to change are key issues for participants in this research, however, by the end of the program you should have some firm principles on which to base further changes. .

So, I encourage you to make the most of the opportunities to think about what you might wish to change, how, you can change, and to have some fun while you do change.

Kind regards  
Felicity Morris  
PhD Student  
Victoria University

Who are we:

Felicity Morris, PhD Student, School of Human Movement, Recreation, and Performance, Victoria University

Associate Professor Precilla Choi, School of Human Movement, Recreation and Performance

Professor Terence Seedsman, Deputy Dean, Faculty of Human Development, Victoria University

**Felicity Morris is your main contact person and can be contacted on:**

**96884467 (Campus office) or on  
Mobile phone # 0412 442 162**

**If you are concerned by any thing you are being asked to do for this research or distressed by the research process please contact:**

Dr Daryl Marchant, Psychologist

On  
039688 4035

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# VICTORIA UNIVERSITY

School of Human Movement,  
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Footscray Park Campus

Ballarat Road

Footscray

## Information and Informed Consent Certification form for participants in research on The Adoption and Maintenance of Physical Activity for Sedentary, Mid-life, Women.

### ABOUT THE STUDY:

You are invited to take part in a study on increasing physical activity in women aged 45-59 years, who consider themselves to be sedentary, and who would like to make some changes to their current activity levels. We need women to take part in one of two programs or a control group. The programs consist of strategies for increasing physical activity and will include things like setting specific goals, finding an activity that is simple to fit in with everyday life, and encouragement. .

Generally, physical activity is now known to be important to health and well-being for most people. Research has found however, what many women already know, that it is really hard to fit regular physical activity into busy lives and even harder to keep going. A number of studies have suggested ways to help people begin physical activity, but have found for many that maintenance of activity at any level is difficult. This study is

important because we are going to combine a number of different strategies to see which are more effective.

We're offering a short and a long program. They have been especially designed to provide ways of planning and keeping up change in activity levels. .

**.Continued..!**

6

- information will be collated at the end of the study, analysed and reported
- anonymously.
- If you are in the control group you will be asked to
- attend one meeting at the beginning of the study, and complete a set of
- questions, then
- complete further sets of questions on four other occasions throughout the year.
- also to write self-monitoring diary entry once a month throughout the year.
- You may of course withdraw from the project at any time without prejudice.

### Other important information ■ ■

- The main results of the project rely on a pooling of all responses.
- There are no right or wrong responses.
- The interventions are designed solely help you plan to make sustainable
- lifestyle change during the next year.
- The information from each questionnaire or journal will be added to all the
- others and reported anonymously.
- Then all the responses will be assessed in terms of how useful the program has
- been to you in maintaining lifestyle change across the year.
- All questionnaires and journals you submit to us will be kept under lock and key
- and the contents treated as highly confidential. Five years after publication of

- the study these items will be destroyed using a confidential shredding or
- destruction protocol. .
- Questions are welcome at any time during the project.

If before, during or after being involved in the study, you feel uncomfortable or distressed about your experience, please do not hesitate to call one of the people listed below.

Any queries about your participation in this project may be directed to the researchers .

(Names: Professor Terence Seedsman ph.9688 4921 or Felicity Morris ph. 9688 4467).

If you have any queries or corriplailts about the way you have been treated, you ay contact the Secretary, University· Human Research Ethics Committee, Victoria University of Technology, PO Box 14428·MC, Melbourne, 8001 (telephone no: 0396884710).

If you feel at all concerned or distressed by participating in this study contact please call Dr Daryl Marchant, Psy<:hologist on 9688 4035

8

## Being a Participant.

Self-evaluation, ·Environmentalevaluation, support from others, and commitment to change are all'important factors that will be asked of you as a participant in this research. Despite the fancy names, we believe that these are things that you may have done before, but perhaps not in a systematic way. Just to make sure we are talking about the same things this'is what I mean by each of the above phrases. .

### Self-evaluation

· This is a technique used by people to rethink many things. It can be applied to your health, workplace,relationships, but in this instance your self-evaluation will focus on making changes particularly in activity levels. You will be asked to reflect on your past, current, and future 'ppssible selves with reference to how you think about movement arid activity, how you could prepare to do things differently, whatyou feel about making changes in this area, what enthuses you about changing and what fears do you have about committing to changes in physical activity that although they' might be done as part of daily life they are · still different to what you do now.

### Environmental Evaluation

Involves looking at where you work, your home, your neighbourhood, your local parks and surroundings, standing back, and reviewing them with the eyes of a visitor to the neighbourhood. You will be looking at your environment with a view to using what is readily, inexpensively (preferably no cost) available to you · within your daily location and routine. For inStance, you may look at car parks located a short way from your work but not at work, with a view to using the car park-located furthest away once or twice (or more) a week.

### Support from Others

For the duration of the research you will have regular contact with one of the 'researchers, however, for you to get the most of the change process you will receive help in identiFying someone to help you with your specific change that you want to make over the year.. We will provide you with information just for them so they can help you to keep on with your chosen plan.

10

## Planned Lifestyle and Change

In the very early stages of this programme you will be asked to think about **one thing** you want to build-in to your already *very* busy life.. This is not going to be easy but· with support and encouragement we know you will give it your very best try. Here are some guidelin<:s to help you succeed in making a good start to changing activity levels.

If you're thinking "Hold on, I've tried to change but just can't seem to keep . it up...." read on. . .

Just by being involved in this r<:search I know that you iNant to make chang<:s. Th.ere.may be any number of reasons why past attempts have



## Discussion Topics for Workshop

### Setting your goal

#### Positive statements

#### Reminders

Approximately 15 minutes for each discussion

14

## Setting Your Goal

### It might help to

- Forget about past unmet goals
- Leave behind 'all or nothing' thoughts

### Aim to

- Choose a goal that you are Confident you can meet but with a hint of challenge.

- **Specify your goal-make** only 1 (one goal) - type of activity .

- **Be** specific about **how often** you will do it

- **Be** specific about **how much** you will do .

**Remember whatever you choose to do even if you only accomplish that goal on a few occasions each month it is probably more than you did last year**



**Remember everything you do counts towards doing your activity!**





the parking place you want to aim for.

·Of course, once you have built the activity into your day or your week these reminders may be replaced by others.

# MY PLAN

Today .. 1../03 I have decided to

Write down what you will do

Write down how often you will do it, will it be daily, weekly, monthly, twice a day, twice a week etc..

Write-down how much you will do it, will it be for 1 minute, 5 minutes, 10 minutes 15 minutes etc.

Please write down why you want to make this change?

**My positive statement is:**

**My reminder(s) *is/are* to**

**My supporter is: . \_**

Next, put up copies of this plan in as many places as possible so you see it daily

# Appendix H: Postcard

Front Side ..,.....-----!!!!!!!!!!!!-----...,,.,.,,

Back Side .-----,

LIFE · Live. Upl

Dear

I'm making a  
change - please  
will you be my  
supporter for this  
change?

I'll tell you more  
when I see you.  
Thanks and live it  
up today.

-----',,\_CD\_"W

# Appendix I: Interview Guide for Treatment Condition Participants

## Interview Guide For Treatment Condition Participants

- Thanks for coming today
- People busy - expand on ejournal entries - your experience - glad extra session
- Information for participants - Informed consent signed again
- Introduce what will be talked about ~ participant's experience of physical activity across the last year
- Notification of ejournal entries summary to be provided during the interview - not test - just to understand more about your experience whether positive or negative.
- Talk about data collection e.g. interview is being audio taped - research assistant and myself hear tapes for transcription, information kept confidential- tapes locked away and destroyed after 5 years. Summary of the findings available
- Sensitive topics - you can stop at any point and if distressed we'll provide a counsellor for you.
- Any questions so far?
- Sign consent if happy to begin interview.
- How do you feel you've gone over the year with your activity?
- What about your physical activity levels before the program?
- What motivated you to respond with interest to research participation?
- How did you find the workshop?
- goal setting, reminders for ourselves and positive statements
- and seeking support from someone can you tell me about what you thought about the goal setting? .
- How did you find the interactive parts of the workshop?
- How did that work for you ~ in terms of talking about it with someone you didn't know?
- What did you think about goal-setting?
- What about reminders?
- Positive statements?
- Social Support
- Workshop memories
- Ejournal summary - read through
- Ejournal frequency receipt etc
- What do you think or feel about activity now?
- Thanks

Appendix J:  
Interview Guide for Waiting List  
Control Condition Participants

E:\Interview Guide Treatment Condition Participants.doc

## **Interview Guide For**

### **Waiting List Control Condition Participants**

- • Thanks for coming today
- • People busy - expand on ejournal entries - your experience - glad extra session
- • Information for participants - Informed consent signed again
- • Introduce what will be talked about - participant's experience of physical activity across the last year
- • Notification of ejournal entries summary to be provided during the interview - not test - just to understand more about your experience whether positive or negative.
- • Talk about data collection e.g. interview is being audio taped - research assistant and myself hear tapes for transcription, information kept confidential- tapes locked away and destroyed after 5 years. Summary of the findings available
- • Sensitive topics - you can stop at any point and if distressed we'll provide a counsellor for you.
- • Any questions so far?
- • Sign consent if happy to begin interview.
- • How do you feel you've gone over the year with your activity? .
- • What about your physical activity levels before the program?
- • What motivated you to respond with interest to research participation?
- • What did you think about the meeting at the beginning of the year.
- • Ejournal summary- read through
- • Ejournal frequency receipt etc
- • What do you think or feel about activity now?
- • Thanks

E:\Interview Guide Waiting List Control Condition.doc

# Appendix K:

## Example of Ejournal

### Summary Treatment

### Condition

#### *AM24 Summary of ejournals*

Initially there was a possible link between "the all or nothing approach" and why you had put off being active in the past, and thinking about the value of only doing little bits was challenging to you. Initially, you felt positive and started taking the stairs more often, as well as seeking out an exercise bike. Participating in the program made you quite good and you hoped it would help others in future. You reported health issues (high blood pressure, need to lose weight - cut your throat diet!) but seemed determined to avoid sickness and to live it up.

After the first month you felt mostly up, but found it difficult to deal with your partner's negative moods. You were thinking about what you could and what you couldn't change, and decided you couldn't change your partner but would change yourself and your thinking by concentrating on the positives in your life. Taking time to enjoy what you have was on your mind as well as reminding yourself to be active was by talking to yourself. Taking time to smell the roses meant for you that you could look at and feel what you have achieved. Your goal was the same as at the beginning. You were walking and riding your exercise bike. There were physical changes in your environment as you engaged in redecoration which was hard work. You decided on redecoration rather than travel after thinking about the world terrorist situation. Walking was seen as more enjoyable exercise than reaching into corner cupboards! Work issues weighed heavy with you now as you expressed anger at your employers/colleagues lack of appreciation for the work you do and flexibility needed to keep your head above water with your workloads.

During the second month you were extremely depressed, nothing was helping you to be active, even reminders of talking to yourself about how good you'd feel in six month's time didn't help. You had changed your goal slightly, and were telling yourself to believe in yourself. Work was still extremely stressful, with threats to your work esteem and transitions at work significantly impacting your thoughts. Again being made to feel insignificant at work was very demoralising. Despite all these trials you still valiantly decide to keep doing your job to the best of your ability and believe in yourself.

Three months into the project you began to see some progress and felt you were going okay with your goal. Determination and encouragement from others was helping you, whilst feeling flat a lot of the time didn't help your activity levels. You felt change in general was inevitable, and beneficial, and that moving on, and going forward in life was important in beating stagnation. You were telling yourself to make the most of every day, and still reminding yourself to be active by thinking of your achievements. Your goal was still the same. Your initial reason for joining the study was to be healthier now and in later life, now, however, you also want to be happier and more relaxed. Work problems were the main issues at this time. Your partner was working and you had been on a social outing both of which had made you feel better. You had been sick with ear infection and had a vicious allergic reaction to asthma medication. Activity was not happening because of these factors.

C:\data set 2004\AM24 final summary 17 nov 2004.doc

#### *AM24 Summary of Ejournal*

At four months you did activity sporadically, particularly gardening, and you

felt you were doing more chores at this time: You feel you haven't really made any changes to your activity levels and thought that another meeting of everyone at that time might help keep you going.

Five months on you felt mostly positive, but that you "should" be doing more with exercise. Tiredness had not helped your activity levels. You also stated you enjoy change. .

Six months sees you on leave feeling in retirement mode. You feel you are going reasonably well with your goal. Perseverance, warm weather and company of friends are helping you be active, whereas being disorganised with time is not helpful. You think the program has made you stop and think about yourself and where you are going and where you want to go. Also, that you can do things for yourself without feeling too guilty. You are telling yourself "I can do that". Not using any reminders and have the same goal. You still want to participate for health reasons. You had a three week break from work where you fully relaxed and came out of it inspired. Your break has changed your attitude to work completely. You seem determined to assert yourself (in a good way). .

A month after our second workshop together you felt enthusiastic most of the time, and sometimes frustrated. You felt you were plodding with your goal. Tiredness and making room for others was not helping you be active. Your statement here was "Make the best of everything and you think change is a must and you have to keep at it". Your goal is to do as much as you can but not stress that you "should" be doing more. .

Although you generally felt positive, because of anxiety, your sleep had been poor for weeks. You stated that participation in this research was worthwhile, and it encouraged you to take a proper look at yourself, and where you are heading. .

At twelve months you were tired, depressed and down. Your goal was to keep doing the extra bits but try to do 30 mins per day of some sort of exercise. You think you may have SADs, and you feel you need a holiday to recoup your energies. You feel you "should" be chirpier as things are better at work. The program helped you look at yourself. .

AppendixK:  
Example of Ejournal Summary  
Waiting  
List Control Condition

## *C5 Summary of Ejournal*

When you volunteered you hoped that the program would be a catalyst for increasing your physical activity, and even though it did make you more aware of your activity levels, as well as making you honest with yourself about your activity levels, you were disappointed when it was not the catalyst you had hoped for. Your first impressions of the project were that it was upbeat but not hectoring and you approved the balloon image.

By month seven your activity consisted of an occasional dog walk of 30 minutes, and activity involved in moving house. You don't feel at all active at this point. Participation was challenging for you, and sometimes you resented being involved, however, it had made you aware of being honest with yourself about increased or decreased activity levels. You thought that having access to a dog would motivate you to do more walking, and had talked with your sister about possibly starting a formal fitness program. Regular contact with her could then be maintained, as you were now geographically nearer to your other sister. As a participant of a study you began 10 years ago, you had recently received feedback on your physical condition and you were not sure whether it would motivate you to be more active. You felt the best motivation for you is to be active at a level that leads to you feeling benefits of the activity, however, one drawback of this as a motivator for you, was that the less you do in fact do, the less benefits you feel, so you do less, then feel defeated. - A vicious cycle for you!

Your final ejournal comments were that you felt quite defeated by the imbalance of your working life and your activity levels. You do not feel active and felt your year's experience of physical activity has been very patchy. Your final months with this study have been shaped by preparations for your choir tour.. These preparations had been more mental than physical for you, however, they were a different character from your regular academic work that can be somewhat negative in their effects, choir involvement was definitely positive for you producing more energy for life. .

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## Appendix L:

### Example of Visual Cue

..... Physical activity will .

.. add years to your life and life to  
your years

Appendix M:  
Example of Flyer for Recruitment

Electronic version of this is not accurate – if you require a copy of the original with illustration please contact Felicity Morris on 9919 2972

VICTORIA UNIVERSITY ■

# **Call for Research Participants in Melbourne**

## **LIFE • LIVE IT UP**

**Are you a woman aged 45-59 years?**

**Do you sit much of the time whilst working?**

**Are you generally healthy?**

**Do you have access to Email?**

**Not doing much physical activity at present?**

Does this sound like you? If so, would you like to take part in research to help

you make some lasting changes to your activity levels?

**For further details contact Felicity Morris at**

**Felicity.Morris@research.vu.edu.au**

**03 9688 4467 or 0412442162**