The Motivation and Maintenance of Physical Activity in Women

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Submitted in partial fulfilment of the requirements for the degree of

Doctor of Psychology (Health)

Deakin University

August 2015
I am the author of the thesis entitled:

The Motivation and Maintenance of Physical Activity in Women

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Abstract

There is ample evidence to suggest that body weight of women in the developed world has been increasing despite growing awareness of the health risks associated with obesity, poor diet and physical inactivity. Although preliminary and anecdotal evidence indicates that women are in fact engaging in increasingly diverse types of physical activity compared to previous generations, prevalence statistics for these physical activities are not available, nor is it clear the extent to which these activities and women's motivations for engaging in these activities, particularly the new/emerging activities, are relevant to women's body weight, body image and their maintenance of physical activity over time. The present thesis employed a series of online surveys to evaluate the diversity of physical activities undertaken by Australian women, the motivations underlying these activities, and the psychological and behavioural correlates of these activities. This research first required the development, in Study One, of a typology to be used to enable measurement of the diversity of physical activities currently being undertaken by women, and the behavioural pattern of these activities. Qualitative content analysis was used to analyse data extracted from interviews with health professionals and laypeople, coupled with commercial marketing material from physical activity products. From this analysis, Study One extracted a typology of 15 physical activities: Cycling, jogging/running, walking/hiking, swimming/diving, skiing/snowboarding, dancing, yoga, pilates, group fitness (cardio), group fitness (weights), sport (competitive), sport (social), boxing/kickboxing, weight training/resistance exercise and 'other'. Furthermore, and in accordance with Self-Determination Theory (SDT), a set of five potential engagement patterns or outcomes relating to physical activity participation were identified: 'maintained', 'increased', 'decreased or stopped', 'stopped and started', and 'no participation over 12 months'. In Study Two the physical activity typology was used to quantify the diversity of physical activities undertaken, as well as the maintenance of these activities over time, in a sample of
408 physically active women 18 to 73 years old (M=33.69, SD=10.09). Participants completed an online survey on physical activity methods; participation rates and motives (current and retrospectively); Stage of Change; exercise identity and self-efficacy; depression, anxiety and stress; gender role; drive for muscularity; and eating disorder risk. The results indicated that Australian women are undertaking diverse physical activities with almost half of the women surveyed engaging in non-traditional strength-related activities. This diversity of activity was reflected in diverse motives for physical activity, with women rating Health/Fitness motives as being of greatest importance. More traditional motives such as Appearance/Weight are rated almost equally to Health/Fitness. However, Appearance/Weight motives were unrelated to either frequency or maintenance of physical activity but were related to a variety of negative psychological indicators including eating disordered symptomatology, stress, anxiety and depression. On the basis of SDT, and the proposition that individuals experience multiple types of motivation simultaneously, and further supported by previous research identifying individuals report a combination of multiple motivational regulations for a given domain at the same time, Study Three used an online survey to assess the relevance of various 'motivational profiles' to women's long-term maintenance of physical activity from adolescence (reported retrospectively) through to adulthood in a sample of 246 women 18 to 88 years old (M=31.30, SD=12.93). Cluster analyses extracted four motivational profiles, with a 'moderate-broad profile' - characterized by elevation in all motivation types - associated with greater likelihood of lifelong maintenance of physical activity. Collectively, the results provide a contemporary snapshot of women's physical activity choices and motives and the relevance of both to their mental and physical health.
Acknowledgements

Thank you, Mum, for your academic support, guidance and inspiration. Thank you also, for always being my personal cheer squad and instilling in me the unshakeable belief that I can do anything.

Thank you, Dad (‘the fount of all knowledge’), for seriously and completely answering almost every single question I ever had as a child (and as an adult!), and thereby developing my curiosity in research, and the interconnectedness of all things.

Thank you, Sarah and Sean, for being fabulous older siblings – always supportive and encouraging.

Thank you to all of my friends, near and far, who have kept me entertained and motivated along this journey, especially Gideon and Katie, who endured the whole process with me.

Thank you, Alex, for sharing your knowledge and expertise through your supervisory guidance. My murky ideas frequently crystallised into clear directions and concepts following our chats.

Thanks team, we made it!
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1. Introductory Chapter: The Relationship Between Physical Health, Body Image and Physical Activity

1.1 Preamble

Dramatic shifts in the human environment, behaviour, and lifestyle have resulted in a global epidemic of obesity and physically inactivity (Tsai, Wu, & Hsu, 2014); while experiencing significant pressure to conform to a thin ideal, women, on average, are getting fatter. In 2011–12, approximately 60% of Australian adults were classified as overweight or obese, and more than 25% of these were categorised as obese (ABS, 2012). The total cost of health care for overweight and obese Australians is estimated at more than $56 billion annually due to the range of health issues associated with overweight and obesity. Physical inactivity is the fourth leading cause of death worldwide. The major public health problem created by this widespread decline in physical inactivity participation in developed countries is even more significant in the female population, in which physical activity levels are consistently lower, on average, than those of males (WHO, 2010). The cost of physical inactivity to the Australian economy is conservatively estimated to be approximately $14 billion (Medibank Private, 2008). Central to addressing this problem, is understanding what motivates physical activity participation, and what leads to physical activity adherence over time.

Paradoxically, while women are experiencing physical health issues relating to weight gain, they are experiencing psychological health issues relating to thinness and weight loss. Pressures on women to conform to narrow, unrealistic, and increasingly unattainable ideals of thinness promoted by the media, peers, and family members (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), are thought to contribute to a preoccupation with weight, food, the subjective overestimation of one’s own weight (Bruch, 1962), the development of negative
body image, and the adoption of unhealthy weight-loss strategies and disordered eating symptomatology (e.g., Cash & Brown, 1987; van den Berg, Thompson, Obremski-Brandon, & Coover, 2002). Several personality, attitudinal, emotional, and behavioural characteristics, such as frequency of engaging in body comparisons, internalizing the thin ideal, low self-esteem, perfectionism and adherence to a traditional feminine role have been identified as promoting susceptibility to these sociocultural pressures (e.g., Garner, Garfinkel, Schwartz, & Thompson, 1980; Haworth-Hoeppner, 2000; Stice, 1994). Indeed, many theorists have suggested that individuals with eating disorders devalue most other aspects of their self and over-value their physical appearance (Cooper & Fairburn, 1992; Fairburn, Shafran, & Cooper, 1999a; Fairburn et al., 2003; Geller, Zaitsoff, & Srikameswaran, 2002; Walsh & Garner, 1997). Fairburn and colleagues (Cooper & Fairburn, 1993; Fairburn & Garner, 1988) showed that the self-esteem of women with eating disorders was more strongly related to feelings about weight and shape than women without eating disorders. However, the focus of research relating to body image and disordered eating has been on thinness and weight rather than utility or shape.

Research has identified a number of different environmental, personal and psychological factors that influence physical activity adoption and maintenance (Buckworth & Dishman, 2007). These influences of regular physical activity however, are limited in accounting for individual differences in ongoing maintenance of physical activity. This has contributed to a shift in focus towards the psychological factors that influence physical activity in the attempt to gain a more comprehensive understanding of regular physical activity (Buckworth & Dishman, 2007). For both men and women, there is a complex interplay between participation in physical activity and body image. In more recent years, the undocumented changes that have been anecdotally occurring in female body image
preferences warrants further empirical attention both as an end in and of itself, and in how it impacts on physical activity participation and adherence over time.

Research on body image and public health have led not only to different and incompatible conclusions, but the recommendations from these research areas constitute mixed messages – being overweight is physically unhealthy, but it is psychologically unhealthy to focus on thinness. This highlights the limited focus on thinness and weight in terms of body image and health goals that has occurred in both public health and body image research. Yet, there is emerging evidence that shape and utility are of growing relevance to women’s body change motivations and choice of body change strategy, and that these choices may have more positive psychological foundations than the focus on thinness.

In the present thesis it will be argued that the emphasis on weight and weight loss has contributed to a focus in body image research on appearance-based motivators of body change (including physical activity) that are relevant to a drive for thinness, unrealistic ideals of thinness, and dissatisfaction with current body weight. Evidence will be reviewed to demonstrate that comparatively little attention has been paid to body shape and body utility. In particular, it will be noted that aspects of body shape/appearance relating to muscle size and muscle tone (Bottamini, 2006; Cafri, Strauss, & Thompson, 2002; Kimmel & Mahalik, 2004; Ricciardelli & McCabe, 2001; Ricciardelli & McCabe, 2004; Spitzer, Henderson, & Zivian, 1999), have received little empirical attention in the context of women, with the muscle dimension of appearance typically being attributed to men and the pursuit of masculinity (McCready, Saucier, & Courtenay, 2005a). This is despite mounting evidence that women are increasingly interested in achieving shape and weight change through muscle building and toning activities, and that some are also interested in achieving muscle for its
aesthetic appeal (George, 2005; Ginis, Eng, Arbour, Hartman, & Phillips, 2005; Grogan, Evans, Wright, & Hunter, 2007).

The present literature review will also consider evidence that several non-appearance-based motivators of body change that have typically been associated with men and male body image (McCreary, et al., 2005a) are also significant to women. The male body image literature in the context of muscle and physical activity includes utilitarian aspects of the body such as physical strength, power, fitness and endurance, physical health and various factors related to identity and self-worth such as gender identity (masculinity), vitality, psychological health and well-being, respect from others, self-esteem and empowerment. On the basis of the male literature it will be proposed that there is insufficient data on women looking at non-appearance based factors related to body image and how these relate to physical activity participation. The data limitations may, in part, stem from a lack of a suitable measure for identifying the full breadth of activities being undertaken by women, beyond those associated with weight loss and achieving the traditional slim ideal. The current literature has not kept pace with the recent explosion in physical activity methods that women are anecdotally participating in (e.g. CrossFit, PowerYoga, HIIT), or why this increase in diversity has occurred. In order to understand the relevance of this change, the construction of a typology to enable measurement of the diversity of physical activities currently being undertaken by women, and the behavioural pattern of these activities is required. This typology will facilitate further research to understand the motivations underpinning these activity choices and how they relate to outcomes impacting on physical health (participation in physical activity over time) and psychological health (including eating disorder risk, stress, anxiety and depression).

The literature review that follows will consider the substantial research that exists documenting the links between body image in women, particularly negative body image, and
appearance-motivated body change behaviours. The review will cover both the psychological and physical consequences of negative body image in women with a particular focus on the pursuit of thinness through weight-loss dieting and the development of disordered eating.

This review will then broaden to include the limited research on motivations for body change in women that do not focus on thinness. This includes physical activity based body change behaviours typically associated with men’s body image and their pursuit of strength, athleticism, and muscularity. Most importantly, consideration will be given to two potentially important and related ideas in women’s health: that women’s body image concerns have diversified to include (for some) body shape not just body thinness, and that women’s body change behaviours can no longer be characterised solely by appearance concerns, the pursuit of thinness through passive (dietary) methods, and motivated by traditional feminine goals of achieving weight loss and moving toward the perception of the thin ideal. The review will extend to compare how identification with different gender roles impacts on psychological outcomes and physical activity uptake.

Previous research has suggested that given the multidimensional nature of physical activity motivation, different combinations of motives combine to yield motivational profiles and that these profiles may form the basis of different outcomes relating to physical activity participation. The literature review that follows will review this research within the framework of Self-Determination Theory (Deci & Ryan, 1985) in order to assess how different combinations of motivations may differentially predict physical activity adherence over time.

This thesis will report on the results of three studies. Study One, was conducted with the aim of developing a contemporary and comprehensive typology of physical activities engaged in by women. It was intended that this typology would include both ‘typical’
activities (such as aerobic exercise) associated with the pursuit of the thin feminine ideal, as well as ‘atypical’ activities associated with altering physical body shape and functionality in other ways and for other reasons, in addition to an outcomes measure of the behavioural pattern of these activities. Study Two, used this physical activity typology to assess and document women’s rates of participation in each activity and their motives for participating in that activity. In keeping with the aim of being comprehensive and exploring typical as well as atypical physical activities, the evaluation of motives for participating in physical activities included appearance but also utilitarian goals such as increased strength, muscle and body functionality, and the pursuit of personal empowerment and well-being. The psychological and health implications of the physical activities and motives surveyed were examined in the context of Self-Determination Theory (Deci & Ryan, 1985). Specifically, relationships were examined between particular motive-activity combinations and, i) body image disturbances; ii) positive psychological indicators relating to body image (including quality of life and gender roles); and iii) predictors of successful physical activity engagement over time. Study Three, extended this understanding to include a more comprehensive evaluation of motives by assessing relationships between combinations of motivations; that is, ‘motivational profiles’ (Matsumoto & Takenaka, 2004; Ntoumanis, 2002), and a woman’s choice of and adherence to physical activities.

The review that follows will start by exploring the growing public health issue of physical activity; the rapidly declining rates and the multitudinous consequences of participation, and the increasing focus (in Western countries) on interventions aimed at increasing physical activity for both physical and psychological health benefits.
1.2 Public Health

The widespread decline in physical activity participation in developed countries is a major public health problem (WHO, 2010). Despite the mounting evidence surrounding the benefits of physical activity, a recent global review of prevalence rates of physical activity levels among youth and adults found in most countries, less than 50% of the population was sufficiently active\(^1\) (Sisson & Katzmarzyk, 2008), and females are generally less active than males (ABS, 2013). Levels of physical activity decline in older age, with just one in five women 75 years or over getting sufficient physical activity (see Figure 1.1: ABS, 2013).

\[\text{Figure 1.1.} \text{ Australian women aged 18 and over – percentage sufficiently activity (ABS, 2013).}\]

The current generation of both adults and children are spending increasing time in environments that both limit physical activity and encourage prolonged sitting; at home,

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\(^1\) Based on internationally recognised standards of sufficient activity.
work, school and other educational environments; in cars, buses, trains and trams, and in
community activities (Hill, Wyatt, Reed, & Peters, 2003). Each of these domains and
activities are continually being re-engineered to minimise human effort which results in less
movement and more sedentary behaviour. This shift (in developed countries) from a life of
physically demanding activities, to one with few physical demands has been relatively recent
and quite dramatic. In Australia, 48% of adults work in an occupation in which they are
sitting 50% or more of their work day (ABS, 2013). Australian adults also spend
approximately 30 additional hours weekly (average) on other ‘leisure time’ sedentary
activities, including watching television, playing electronic games, using a
computer/internet/phone, sitting for transport and other activities (ABS, 2013).

This decline in physical activity has resulted in an increase in many serious physical
reports physical inactivity causes 1.9 million premature deaths in the world each year. In
Australia, physical activity is the greatest contributor to the burden of disease in women with
the direct costs of physical inactivity of the population to the health care system estimated at
1.5AUD billion (Medibank, 2007). Promotion of increased physical activity is increasingly
recognised by international and national health bodies as an important public health priority
and a primary means for the prevention, treatment and rehabilitation of chronic disease. This
is exemplified in The World Health Organization’s (2010) global strategy on physical
activity, the English National Health Service (NHS., 2015) ‘Choosing Activity’ physical
activity action plan, the US ‘Physical Activity Guidelines for Americans’ (Department of
Health and Human Services, 2008) and the ‘National Physical Activity Guidelines in
Risk factors for many health conditions are separated into non-modifiable factors (e.g. age, gender and family history) and modifiable risk factors (e.g. physical inactivity, unhealthy eating habits and social isolation). Physical activity participation is a modifiable risk factor for many serious health issues including coronary heart disease, ischemic stroke, type 2 diabetes, colon cancer and breast cancer, osteoporosis, arthritis and fibromyalgia and helps in the relief of such diverse conditions as nicotine abstinence and menopause (Begg, Vos, Barker, Stanley, & Lopez, 2008; Flynn et al., 2009). Physical activity has also been found to reduce chronic risk factors such as overweight/obesity and high blood pressure; reduce symptoms of depression, anxiety and stress and improve general wellbeing (Armstrong, Bauman, & Davies, 2000; Begg, et al., 2008). Other psychological benefits of physical activity include improvement in self-esteem (Sonstroem & Morgan, 1989), and vitality (Salmon, 2001). Regular physical activity may also protect against the development of depression (Paffenbarger, Lee, & Leung, 1994; Pate et al., 1995; Raglin, 1990); or physical inactivity might be a risk factor for depression (Farmer et al., 1988).

Research has identified a number of different environmental, personal and psychological factors that influence physical activity adoption and maintenance (Buckworth & Dishman, 2007). Environmental factors such as limited time and poor health have been commonly reported among younger and older adults respectively (Sallis, King, Sirard, & Albright, 2007; Salmon, Owen, Crawford, Bauman, & Sallis, 2003). The built environment (for example, transportation) and access to physical activity facilities, such as walking trails have also been found to influence physical activity (Duncan, Spence, & Mummery, 2005). Such factors have also been proposed to influence physical activity differently depending on if they are actual or perceived (Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2008).
Personal factors such as age, gender and having a history of physical activity have been associated with different patterns of adult physical activity (Buckworth & Dishman, 2007), including a weak to moderate relationship between childhood physical activity and sports participation, and regular adult physical activity (Tammelin, 2005; Telama et al., 2005). Physical activity levels have also been found to decline with age, and males (of all ages) are generally more active than females (ABS, 2013).

These influences of regular physical activity however, are limited in accounting for individual differences in ongoing maintenance of physical activity. This has contributed to a shift in focus towards the psychological factors that influence physical activity in the attempt to gain a more comprehensive understanding of regular physical activity (Buckworth & Dishman, 2007). For both men and women, there is a complex interplay between participation in physical activity and body image. In more recent years, the undocumented changes that have been anecdotally occurring in female body image preferences warrants further empirical attention both as an end in and of itself, and in how it impacts on physical activity participation. This is particularly significant, given the lower rates of physical activity in females compared to males. However, the public health messages aimed at improving health by reducing body weight may inadvertently heighten the focus on weight and thinness that has a multitude of negative psychological consequences, particularly in the body image of women.

1.3 Body Image in Western Industrialised Societies

The term ‘body image’ is variously used to describe the cognitive, affective, and/or perceptual aspects of one’s physical appearance (Cash, 2002). The cognitive behavioural model of body image proposed by Cash (2002) recognises the complexity of this construct. It first distinguishes contributions from two pathways - historical factors, referring to past
events, attributes and experiences that “predispose or influence how people come to think, feel and act in relation to their body” (p. 38) including, specifically, physical characteristics, interpersonal experiences, cultural socialization, and personality attributes. These then interact with proximal event and processes including appearance-schematic processing, internal dialogues (such as thoughts, interpretations and conclusions), body image emotions and adjustive, self-regulatory behaviours. This provides a useful framework for examining the development of negative and distorted body image and the mediating and moderating role of various psychological factors. The most salient contextual factor is the thin ideal promoted in Western societies.

The following subsections will review psychosocial factors that have been identified as risk factors for predisposing and/or maintaining unhealthy attitudes and behaviours related to body weight and the desire for weight-loss with particular emphasis on disordered symptomology, in recognition of the central role of body image in mediating the influence of sociocultural pressures of appearance on unhealthy body change. The primary aim of these subsections is not to provide a detailed and comprehensive review of all contributing factors but to explore some of the general classes of individual differences in the experience of sociocultural pressures on body weight and individual differences in disordered eating and the burden on individuals, their families and health care that body image disturbance constitutes.

1.3.1 Physical Influences on Negative Body Image in Women and Girls

Girls learn from an early age that their appearance is the basis for many judgements including their value in society (Klein & Shiffman, 2005); the ideal appearance to achieve is thin. Judgements about intelligence, success, attractiveness, fertility, sexual maturity, child-bearing capacity, overall health, and positive personality traits are made based on appearance
Studies of preschool aged boys and girls identify that the stereotype of “what is beautiful is good” has already developed at this age in that attractive peers are viewed as friendlier, smarter (Dion, 1973) and more popular (Vaughn & Langlois, 1983) than unattractive peers. This becomes particularly significant during adolescent development, during which time the emergence of body dissatisfaction and subsequent dieting and weight-loss behaviours in women is common (Levine, Smolak, & Hayden, 1994). During this stage, girls typically become more conscious of their body size and physical appearance, and are more concerned about how other people perceive them. Body image becomes an important component of self-esteem and identity (Levine, et al., 1994). This heightened self-consciousness co-occurs with physical changes that tend to shift a girl’s body shape away from the thin-ideal female form emphasized by society. It has been suggested that adolescents are then more susceptible to critically evaluating their bodies, especially with regards to being overweight (Cash & Pruzinsky, 1990). Amongst Australian adolescent girls, a high prevalence of body dissatisfaction and preference for a thinner body type has been identified, with over 60% of 13-15 year old girls, and approximately 90% of 16-18 year old girls reporting dissatisfaction with their bodies (Maude, Wertheim, Paxton, Gibbons, & Smukler, 1993; Nowak, Crawford, & Buttner, 2001). Approximately half of the girls sampled also reported dieting or engaging in some form of extreme weight-loss method such as vomiting and use of laxatives (Maude, et al., 1993; Nowak, et al., 2001; Wertheim, Paxton, Schutz, & Muir, 1997).

1.3.2 Socio-Cultural Influences on Body Image
The tripartite model identifies three significant sources of sociocultural pressures on appearance: the media, family, and peers (Thompson, et al., 1999). Kandel (1980) identifies two mechanisms by which this occurs: social reinforcement (or direct pressure) and modelling. Social reinforcement occurs via the comments or actions of significant others that support and perpetuate the thin-ideal for women (Stice, 1998). Examples may include pressure to lose weight and weight/shape related teasing, leading to the internalisation of the values and attitudes corresponding with the thin-ideal, resulting in body dissatisfaction and subsequent potential ramifications such as eating disorders. Modelling is more of an indirect pressure to conform (Stice, 1998). It refers to the imitation of behaviours such as preoccupation with appearance, admiration of images conforming to the thin-ideal and dietary restraint.

Within the triad of family and peers and the media offered by the tripartite model, the former two occur through direct interactions with significant others, usually starting with the significant influence of parents. Parental expectations start even before a child is born and start to influence a child’s body image through ongoing exposure to parental attitudes, comments and behaviours (Kearney-Cooke, 2002). Feelings of personal worth start to develop when a child’s emotional needs are met and secure attachment occurs, which forms the basis for secure body image (Kearney-Cooke, 2002). Within this context, the progressive process of internalisation begins, in which interactions between the individual (child) and the outer world are replaced by inner representations of the self and body. As children age, parents have increasingly negative perceptions of and attitudes toward their children’s physical appearance (Striegel-Moore & Kearney-Cooke, 1994). Children will internalise these messages about their bodies from their parents as they are developing and forming their body image concept. In a study of adolescent girls, maternal feedback predicted body image satisfaction and importance (McCabe & Ricciardelli, 2003).
Being teased is one of the most commonly reported precipitants of body dissatisfaction (Striegel-Moore & Kearney-Cooke, 1994; Tantleff-Dunn & Gokee, 2002). Teasing is seen as a socially acceptable response to those who do not fit the thin-ideal, even for the recipients of the teasing, (Grogan & Richards, 2002) where becoming fat is linked with weakness, losing control of the body, self-indulgence and lack of self-discipline (Tiggemann & Rothblum, 1988). One previous study identified that the three strongest predictors of body dissatisfaction and drive for thinness are the media, teasing, and criticism from household members (Levine, et al., 1994). Other studies on bulimic symptomology in young adult women have found family and peers, to be the strongest predictors (Stice, 1998) and perceived pressure to achieve the thin ideal from family, friends, dating partners and the media to be highly related (Irving, 1990; Stice, Ziemba, Margolis, & Flick, 1996). Interpersonal experiences may be mediated and or moderated by personality factors.

1.3.3 Body Image Disturbances and Disordered Eating in Women and Girls

Increased efforts to achieve the thin-ideal are reinforced by a societal attitude that everyone can improve themselves with sufficient effort. The majority of people believe that their ability to change their body size and shape are almost entirely under their own control (Bennett, 1984). In fact, only a small proportion of females are physically able to shape their bodies into the idealised form due to genetics and the physiology of weight regulation. This has been explored through twin studies, in which identical twins reared separately are significantly more similar in weight than fraternal twins or siblings (Stunkard, Foch, & Hrubec, 1986). Adopted children also resemble their biological parents more closely in weight than their adoptive parents (Stunkard et al., 1986). The physical and psychological consequences for individuals who do not match society’s physical body ideals may be extreme. Food restriction methods, coupled with certain personality and family dynamics, can
lead to eating disorders such as anorexia nervosa and bulimia nervosa (Polivy & Herman, 1999). The latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5: American Psychiatric Association, 2013) states anorexia nervosa is characterised by “persistent restriction of energy intake leading to significantly low body weight (in context of what is minimally expected for age, sex, developmental trajectory, and physical health; either an intense fear of gaining weight or of becoming fat, or persistent behaviour that interferes with weight gain (even though significantly low weight); and disturbance in the way one's body weight or shape is experienced, undue influence of body shape and weight on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.”

Bulimia nervosa is typified by recurrent episodes of binge eating with a sense of lack of control over eating during the episode; recurrent inappropriate compensatory behaviour in order to prevent weight gain (e.g. self-induced vomiting, misuse of laxatives, diuretics, or other medications, fasting, or excessive exercise); and self-evaluation disproportionately influenced by body shape and weight (American Psychiatric Association, 2013).

Sociocultural influences that promote the unrealistic stereotypical thin ideal and promote the value of appearance for women have a negative impact on body satisfaction and can be a precursor to disordered eating behaviours (Heinberg, Thompson, & Matzon, 2001). Three significant sociocultural influences are proposed by Stice (1994): i) a feminine ideal that highlights thinness or slenderness in body shape (the ‘thin ideal’), ii) the dominant feature of appearance in the female gender role, and iii) the perceived association between a woman’s appearance and her success and social status. From birth, females are surrounded by these messages and thereby develop a perspective of themselves and other women that centers around the importance of appearance for women. The experience of these messages escalate
during puberty (Striegel-Moore, Silberstein, & Rodin, 1986). Although these sociocultural pressure saturate Western populations, substantial differences exist in the extent to which females experience a negative body image, with only a small proportion of women presenting clinical levels of disordered eating (Tylka, 2004).

Body image disturbance is the term used to define two aspects of body image: ‘negative’ body image and ‘distorted’ body image, both of which are of clinical relevance. ‘Negative’ body image includes negative self-evaluations, the experience of body dissatisfaction, preoccupation with appearance and overvaluing appearance. ‘Distorted’ body image is characterised in females by over-estimation of body weight and internalizing an unrealistically thin ideal body. Body image disturbance has been strongly implicated as a causal factor in the development and maintenance of eating psychopathology and has long been viewed as a central component of clinical eating disorders (Thompson, et al., 1999). Longitudinal studies have demonstrated an association between body image disparagement and concerns regarding body shape and weight and the later onset or intensification of eating disorder symptoms (Cattarin & Thompson, 1994; Killen et al., 1994; Wertheim, Koerner, & Paxton, 2001).

These consequences of disturbed body image have significant ramifications primarily and obviously for the individual but more broadly the impact ripples out into society, including a substantial burden on health services. This burden has two facets: the demand placed upon often under-resourced services (which can then impact back on the individual in the form of inadequate treatment) and the cost shouldered by the public health system. Only limited data has been collected on the overall financial cost of disturbed body image and the subsequent psychological and physical disorders including depression and eating disorders (Striegel-Moore, Leslie, Petrill, Garvin, & Rosenheck, 2000). The data that has been collected
is mainly in the area of eating disorders, but focuses on the primary elements of the disorder rather than the broad range of secondary health problems that often follow, ranging from osteoporosis to dental decay (Pike & Striegel-Moore, 1997). This is set within the context of only a small fraction of individuals actually seeking treatment specifically for their eating disorder (Hoek, 1995; Rathner & Rainer, 1997).

Eating disorders are not the only consequence of body image disturbance. Research has identified a relationship between body image and eating disturbance and low self-esteem, negative affect and general emotional distress (Button, Sonuga-Barke, Davies, & Thompson, 1996; Fabian & Thompson, 1989; Kansi, Wichstrom, & Bergman, 2003; McCabe, Ricciardelli, & Banfield, 2001; Ricciardelli & McCabe, 2001), although it is not yet clear whether psychological distress, such as low self-esteem and negative affect, precedes body dissatisfaction and eating dysfunction or occurs as a consequence.

The psychological, social and health burden of disease constituted by eating disorders has ensured that they receive continuing clinical, empirical, public and government attention. However, the focus on weight and pathological weight loss in women may have obscured theoretically and clinically interesting shifts in women’s attitudes in non-weight aspects of appearance, and behaviours that are not limited to weight modification and that may actually have the potential to cycle back in as positive contributors to the problem of eating disorders. This raises the need to document and further explore the psychosocial bases of these potential motivators and investigate clinical implications. Comparatively little attention has been paid to body shape, despite the substantial individual differences that exist in the way in which fat distributes itself on women’s bodies. Aspects of body shape/appearance relating to muscle size and muscle tone (Bottamini, 2006; Cafri, et al., 2002; Kimmel & Mahalik, 2004; Ricciardelli & McCabe, 2001; Ricciardelli & McCabe, 2004), have received little empirical
attention in the context of women, with the muscle dimension of appearance typically being attributed to men and the pursuit of masculinity (McCreary, et al., 2005a). This is despite mounting evidence that women are increasingly interested in achieving shape and weight change through muscle building and toning activities, and that some are also interested in achieving muscle for its aesthetic appeal (George, 2005; Ginis, et al., 2005; Grogan, et al., 2007). In seeking to understand these changing trends, sociocultural influences including interpersonal interactions provide a potent starting point.

1.3.4 Personality Factors

Individual personality attributes significantly influence the development of body image attitudes. Cash (2002) suggests that self-esteem may be the most critical of these factors. Whereas a positive self-concept may assist in the development of a positive evaluation of one’s body and protect against external pressures that promote unrealistic body image, poor self-esteem may increase one’s body image vulnerability. Women with low self-esteem and high negative affect may be more vulnerable to externally prescribed pressures, and thus be more likely to subscribe to the Western cultural standard of the thin-ideal. Comparison to these often unattainable standards, then leads to body dissatisfaction which is associated with anxiety and depression (Holsen, Kraft, & Roysamb, 2001). Attempts are made to change bodily appearance in an effort to heighten esteem and improve self-worth. Body dissatisfaction has been linked to restrictive eating, bulimic behaviours, including purging, abuse of laxatives or diet pills and excessive exercise (Heinberg, et al., 2001). Alternatively, it has been suggested that body dissatisfaction and subsequent engagement in weight loss or body change methods may produce or exacerbate negative affect and lowered self-esteem because of the ineffectiveness of these means in controlling weight (Stice, 1994). Another proposal is that the relationship between global psychological functioning and body
dissatisfaction and eating disturbance may, in fact, be bi-directional in nature (Bardone, Vohs, Abramson, Heatherton, & Joiner, 2000).

Perfectionism is another potentially influential personality trait that may lead individuals to link self-worth to the ability to achieve high physical ideals. Perfectionism refers to high standards of performance which are accompanied by excessively critical evaluations of behaviours and concern over mistakes (Franco-Paredes, Mancilla-Diaz, Vazquez-Arevalo, Lopez-Aguilar, & Alvarez-Rayon, 2005). Several studies have found a relationship between perfectionism and clinical levels of disordered eating (e.g., Tyrka, Waldron, Graber, & Brooks-Gunn, 2002).

Gender-based attitudes and values may also impact upon body image. Cash (2002) outlines that females who support traditional gender attitudes in their relationship with males are more invested in their appearance, have internalised cultural standards of beauty more fully and hold more maladaptive assumptions about their looks. This will be further discussed in relation to maintenance and transgression of gender-based attitudes and behaviours, the development of these attitudes and subsequent behaviours through cultural socialisation, and subsequent impact upon psychological well-being.

1.3.5 Cultural Socialisation

The third source of significant sociocultural pressures on appearance identified within the tripartite model is the media. Television, magazines, films, outdoor advertising, radio and the internet all use a range of glamorous words and images promoting a uniform presentation of the “perfect” female, who possesses flawless skin, a thin waist, long legs and well-developed breasts (Thompson, et al., 1999). Unlike boys, who are socialised to value their bodies as an instrument to apply to mastery of challenges in their environment, girls are
socialised to value their bodies as a way to attract others (Stephens, Hill, & Hanson, 1994). Objectification theory (Fredrickson & Roberts, 1997) proposes that as females learn to see themselves as objects to be evaluated based on appearance, they are more likely to feel shame, discomfort and anxiety for not achieving a “perfect” appearance (based on culturally defined ideas). The media’s sociocultural messages that overemphasize the importance of appearance and promote unrealistic ideals such as thinness and youthfulness lead to both male and females inferring that appearance is a female’s most valuable attribute and therefore a lifelong project (Brumberg, 1997). Research has identified that increasing levels of exposure to media leads to increases in the frequency of negative emotions females experience both directly in relation to their physical bodies but also more generally about themselves (Pinhas, Toner, Ali, Garfinkel, & Stuckless, 1999; Stice & Shaw, 1994).

The 2011-2012 Physical Activity Survey conducted by the Australian Bureau of Statistics (ABS, 2013) reported that children (5-17 years) viewed just under 16 hours of screen time per week, with the vast majority of this being television viewing. Advertising constitutes 25% of each hour of commercial programming (Australian Communications and Media Authority, 2014), which results in children being exposed to approximately four hours of television commercials every week. Television commercials are designed for impact and contribute significantly to cultural norms (Pollay, 1986). Cultivation theory (Gerbner, Gross, Morgan, & Signorielli, 1994) suggests that the cultural norming process occurs in part through repetitive homogenous television images of certain values, types of people and themes (such as the thin-ideal for women), which reinforce sociocultural messages that become accepted as mainstream reality (Gerbner, 1999; Gerbner & Gross, 1976). Television is an influential socializing agent, particularly in the area of gender identity (Barner, 1999; Bretl & Cantor, 1988; Signorielli, 1989). "One of the most obvious and important
characteristics of television actors is their gender, and one of the most important 'lessons' that children learn from TV actors is how gender fits into society” (Barner, 1999, p. 551).

1.4 Identity and Gender

1.4.1 Identity and Femininity

One of the significant sociocultural ideals that impacts upon body image is femininity. Bordo (2004) defines femininity as a socially constructed standard for women's appearance, demeanour, and values. Femininity will therefore vary within different cultures and subcultures dependent on a myriad of factors such as race, sexual orientation and historical context (Chow, 1999). Within the multiple femininities defined by different sociocultural factors is a hegemonic femininity (Choi, 2000; Krane, 2001a; Lenskyj, 1994). Within the Western world (and expanding beyond at a rapid rate) hegemonic femininity is constructed within a white, heterosexual, and class-based framework, and therefore, accentuates the importance of appearance with the reference point of an ideal feminine body as thin and toned (Krane, Choi, Baird, Aimar, & Kauer, 2004).

Bodies that do not match this ideal are considered substandard (Holliday & Hassard, 2001). The media feeds this concept by producing homogenous images that match the hegemonic femininity (Bordo, 2004). Diversity in areas such as shape, size, colour and muscularity is not acknowledged let alone encouraged or supported.

This is further exacerbated by the common process of social comparison in which we relate many aspects of our selves, including our physical appearance, to those of others around us in order to understand how and where we fit in the world (Festinger, 1954). Ongoing exposure to the thin ideal portrayed in the media leads to internalization of the thin
ideal body image which adds to body dissatisfaction in women when comparison leads to a perception that the individual does not meet society’s standards (Krones, Stice, Batres, & Orjada, 2005). Three motives for social comparison are generally identified by social comparison theorists: self-evaluation, self-improvement and ego-enhancement (Wood, 1989). Interestingly, Stormer and Thompson (1996) found that when individuals are instructed to consider different goals when undertaking social comparisons of appearance, significant variations can be achieved in regard to measures of negative body image. That is, one study found that girls who were instructed to self-evaluate their own physical attractiveness through reference to slender models felt less physically attractive afterwards, whereas girls instructed to think about slender models in ways that inspire self-improvement felt more physically attractive after seeing the models (Stormer & Thompson, 1996).

Given the prevalence of this thin-ideal body image within Western societies, it is unsurprising that the majority of individuals experience normative discontent - some level of dissatisfaction with their appearance (Krones, et al., 2005; Thompson, et al., 1999).

1.4.2 Body Change Goals: Men

Whereas the sociocultural standard of physical attractiveness for women is focussed on the thin-ideal, the social standard for men reflects being big and muscular. This is referred to as the muscular mesomorphic shape (Mishkind, Rodin, Silberstein, & Striegel-Moore, 1986) and is characterised by well-developed chest and arm muscles and wide shoulders tapering down to a narrow waist. Men state proportionally greater body satisfaction as their self-reported (Tucker, 1982b) or actual (Mishkind, et al., 1986) body shape resembles this ideal. Dutton (1995) posits that muscle symbolizes health, dominance, power, strength, sexual virility and threat. Just as women who fit the socially constructed thin-ideal are attributed with
a range of positive traits based on their appearance (for example success and intelligence), men who fit the muscled ideal are likely to be perceived as more respected, admired, attractive and confident (Olivardia, 2002).

In the same way that women may experience a variety of physical and psychological consequences as a result of trying to move closer to the ideal body form, the same is true for men. Many of these consequences (for example decreased self-esteem and negative affect) are experienced by both men and women alike. However, given the different physique men are striving toward (more muscular as opposed to slender), some of these consequences differ. In the negative spectrum, these can include ingestion of human growth hormones and anabolic steroids (Epperley, 1993). However, at the positive end of the spectrum, men report improvements in body image related to perceptions of increases in the utilitarian aspects of their bodies such as physical strength, power, fitness and endurance. They report a greater sense of self-efficacy resultant from their improved athletic abilities which leads to increases in self-esteem and feelings of empowerment (Martin & Lichtenberger, 2002). In males, muscle is seen as an embodiment of cultural views of masculinity and the male sex role, which suggests that men be powerful, strong and efficacious (Mishkind, et al., 1986). Therefore, increased muscle mass in males is closely related to various factors surrounding identity and self-worth starting with their masculine gender identity and flowing through to vitality, psychological health and well-being, respect from others, self-esteem and empowerment (Mishkind, et al., 1986).

1.4.3 Gender Roles

Gender roles are a socially constructed cultural stereotype of what is regarded as typical masculine or feminine behaviour: personality characteristics, interests and attitudes.
Although many gender stereotypes and norms exist in modern culture, many characteristics, interests, attitudes and behaviours that people associate with masculinity and femininity fall into the categories of communion and agency. According to the stereotype, women are communally-oriented (expected to be compassionate, yielding, warm, affectionate, expressive, and group focussed), and men are agentically-oriented (expected to be athletic, aggressive, confident, dominant, and self-reliant) (Conway, Pizzamiglio, & Mount, 1996; Diekman & Eagly, 2000; Prentice & Carranza, 2002). Over the past two decades, studies have identified an increasing trend for women to endorse more agentic/masculine-stereotyped traits (Good & Sanchez, 2010; Twenge, 1997, 2001), however strong cultural stereotypes still exist that expect men should be agentic and women should be communal (Good & Sanchez, 2010).

Within this framework, gender role orientation describes an individual’s profile along two continuous dimensions - masculine and feminine. Bem (1977) defines four gender role classifications. ‘Masculine’ is defined as high levels of masculinity and low levels of femininity. ‘Feminine’ is defined by high levels of femininity and low levels of masculinity. The two additional categorisations are ‘androgynous’ and ‘undifferentiated’. Contrary to fashion references of androgyny being synonymous with asexuality, individuals categorised as androgynous are those who score above the median average on both masculinity and femininity. Those who are undifferentiated score below the median average on both scores. Androgynous and undifferentiated individuals do not conform to typical gender roles. According to Bem’s (1975) theory on sex roles, different situations warrant behaviours that are stereotypically masculine or feminine. Gender-typed individuals are more likely to suppress behaviours that violate the gender role standard, thereby reducing the range of behavioural responses available to them. Androgynous individuals choose whatever behaviour seems most effective, regardless of its gender stereotyped appropriateness. Taylor and Hall (1982) describe this as the “additive androgyny hypothesis”; it predicts that the
additive properties will increase behavioural flexibility which is more likely to be adaptive, and more effective across a range of domains and ultimately lead to greater levels of psychological well-being. Although there are some conflicting results, a body of previous research supports this, with androgyny predicting: resilience (Chun Bun & McBride-Chang, 2007; Werner, 1995), optimal mental health (Lefkowitz & Zeldow, 2006), high self-esteem and adaptive coping strategies (Huang, Zhu, Zheng, Zhang, & Shiomi, 2012), lower depression and adaptive coping skills (Cheng, 2005), leadership effectiveness (Kark, 2012), artistic creativity (Stoltzfus, Nibbelink, Vredenburg, & Thyrum, 2011), and reduced interpersonal stress (Hirokawa, Yamada, Dohi, & Miyata, 2001). Research on gender conformity, however, has found investment in gender ideals has been linked to both positive and negative consequences for the self (Sanchez & Crocker, 2005; Wood, Christensen, Hebl, & Rothgerber, 1997), with the experience of societal pressure to conform to gender ideals negatively predicted self-esteem (Good & Sanchez, 2010).

In research relating to body change activities, androgyny is associated with lower levels of eating disorder symptomatology (Hepp, Spindler, & Milos, 2005) and exercising more frequently (Shifren, Furnham, & Bauserman, 2003). Gender role orientation is an important element of personal development in how one relates to self and others; gender role is related to general self-perception, self-esteem, body image, and body satisfaction, which are psychological aspects highly relevant to disordered eating (Jackson, Sullivan, & Rostker, 1988; Lewis & Johnson, 1985). More research is needed to explore these effects in the context of the potential increasing diversity in body change activities for women, and how gender roles may moderate or mediate the pathways that lead to these activities, and their psychological correlates.
There is insufficient data on women looking at non-appearance based factors related to body image and how this challenge to the traditional gender order of the perceived biological status quo of masculine strength and subsequent implied feminine weakness (Brace-Govan, 2004) may impact on women physically and psychologically.

1.5 Diversity: Changing Trends

As discussed, physical activity levels are declining and this is causing serious and significant physical health problems, particularly in relation to body weight. This is amongst the most serious and widespread public health issues affecting the Western world. Increasing physical activity is key to reducing overweight and obesity (and a plethora of other health consequences), (WHO, 2010). To do this requires an evaluation of the types of activity choices women are choosing to engage in, and which activities are most successfully maintained over time. Within this overall objective, however, a high degree of consideration must be given to the potential psychological ramifications of the desire to reduce body weight, to conform to an unrealistic stereotype. Complicating matters further, women are changing both in terms of their physical activities they are choosing to undertake, and their motives for choosing these activities.

The following section will review the changing trends in women’s choices of body change activity relating to physical activity. In exploring these changing trends, the underlying motives for these choices will be examined. On the basis of this review it is argued that the current literature has not kept pace with changing trends and the broad range of activities being undertaken by women and their motives for these choices have not been documented. The physical and psychological consequences of these actions and motivations are, therefore, not fully understood.
Historically, muscularity has generally been viewed as inappropriate for women (Choi, 2000). The thin ideal has been composed of not only avoiding ‘fatness’ but avoiding muscularity (Grogan & Wainwright, 1996). Although acceptance of physical activities for women has increased, images and perceptions of athleticism and femininity continue to be quite traditional (slender with some muscle tone), with muscularity being associated with masculinity (Brace-Govan, 2004). The attainment of a muscular physique is therefore a deviation from the Western cultural norm.

However, a growing body of evidence suggests that women are increasingly interested in strength training activities, partially for the aesthetic aim of achieving a more muscular shape, and for a variety of other significant motives including feelings of empowerment, self-mastery and athletic gains of strength, power and fitness (Brace-Govan, 2004; George, 2005; Grogan, et al., 2007). These trends have received little empirical attention in the context of women because the muscle dimension of body shape and appearance and identification of the body in terms of its utility have typically been attributed to men and the pursuit of masculinity (McCreary, et al., 2005a). The gradual shift away from gender typical activities toward increasing diversity of physical activity, including strength training, has not been well documented, nor have the motives been well documented. Anecdotally, an increase in the commercial programs in strength training has been marked. This includes CrossFit, BodyPump, Power Yoga and “boot camp” styled group fitness classes. Whereas amateur weightlifting became an official event at the Olympics in 1896 (although no female athletes participated in the games at that time), weightlifting for women was not introduced as an Olympic sport until 2000 (Incledon, 2005) - another indication that women’s participation in diverse physical activity modalities is changing.
Strength training has been shown to be an effective intervention for improving body image in women (Martin & Lichtenberger, 2002). Propositions put forward to explain these findings suggest that strength training provides exercisers with an increased sense of competence as their strength capabilities increase (Tucker, 1982a) or that the decreases in body fat and increased lean muscle mass that results from strength training assists exercisers in moving toward their body ideals, thereby improving body image (Ginis, et al., 2005; Shaw, Ebbeck, & Snow, 2000). Currently, support for the efficacy of strength training is a-theoretical as empirical research examining the underlying mechanisms driving the efficacy is limited.

Several qualitative studies (Brace-Govan, 2004; Gimlin, 2002; Grogan, et al., 2007) of specific subsets of women (body builders, weightlifters and other athletes) have started to extract some of the underlying attitudes and behaviours around women and diversity in their idealised forms to include increased muscularity, drawing attention to the difficulties encountered for women in attempting to reconcile the sociocultural expectations of femininity with their muscular physiques.

A reoccurring theme that emerged from several studies was the concept of identity duality. In a study of female college athletes, participants discussed the development of two identities - athlete and woman (Krane, et al., 2004). In other qualitative research, females described themselves as ‘different’, or ‘other’. Using these dualities of identity was identified as a self-protection mechanism from the potential negative perceptions resulting from their transgression from hegemonic femininity (Brace-Govan, 2004; Grogan, et al., 2007). Female body builders and athletes found that as they increased in muscle mass and thereby transgressed the bounds of “appropriate” femininity they experienced an increase in negative social encounters including labels such as deviant, freak, unattractive, butch, dyke, masculine
and aggressive (Blinde & Taub, 1992; Brace-Govan, 2004; George, 2005). These labels have the effect (whether intentional or unintentional) of bolstering social norms and thereby exerting social control at an individual level. In this way, there is a preservation of the power of the dominant gender ideologies leading to a potential for devaluation and stigmatization of women who redefine themselves by entering traditionally male spheres and thereby fosters male dominance. However, by changing their key reference groups from the general public to other women involved in strength training, several studies (George, 2005) found women were able to limit the impact of this negative social feedback and instead find positive reinforcement from their peers.

Grogan et al., (2007) interviewed a sample of seven bodybuilders with the aim of seeking to understand their motivations and experiences related to muscularity within the Western cultural context in which slimness is the socially endorsed ideal. Within this small sample of a very specific subset of women, the women had a range of very positive associations with their bodybuilding activities. They highlighted their personal rejection of cultural norms and the usual internalisation of the male perspective and instead internalised norms from within their local body-building community. Similarly, their social comparison of both peers and media occurred within the body-building subculture. This resulted in positive reinforcement of their behaviours and appearance. They had positive associations with their appearance, feeling athletic, healthy and beautiful. The women reported feeling sexier and more feminine when they were ‘trained’ and rejected ideas that their muscularity made them look masculine.

Rather than assessing themselves purely in the aesthetic domain and body objectification, the women discussed the feelings of empowerment associated with their bodies’ strength and utility. In looking at the context in which boys learn to be men (Connell,
1983, 1987, 1995, 2000) suggests that weightlifting is the kind of physical activity that teaches dominance, self-possession and mastery of the physical body. Whilst these ideas have not been applied to women in the past, the growing body of literature examining strength-trained females has extracted similar themes. In her interviews with female weightlifters Brace-Govan (2004) reported that weightlifting “provided a sense of self through a marker of their abilities. In particular, the ability to ‘rise above’ the conventional focus that other women have on appearance and the associated effects of being an attractive and sociable woman” (p. 514). She found the weightlifters had experiences of “instrumentally orientated, quantifiable physicality that is not reliant on aesthetic judgements of heterosexual attractiveness” (p. 504). The meaning they attributed to their activities was significantly divergent to the norm. This aspect of their identity provided a different focus upon which the participants could base their personal judgments of self-worth. Similarly, Gimlin (2002) interviewed 24 women aerobics class attendees and found that rather than trying to attain cultural ideals of beauty (i.e. thinness), the women changed their bodies by gaining muscularity and as a result changed their self-identity by feeling stronger and more powerful. This represents a movement from the common unitary focus of women on appearance only, to other domains of self, such as has been traditionally reported in men and their likelihood of assessing their bodies based on utility in addition to appearance.

In contrast, some research has identified that it is sociocultural pressures that are influencing these subgroups of women to obtain a muscular physique. For example, (McCabe & Ricciardelli, 2003) found that adolescent girls experienced pressure to increase weight and increase muscles as well as to decrease weight. The level of perceptions of pressure to increase weight predicted strategies to increase: weight, muscle tone and binge eating. Further research would be useful to further explore this finding with a broader sample. In assessing motives for undergoing these body change activities, more research is also required to
differentiate between motivators that instigate initial body change behaviours, and those that may maintain these behaviours. Research on physical activity motives indicates that although many people may start activity with the goal of altering physical appearance, these goals shift over time toward improving physical functioning and psychological well-being (Martin & Lichtenberger, 2002). This is likely to occur through the positive reinforcement resulting from the physical and psychological changes that occur following physical activity participation.

The body of research within the arena of female bodybuilders provides a focussed environment for examining the interplay between gender, the body and strength (physical, social and psychological). However, an important difference exists between female bodybuilders and the general female population. Although Grogan’s (2007) research identified that appearance was not the only (or primary) motivator for body-builders, it is their physical aesthetic that they are ultimately being judged upon in their competition. This contrasts even with other female athletes for whom success in their sport is dependent upon how their bodies perform, rather than how they look. It is unknown how these factors shape the behaviours of the remainder of the female population.

1.5.1 Theoretical frameworks

This research will be informed by theories of behaviour change and maintenance. However, physical activity poses particular challenges regarding the extent to which it can be analysed using linear models due to the multiple dimensions involved in uptake and maintenance. Theories such as the Theory of Reasoned Action/Planned Behaviour, and Self-Efficacy Theory have been successful in identifying psychological correlates of physical activity adoption and maintenance and have been successfully applied to interventions aiming to promote physical activity adoption (Ajzen, 1991; Bandura, 1991; McAuley & Blissmer,
The phases that individuals move through from sedentary behaviour to maintenance of physical activity have been conceptualised theoretically. The most popular of these theories is the Stages of Change Model, which encapsulates the temporal organisation dimension of the larger Transtheoretical Model developed by Prochaska and DiClemente (1983). The Stages of Change Model outlines the movement through five stages of behaviour change: i) Precontemplation (no thought of change, no awareness of any problem); ii) Contemplation (awareness of problematic behaviour and evaluating the pros and cons of change); iii) Preparation (commitment to change occurs and small behavioural changes may have commenced); iv) Action (actively engaging in new behaviour and behaviours to accommodate the change); and v) Maintenance (working to sustain the new behaviours and avoid relapse). Progression through the five stages is cyclical (rather than linear) and most individuals will cycle through the stages several times before maintaining change long-term (Prochaska & DiClemente, 1983).

The Stages of Change Model (Prochaska & DiClemente, 1983) is a useful starting point for assessing physical activity maintenance, however it lacks granularity. The tools based on the Stages of Change Model provide a single classification of the individuals’ stage at the point of measurement. Although the model recognises that people cycle through the stages, there is no existing tool that measures the different patterns of engagement individuals may follow. The development of a measure with this different dimension of detail would be helpful and will be discussed further in this research project. The Stages of Change Model (and other models of health behaviour previously mentioned) are limited in their explanation of why some physical activity behaviours are maintained and others are not (Callaghan, Khalil, & Morres, 2010; Rothman, 2000). Self-Determination Theory bridges this gap.

1.5.2 Self-Determination Theory
Self-Determination Theory (SDT) is a dynamic theory of human motivation which provides a theoretical framework for understanding the psychological foundations on which motivations form and has been used in a great breadth of psychological research examining motivations in areas as diverse as education, health care, psychopathology, marketing, behavioural nutrition and physical activity.

SDT postulates that all behavioural motivation is either extrinsically motivated, intrinsically motivated or amotivated. These descriptors identify the degree to which external values and goals have been internalised, and therefore the degree to which they are self-determined (or autonomous) (Ryan & Deci, 2000).

Self-determined motivation is built on the foundation of the satisfaction of three universal psychological needs: competence, autonomy and relatedness (Ryan & Deci, 2000). Controlling or amotivated behaviour arises when these needs are not met. The satisfaction of these three basic needs is more strongly predictive of psychosocial adjustment and well-being, whereas the frustration of these needs is associated with maladjustment and psychopathology (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011). Within the category of extrinsic motivation are four types of behavioural regulation which vary depending on the extent to which they reflect self-determined motivations (see Figure 1.2); external; introjected; identified; and integrated (Deci & Ryan, 1985; Ryan & Deci, 2000). Behaviours that are regulated through external means are said to be externally regulated and to lack self-determination. For example, engaging in a behaviour to receive a reward or due to another form of coercion. An example from the physical activity setting would be when a basketball coach exercises for the financial gain associated with employment. Regulated or introjected motivations are those that are only partially internalised. These behaviours may be performed to avoid internal pressure and negative feelings, to gain social approval or to support
conditional self-worth. This is exemplified by someone exercising to improve their physical appearance, because their concept of self-worth is based upon their appearance. Identified regulation is closer to the self-determined end of the motivation spectrum. Behaviour motivated by identified regulation has outcomes highly valued by the individual, so the behaviour is achieved without any pressure, though the task itself may be difficult or unpleasant. For example a tennis player may perform a repetitious task, like practicing their serve, in order to improve their game.

Integrated regulation is the most self-determined form of extrinsic motivation, lying at the higher end of the self-determination continuum. In this category, are behaviours that are performed to bring coherence to, and harmonize, different aspects of the self (Deci & Ryan, 1985). For example, some people will participate in physical activity because they believe participation to be a significant element within a healthy balanced life, concurrent with good nutrition and sleep, and strong relationships. However, even behaviours motivated by integrated regulation are performed for instrumental motives (i.e. for outcomes separable from the activity), and therefore they are still extrinsically regulated. Only a behaviour performed for the enjoyment of the actual engagement in the behaviour is fully self-determined or intrinsically motivated (Deci & Ryan, 1985).

Extrinsically motivated behaviours are very salient in Western culture, where wealth, image and physical appearance are often depicted as signs of success (Vansteenkiste & Soenens, 2008). These goals are seen to be attractive due to the social approval or increase in self-worth that would result from their achievement (Kasser, Ryan, Couchman, & Sheldon, 2004). When a behaviour is extrinsically motivated, previous research suggests this leads to an increase in interpersonal comparison, contingent approval and self-validation based on external signals of worth (Kasser, et al., 2004; Vansteenkiste & Soenens, 2008) and is likely
to frustrate the three basic psychological needs of autonomy, relatedness and competence (Deci & Ryan, 1985). Whereas undertaking a behaviour based on intrinsic motivation is inherently satisfying and is more likely to satisfy the three basic psychological needs (Deci & Ryan, 1985). Consideration of SDT is also highly relevant to research surrounding body image research and disordered eating where it has been suggested that women who are more globally self-determined, across different life domains, have a buffer against the sociocultural pressures perpetuated by the thin ideal and are less likely to experience bulimic symptoms (Pelletier, Dion, & Lévesque, 2004). Similarly, other research has found appearance-oriented motivations to be associated with more problematic weight control behaviours (de Souza, Mussap, & Cummins, 2010) and bulimic symptomology (Verstuyf, Vansteenkiste, & Soenens, 2012).

1.5.3 Application of Self-Determination Theory to physical activity research

A meta-review of self-determination research across varied domains confirmed that different motivational regulations can predict a number of behavioural, cognitive and affective outcomes (Ntoumanis, 2001); specifically, self-determined motivational regulations are associated with adaptive outcomes relative to controlling regulations and amotivation. In the physical activity field, SDT has primarily been used as a theoretical framework to predict physical activity behaviour (e.g., Friederichs, Bolman, Oenema, & Lechner, 2015; Mullan & Markland, 1997; Thogersen-Ntoumani & Ntoumanis, 2006) and intentions to engage in physical activity (e.g., Chatzisarantis, Hagger, Biddle, Smith, & Wang, 2003; Edmunds, Ntoumanis, & Duda, 2006; Wilson & Rodgers, 2004).
Research in the physical activity domain provides support for the relevance of a self-determination continuum in shaping individual adoption of and adherence to physical activity (Chatzisarantis, et al., 2003). Research has also shown various SDT motives to predict a number of different physical activity outcomes (Ntoumanis, 2002; Ryan & Deci, 2007). Physical activity adherence is associated with the more self-determined types of motives, specifically, intrinsic motivation is associated with the most positive consequences and extrinsic motivation followed by amotivation the most negative (Vallerand, 2001). Intrinsic motives are believed to promote physical activity maintenance as they foster flexible and creative responses to drive behaviour that are focused on the task at hand, whereas extrinsic motives foster a more external...
locus of control, which can be compromised by external contingencies and can undermine the psychological needs and consequently influence behaviour persistence (Buckworth, Lee, Regan, Schneider, & DiClemente, 2007; Ryan & Deci, 2000).

Within the present research, Self-Determination Theory has provided the framework to understand women’s motives for physical activity participation and how these motives may influence choice of activity and the interactive effect of motives, activity choice and adherence over time. Of particular interest in the present research, is how activity choice may impact on motives and adherence over time. Clearly, there are specific motives for initiating any new behaviour, including commencing physical activity. Participants are anticipating specific outcomes through their participation in different activities (for example, expecting weight loss from cycling, or expecting stress reduction from yoga). These goals may be achieved, or other unintended consequences may also be experienced (for example, making a new friendship group through participating in a group fitness class, or feeling a greater sense of empowerment through increases in strength). The importance of this understanding cannot be undervalued. For example, women with distorted negative body image may be motivated to commence activity with appearance-based body change motivators (such as weight loss) and may choose to achieve this through strength training due to the increase in metabolism they will likely experience through increased lean muscle mass (Nelson, Weinsier, Long, & Schutz, 1992). However, if participation in strength training creates experiences of empowerment and health and this changes their maintaining motivators, this could have important therapeutic applications. The focus on participation motives for physical activity has been on initiating motivations, with little empirical attention being given to maintaining motivators, and specifically, whether a change in motivations over time can be predicted based on physical activity choice.
The types of motives related to long term physical activity adherence have not been investigated empirically, particularly using longitudinal designs. Research in this area has largely considered the relationships between each type of physical activity motive with other variables in isolation (Ntoumanis, 2002); a ‘variable-centered’ approach (Kaufman & Rousseeuw, 1990). Whilst this is useful in understanding direct and unique associations between each motivation with other variables, it ignores the likelihood that i) individuals are influenced by a number of diverse motivations for physical activity (especially when considering extended time periods; ii) consistent, identifiable patterns of motivations exist in the population; and iii) these identifiable patterns of motivations (‘motivational profiles’) have unique relationships to other variables, beyond the contribution of the individual motives within the profile. Previous research has suggested that given the multidimensional nature of physical activity motivation, different combinations of motives combine to yield motivational profiles and that these profiles may form the basis of different outcomes relating to physical activity participation (Vallerand & Losier, 1999).

Motivational profiling among children and adults in the physical activity domain has identified characteristically similar motivational groups and consistently associated similar profiles with certain physical activity outcomes. Specifically, profiles characterised as ‘self-determined’, have been associated with more positive physical activity outcomes such as positive affect, enjoyment, long term intentions to play sport (Ntoumanis, 2002; Vlachopoulos, Karageorghis, & Terry, 2000), adherence (using the Stages of Change classification of ‘maintenance’) (Matsumoto & Takenaka, 2004), higher levels of participation and perceived physical self-worth (Wang & Biddle, 2001; Wang, Chatzisarantis, Spray, & Biddle, 2002; Wang, Liu, Sun, & Biddle, 2003). Collectively, this limited number of studies support Vallerland and Losier’s (Vallerand & Losier, 1999) propositions that distinct motivational profiles can be identified and associated with different physical activity outcomes. Further
research is required to address the gap in the literature assessing the multidimensional nature of physical activity motivations on long term physical activity adherence.

1.6 Summary

It is unknown to what extent the current body of literature provides a complete explanation of body change motivators relating to physical activity for Australian women today. This understanding is highly relevant to addressing public health concerns of declining levels of physical activity (ABS, 2013) and associated increases in chronic health conditions (WHO, 2010); and addressing psychological outcomes relating to maladaptive body image (e.g., Cash & Brown, 1987; van den Berg, et al., 2002).

Anecdotally, we know women are engaging in diverse physical activities and there is an expanding body of research which has identified a shift toward ideals that are not traditionally associated with the feminine body image ideal, including muscul arity and utilitarian aspects of strength and empowerment (George, 2005; Grogan, et al., 2007; Krane, et al., 2004). To-date, this research has been limited to specific subsets of females (such as athletes and bodybuilders). A survey of the general population of women is required. Validated measures of physical activity exist, but a cultural shift has occurred in what women are doing which has not been included in existing measures (evidenced by the anecdotal examples of the growing popularity of CrossFit, BodyPump, high intensity interval training and “boot camp” styled group fitness classes). An up-to-date typology is needed to measure physical activity comprehensively across all areas of participation. This needs to combine an evaluation of stereotypically traditionally feminine pursuits (for which there are measures) and physical activities geared toward non-traditional stereotypically feminine activities, such
as weight training (for which there is no comprehensive measure that has been used for
women).

Using an updated typology, an evaluation is needed to assess the motives of why
women are engaging in the expected increasingly diverse range of activities. What are the
goals of their participation and have these motives broadened beyond motives related to
appearance, thinness and the Western feminine ideal, to include other motives such as those
more typically associated with masculinity including the pursuit of muscularity, function,
empowerment and strength? In addition, further depth of understanding is needed to establish
how different reasons and physical activity combinations relate to both positive and negative
psychological health consequences (such as body image disturbance and quality of life), and
ultimately, predictors of successful physical activity over time.

Historically, women have experienced multiple concurrent pressures to conform to
narrow, unrealistic, and increasingly unattainable ideals of thinness. The tripartite model
identifies three significant sources of sociocultural pressures on appearance: the media,
family, and peers (Thompson, et al., 1999) and how these influences are thought to contribute
to a preoccupation with weight, the development of negative body image, and the adoption of
unhealthy weight-loss strategies and disordered eating symptomology (e.g., Cash & Brown,
1987; van den Berg, et al., 2002). Based on these historical feminine ideals, the primary focus
of literature within female body image is on appearance-oriented motivators for behaviour
change the thin-ideal. This is insufficient. The establishment of a complete measure of
physical activities is needed, which must be unfettered by traditional assumptions of what
women enjoy or what they may wish to achieve. Once established, this can then be used in
conjunction with existing psychological measures to explore the relationship between
motives, activities and psychological indicators of body image disturbance and positive
constructs of psychological health.

The gaps in the literature around the pursuit of muscle tone and non-appearance
based motivators for physical activity need to be understood also as possible evidence of
broader shifting sociocultural norms and increasing diversity in gender identity and gender
roles. According to Bem’s (1975) theory on gender roles, gender-typed women (who are
stereotypically feminine) are more likely to suppress behaviours that violate the gender role
standard, thereby reducing the range of behavioural responses available to them.
Androgynous individuals (who have both feminine and masculine gender-typing) choose
whatever behaviour seems most effective, regardless of its gender stereotyped
appropriateness. Research is required to better understand whether the increasing diversity in
women’s activities is reflective of a sociocultural shift away from gender role stereotyping
and whether this leads to more adaptive behavioural flexibility that ultimately leads to greater
levels of psychological well-being (as suggested by Bem (1975)).

According to Self-Determination Theory the motives underlying physical activity
choices can be understood across a continuum from extrinsic to intrinsic motivations.
Intrinsically motivated behaviours are those that result in a feeling of satisfaction simply from
engaging with the activity. Most theorists specifically identify that intrinsically motivated
behaviours lead to experiences of competence and enjoyment (Edmunds, et al., 2006; Ryan,
Williams, Patrick, & Deci, 2009; Vallerand, 2001). In contrast, extrinsically motivated
behaviours are those that are executed to obtain rewards or outcomes that are beyond the
experience of participation in the activity. The types of motives related to long-term adherence
physical activity adherence have not been investigated empirically, particularly using
longitudinal designs. Research in this area has largely considered the relationship between
physical activity motives and outcomes in isolation (Ntoumanis, 2002). Whilst this is useful when considering initiating and maintaining factors of physical activity for a specific time period, it ignores the likelihood that individuals are influenced by a number of diverse motivations for physical activity over longer time periods. Previous research has suggested that given the multidimensional nature of physical activity motivation, different combinations of motives combine to yield motivational profiles and that these profiles may form the basis of different outcomes relating to physical activity participation (Vallerand & Losier, 1999). This requires further empirical investigation.

In summary, this research will develop a typology of physical activities that is relevant for the diversity of activities being undertaken by women in Australia. This will allow for an assessment of the frequency of participation in the varied activities being undertaken and an analysis of which activities are most successfully maintained over time. This understanding is important for addressing the growing public health issue of physical inactivity and the resultant health issues including overweight and obesity. Within this overarching objective, the potential psychological ramifications of body change activities will be considered, particularly as they relate to the increasing diversity in motives why women are choosing to be physical active, including motives that are unrelated to the traditional feminine ideal, such as strength, empowerment and, shape and utilitarian function. Finally, this research will consider how different combinations of motivations may combine to predict long term adherence.

Ultimately, the utility of this research is in providing a more comprehensive understanding of females and their relationship to their bodies. By increasing the understanding of motivators for different body ideals it may be possible to promote and encourage women to shift away from goals of appearance, toward physical fitness and strength as a way of promoting
healthier behaviours and healthier attitudes to the body and to body change; and to achieve the physical health benefits related to successful engagement in physical activity over time.
2. Study 1: The Development of Instruments for this Research: a Physical Activity Method Typology and Physical Activity Outcomes Measure

2.1 Overview

Investigating choice of physical activity behaviours within the framework of Self-Determination Theory requires the identification and operationalisation of two characteristics of physical activity: 1) physical activity methods to assess current participants’ choices regarding physical activity that result from their participation motives; and, 2) physical activity patterns of participation to assess their engagement outcomes over time.

The present study extracted these physical activity characteristics in the form of a typology of physical activity methods and an outcomes measure of patterns of participation. The typology and outcomes measure were created from data gathered from interviews with laypeople and health professionals and the marketing material for commercial physical activity products. The descriptions of physical activity types varied from very common physical activity choices (such as walking), through to commercially branded programs (such as Les Mills Bodypump). The data obtained from these sources was analysed using qualitative content analysis (Hsieh & Shannon, 2005). The rationale and results of this approach are described in following sub-sections.

2.2 Rationale for the Measurement of Physical Activity Methods and Patterns of Participation

Most research on women’s physical activity has bypassed the detail of measuring particular physical activity methods and instead used broader measures including physiological or behavioural variables relevant to physical activity (such as intention to be active, frequency of activity, duration, or intensity of physical activity). Commonly used
instruments for these measurements include the International Physical Activity Questionnaire (IPAQ: Craig et al., 2003), the Active Australia Questionnaire (AAQ: Australian Institute of Health and Welfare, 2003) and the Stanford 7 Day Physical Activity Recall (Hayden-Wade, Coleman, Sallis, & Armstrong, 2003). In Australia, the Bureau of Statistics also collects general data on a limited subset of physical activities and a broad frequency of participation measure (ABS, 2013).

More recently, the use of more advanced and accurate activity tracking devices (pedometers and other types of accelerometers) and mobile applications has increased the accuracy of data collection through increased user functionality (Foster et al., 2005; Schneider, Crouter, & Bassett, 2004), but still this data relates to a limited subset of activities and the application of the data yielded is often still limited by a blinkered understanding of assumed behavioural intentions for women of weight loss and the pursuit of thinness. Existing measures of physical activity that do assess types of activity, such as the Minnesota Leisure Time Physical Activity Questionnaire (Richardson, Leon, Jacobs, Ainsworth, & Serfass, 1993) or the different versions of the physical activity survey from the European Prospective Investigation into Cancer (Wareham et al., 2002), however these measures are all over fifteen years old, and therefore unlikely to represent the current diversity of physical activity types that has emerged in recent years in the female population.

All of these measures are useful for different research purposes, however currently there are i) no instruments in existence that measure and categorise the full breadth of current physical activities available to women, and ii) few measures related to outcomes over time. The primary current methods of outcomes measurement involve one of two methods, i) using an instrument based on the Stages of Change (e.g., Stages of Change for Regular Physical Activity Questionnaire: Marcus, Selby, Niaura, & Rossi, 1992), in which participants are
categorized as being in one of five ‘stages’, precontemplation, contemplation, preparation, action, or maintenance (which is defined as having maintained a behaviour change for six months); or ii) using a frequency/intensity/duration measure (such as the IPAQ: Craig, et al., 2003) taken at two (or more) time points, or asked retrospectively. Whilst these approaches are certainly useful for different assessment purposes (and indeed, both of these approaches will be utilised in Studies Two and Three), in Study Two we required an outcomes measurement that could be applied retrospectively, that had a higher degree of granularity than either of the two methods described. The absence of both a typology assessing the full breadth of available physical activities and the lack of granularity regarding existing measures of physical activity outcomes obscures the relationship to motivations and identifying healthy or unhealthy psychological correlates, and allows only for generalities around duration and intensity.

In past research where methods have been cited beyond those associated with weight loss and the pursuit of thinness, it has generally been within cross-sectional studies comparing a small selection of physical activity methods within specific sub-populations (such as competitive athletes or older adults). For example, researchers have examined the effects of yoga on physical and mental health (Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012), the psychological and social benefits of sport participation (Eime, Young, Harvey, Charity, & Payne, 2013), and the effects of different methods of strength training (traditional, functional, endurance and control) on body composition, strength and well-being of older adults (Solberg et al., 2011).

As discussed in Section One, body-change activity, and specifically physical activity participation is governed by a complex series of interactive influences. Assumptions are made that the outcome of physical activity participation will always be improved health. This
needs to be further unpacked. Dependent upon the motives underpinning the physical activity behaviour, the psychological health consequences of participation may be, such as in the case of depression or anxiety (Da Silva et al., 2012; Herring, Puetz, O’Connor, & Dishman, 2012; Mammen & Faulkner, 2013), or may be worsened, such as may occur in the example of eating disorders and exercise addiction (Freimuth, Moniz, & Kim, 2011). In addition, SDT states that self-determined behaviour is motivated by the satisfaction of three basic psychological needs: autonomy, competence, and relatedness, whereas controlling or amotivated behaviour may be evident when these needs are not met (Deci & Ryan, 1995).

From this framework, it is evident that the motives underpinning physical activity behaviour, and the experience of participating in the physical activity may both influence ongoing motives for participation and the likelihood of successfully maintaining the behaviour over time (depending upon how these needs are satisfied through participation). In order to investigate the interaction between these variables an instrument was required which classified the possible outcomes of physical activity, or pattern of activity over time.

Further research is required to investigate what physical activity is being undertaken, why it is being undertaken, the psychological correlates of the behaviour, and the pattern of activity over time - particularly amongst females. To achieve this, a typology of physical activities (beyond those associated with weight loss and the pursuit of thinness) needs to be established, and classification of outcomes needs to be created.

Psychological, health and medical journal were thoroughly investigated using the EBSCOHost, PsycTESTS, PsycARTICLES and MEDLINE Complete databases and no existing instruments were identified that systematically measured either the full breadth of physical activity options or patterns of participation. Following this confirmation of the absence of an appropriate instrument in the literature, the next step was to survey the diversity
of physical activity methods currently being undertaken by women, followed by classification on the basis of conventional content analysis into overarching types of physical activity methods and patterns of participation. The following sections detail this process and the resultant typology of physical activity methods and classification of patterns of participation.

2.3 Systematic Review of Physical Activity Methods

A comprehensive list of physical activities was created with the name of each activity, a brief description of participation methods, and claims of what the physical activity can achieve were collated from a variety of sources:

- Health, fitness and leisure centres in Melbourne (Australia);
- the physical activity/exercise section of bookstores;
- television advertisements on all commercial networks (Melbourne, Australia);
- the Internet, using the search terms ‘physical activity’, and ‘exercise’ were entered into the Google search engine and the first 80 links were investigated for their relevance;
- ten laypeople aged between 14 and 72 were interviewed about their history of physical activity participation (see Appendix A for the interview schedule); and
- four health professionals working in physical activity and human movement were consulted (see Appendix A for the interview schedule).

The use of the Internet ensured that the list of physical activity methods considered international trends. Television advertisements were monitored over six weeks. The data captured from all sources led to the creation of a list of 174 physical activity types and descriptions, accompanied by 96 marketing claims. Laypeople and health professionals (who were not involved in creating the list), were consulted to identify any omissions of popular
physical activities, no further activities were identified. All audio data was recorded and transcribed verbatim.

2.4 The Classification of Physical Activity Methods

To create the physical activity method classification, the descriptions of the experience of participating in the activity and the outcome expected from the activity (marketing material or personal experiences from laypeople and health professionals) were examined for common themes. Initially, themes were examined to establish similar activities, where variation occurred based on minor differences in: 1) intensity or setting of activity (for example jogging and running; walking and hiking; and 2) nuances within the activity type (for example Latin dancing and ballroom dancing identified as types of ‘dancing’; and hatha yoga and vinyasa yoga were both types of yoga). Fifteen categories were collaboratively identified through this theming process (including one category of ‘other’). Unlike quantitative research processes in which value is placed upon the degree of concordance between independent judgments, the value of the collaboration that identified these categories was found in the interpretive discussions between researchers (Barbour, 2001).

Table 2.1 presents the fifteen physical activity methods, and examples of commercial products which fit within the category (where relevant). All physical activity will increase the amount of energy being expended by the body (in comparison to sedentary activity), and would therefore satisfy the motivation of moving toward the traditional slim ideal. However, in addition, the categories chosen were judged to represent distinctly different methods of physical activity which would provide the additional granularity required (and absent from many other physical activity scales) to better understand additional possible motives and interactions. To illustrate this distinction, consider the following two physical activity methods: weight training and social sport. Both of these activities would achieve increases in
caloric energy expenditure and improvements in fitness (when compared to sedentary activity). However, when considering the differences between these activities, weight training is much more likely to be undertaken individually, and lead to specific strength gains, whereas social sport is more likely to involve social engagement and non-specific fitness improvements. So while both methods may achieve an increase in energy expenditure and fitness, they each have unique additional benefits, and achieve the common benefits in different ways which may impact on the decision-making influences, behaviours and interactions.

As a check of the physical activity method typology, all identified physical activities were then grouped according to this categorisation. While this process highlighted that the physical activity method groups are not mutually exclusive, all activities could still easily be classified according to the physical activity method group that provided the most specific description of the activity. For example, the activity of Power Yoga and Reformer Pilates both incorporate elements of resistance exercise; however they can clearly be more specifically identified as Yoga and Pilates respectively, as they have other differentiating features beyond the element of resistance exercise.
Table 2.1

List of Physical Activity Methods and Common Commercial Examples (where relevant)

<table>
<thead>
<tr>
<th>Physical Activity method</th>
<th>Example of commercial activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycling</td>
<td></td>
</tr>
<tr>
<td>Jogging/ Running</td>
<td></td>
</tr>
<tr>
<td>Walking/ Hiking</td>
<td></td>
</tr>
<tr>
<td>Swimming</td>
<td></td>
</tr>
<tr>
<td>Skiing/ Snowboarding</td>
<td></td>
</tr>
<tr>
<td>Dancing</td>
<td>Salsa, Ballroom, Kizomba,</td>
</tr>
<tr>
<td>Yoga</td>
<td>Bikram, Barkan, Power Yoga</td>
</tr>
<tr>
<td>Pilates</td>
<td>Reformer, Stott, Gravity</td>
</tr>
<tr>
<td>Group fitness – cardio</td>
<td>Bodyattack, Spin, Hi Lo,</td>
</tr>
<tr>
<td>Group fitness – strength training</td>
<td>Bodypump, Powerbar, Crossfit</td>
</tr>
<tr>
<td>Sport – competitive</td>
<td></td>
</tr>
<tr>
<td>Sport - social</td>
<td></td>
</tr>
<tr>
<td>Boxing/kickboxing</td>
<td></td>
</tr>
<tr>
<td>Weight training/resistance exercise</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

2.5 The Classification of Physical Activity Outcomes

The classification of patterns of physical activity participation were derived from collaborative discussions between researchers and the interviewed health professionals and lay persons. Firstly, the interviews of laypeople and health professionals were thematically analysed for patterns of physical activity participation. The researchers systematically
condensed the identified themes into five options that covered all possibilities. Secondly, the marketing claims of the commercial physical activity products were examined to identify any additional patterns or considerations. Thirdly, the physical activity typology was used as a basis to further explore any omissions in the list of possible patterns of activity - none were identified. As an example, some interviewees said “I have jogged pretty consistently over the past 5 years”, and “I have a pretty set exercise routine - Mondays, Wednesdays and Fridays”. These statements (and other similar statements) evolved into the pattern described by “I maintained my overall level of exercises. I exercised regularly and consistently”. Comments by other interviewees included, “I always start strong, but then I always peter out over time”, and “I was going to the gym regularly, but then I injured my leg and stopped”. These statements were two of many similar statements that led to the pattern “I decreased and/or stopped my overall level of physical activity over time”.

Five patterns of physical activity participation were extracted and these are listed below:

1. I maintained my overall level of physical activity. I exercised regularly and consistently.
2. I decreased and/or stopped my overall level of physical activity over time.
3. I increased my overall level of physical activity over time.
4. I stopped and started my overall level of physical activity repeatedly.
5. I have not engaged in any physical activity at all in the last 12 months.
2.6 Conclusion

This study detailed the classification of physical activity methods and patterns of participation in physical activity over time. Out of the breadth of physical activity descriptors, 15 physical activity methods were extracted: Cycling, Jogging/Running, Walking/Hiking, Swimming/Diving, Skiing/Snowboarding, Dancing, Yoga, Pilates, Group Fitness (Cardio), Group Fitness (Weights), Sport (Competitive), Sport (Social), Boxing/Kickboxing, Weight Training/Resistance Exercise and ‘Other’.

To identify pattern of physical activity, a scale was constructed which reduced all possible physical activity engagement patterns, down to five options. Participants were asked to select one statement that best described their current pattern of physical activity from the first time they started their current physical activity to the present. The five patterns of engagement in physical activity can be described as: ‘maintained’, ‘increased’, ‘decreased or stopped’, ‘stopped and started’, and ‘no participation over 12 months’.

This preliminary work was essential prior to addressing the main research questions of this thesis, as the increased diversity in physical activities being undertaken by Australian women has not been documented, nor has a pattern of participation been previously measured. In Study Two, these typologies were used to assess the range of diversity of activities being undertaken by Australian women, and the relationship of physical activity methodology to successful engagement over time.
3. Study 2: Diversity of Physical Activity Methods and Motivations; Relationships to Maintenance and Psychological Consequences

3.1 Introduction

In the present study, the physical activity typology and measure of patterns of participation derived in Study One were used to document and quantify the diversity of physical activity methods and outcomes being undertaken by a sample of 408 women who were participating in physical activity. The central goals of this research were to assess the relative participation rates of Australian women in the diverse range of physical activities (which were established in the creation of the typology in Study One), and to investigate whether this increased diversity of activities reflected an increased diversity of motivations for participating in physical activity. Subsequently, the research aimed to examine how these types of activities and motives for participation were related to successful maintenance over time, and psychological consequences. Psychological consequences associated with negative body image and unhealthy body-change behaviours, were of particular interest and conversely, as were positive psychological consequences that may relate to gender roles.

Utilising the typology developed in Study One also allowed for a practical assessment of the utility of this instrument in its ability to operationalise its subject matter for the purposes of research.

3.1.1 Understanding the Motivations for Physical Activity: SDT

SDT postulates that humans have an innate drive for self-determined behaviour, which is defined by behaviour persistence and psychological well-being. To expand upon the previous explanation (see sections 1.5.1 and 1.5.2), SDT is a meta-theory that incorporates four sub theories; Basic Needs Theory (BNT), Causality Orientation Theory (COT),
Cognitive Evaluation Theory (CET), and Organismic Integration Theory (OIT). Each sub-theory has its own set of detailed hypotheses that cover the major predictions of Self-Determination Theory (Deci & Ryan, 1985). One of integral components of SDT, BNT, incorporates the concept of the basic psychological needs and their role in behaviour persistence and psychological wellbeing (Ryan & Deci, 2007).

BNT postulates that all individuals are innately active in their pursuit to satisfy three basic and universal psychological needs; Competence, relatedness and autonomy (Ryan & Deci, 2000). Competence refers to interacting effectively with one’s environment while mastering challenging tasks (White, 1959). Autonomy involves an internal choice of behaviour, rather than control based on external contingencies (DeCharms, 1968).

Relatedness refers to a sense of meaningful connection in one’s social world (Baumeister & Leary, 1995; Ryan & Deci, 2007). These needs determine the direction and persistence of behaviour, most likely to satisfy these needs, (Ryan & Deci, 2007).

Physical activity and sporting environments that foster the three psychological needs of competence, autonomy and relatedness, have been associated with physical activity maintenance, psychological wellbeing and self-determined behaviour (Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003; Vallerand, 2001; Wilson & Rodgers, 2004).

Such environments have similarly been found to foster an internal locus of control as opposed to an external focus of control, which can negatively affect need satisfactions and undermine physical activity (Hagger, et al., 2003; Wilson & Rodgers, 2004; Wilson, Rodgers, Blanchard, & Gessell, 2003), this brings in the next sub-theory of SDT, COT (Ryan & Deci, 2007).

COT examines the influence of the social context on motivations and a behaviours locus of control. Autonomy-supportive environments (i.e., social contexts that support choice,
initiation and understanding) as opposed to controlling-environments (i.e., social contexts that are authoritarian, pressuring and dictating) have been found to facilitate self-determined motivation for physical activity and optimal psychological functioning (Standage, Gillison, & Treasure, 2007b; Wilson, Rodgers, Fraser, & Murray, 2004). Different loci of control give rise to different types of motivations, that is intrinsic and extrinsic motivations, which are incorporated in the third sub theory of SDT, CET (Ryan & Deci, 2007).

CET focuses on how the social context in which a behaviour occurs can optimise intrinsically motivated behaviour, where the choice to engage occurs because the behaviour is perceived to be inherently interesting, satisfying, gratifying, enjoyable, or fulfilling, through satisfaction of the three basic needs (competence, relatedness and autonomy) (Deci & Ryan, 1985). When the social context fails to support these needs, behaviour is more likely to be extrinsically motivated, where the choice to engage occurs due to the objective consequences that may occur (such as tangible rewards or praise) (Deci & Ryan, 1985; Vallerand & Losier, 1999). As discussed in Chapter One, physical activity literature has found intrinsic motivations to have positive effects on physical activity adoption and maintenance (Ntoumanis, 2002; Ryan & Deci, 2007; Vallerand, 2001). Extrinsic motivations have been found to undermine physical activity and psychological wellbeing, however they have been associated with physical activity adoption, yet intrinsic motivations are required for physical activity maintenance (Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005). Just as motivations can become more controlling and extrinsic in nature, the social environment can also assimilate more autonomous intrinsic/self-determined motivations, this process is referred to as internalisation (Ryan & Deci, 2007) and is reflected in the fourth sub theory of SDT, Organismic Integration Theory (OIT).
OIT outlines the process by which extrinsic motivations can become more intrinsically motivating through integration with other behaviours that satisfy the psychological needs of competence, autonomy and relatedness (Ryan & Deci, 2007). This process is more likely if the social context of the new behaviour supports the psychological needs (Ryan & Deci, 2007). Research has shown how aspects of the physical activity social context can promote the psychological needs (through activity choice, achievable goals and creating an atmosphere of relatedness), positively influencing physical activity maintenance through the promotion of more autonomous and self-determined/intrinsic motivations (Hagger, et al., 2003; Mandigo & Holt, 2002; Wilson, et al., 2003). The SDT approach to intrinsic and extrinsic motivation is different from the traditional either/or notion, and allows for a more dynamic perspective, in which individuals can have multiple extrinsic and intrinsic motivations simultaneously in play. This notion can be represented on a continuum (i.e., refer to Figure 1.2) (Ryan & Deci, 2007). Optimal self-determined behaviour, regulated by intrinsic motivations, is positioned at the upper boundary of the continuum, the lower boundary of the continuum representing amotivation a state without motivation for behaviour and the middle represented by various forms of extrinsic motivation based on level of control (i.e., refer to Figure 1.2) (Ryan & Deci, 2007).

Study Two aimed to document and quantify the relative participation rates of Australian women in the diverse range of physical activities established in Study One, and to use the framework of SDT to understand their motives for physical activity participation. This foundation of new knowledge, understanding the choices women are making in regard to the body change activity of physical activity and their motives for these choices, will then allow for more detailed consideration of two of the central themes of this research. That is, understanding the physical health consequences (in terms of weekly participation amount and
outcome over time) of physical activity choice and motives, and understanding the psychological ramifications detailed in Chapter One.

3.1.2 Physical and Psychological Health Implications of Physical Activity

Chapter One detailed the paradox surrounding physical activity; the significant decline in physical activity levels (ABS, 2013) and the resultant public health issues relating to weight gain and other chronic disease (WHO, 2010), contrasted against the psychological health issues relating to thinness and weight loss (Levine, et al., 1994), including normative discontent surrounding female body image (Krones, et al., 2005; Thompson, et al., 1999), unhealthy body change activities, and disordered eating (e.g., Cash & Brown, 1987; van den Berg, et al., 2002). Study Two aims to address these concerns of clinical and health psychologists in relation to normative body discontent and rates of disordered eating by investigating the association between specific physical activity choices and motives, and psychological indicators relating to women's negative body image and potentially hazardous body change behaviours.

In addition to these psychological concerns, Study Two aims to address the physical health concerns by investigating whether specific physical activity choices and individual motives are useful predictors of the outcomes of weekly activity rates, and maintenance over time. Clearly, there are specific motives for initiating any new behaviour, including commencing physical activity. Participants are anticipating specific outcomes through their participation in different activities (for example, expecting weight loss from cycling, or expecting stress reduction from yoga). These goals may be achieved, or other unintended consequences may also be experienced (for example, making a new friendship group through participating in a group fitness class, or feeling a greater sense of empowerment through
increases in strength). The importance of this understanding cannot be undervalued. For example, women with distorted negative body image may be motivated to commence activity with appearance-based body change motivators (such as weight loss) and may choose to achieve this through strength training due to the increase in metabolism they will likely experience through increased lean muscle mass (Nelson, et al., 1992). However, if participation in strength training creates experiences of empowerment and health and this changes their maintaining motivators, this could have important therapeutic applications. The focus on participation motives for physical activity has been on initiating motivations, with little empirical attention being given to maintaining motivators, and specifically, whether a change in motivations over time can be predicted based on physical activity choice.

3.1.3 Quantifying the diversity of physical activity participation and motives for participation

Study Two was an attempt to quantify the relative popularity of the increased diversity in physical activities being undertaken by Australian women (as documented in Study One), and their motives for undertaking these activities.

The typology was required as emerging evidence suggested an increasingly diverse range of activities were being undertaken by Australian women, and no previous instrument existed measuring this diversity. With the typology developed in Study One, which operationalised the different types of physical activity, it is now possible to measure, quantify and compare different physical activity types being undertaken, and perhaps more interestingly, assess whether there is an increase in diversity of motives underpinning these choices.
3.1.3.1 Hypothesis one

H1: Based on the typology developed in Study One, the relative popularity of a breadth of diverse physical activities that Australian women engage in (on a regular basis) beyond traditional activities associated with weight control and leisure will be quantified.

3.1.3.2 Hypothesis two

H2: It is hypothesised that the increased diversity of physical activities will reflect increased diversity in motives for participating in physical activity, and that these motives will extend beyond traditional motives related to the pursuit of thinness, weight control and appearance, and may include motives associated with male body change goals including the pursuit of utilitarian goals of health, strength and empowerment.

3.1.4 Assessing the relationships between motives for participating in physical activity, type of activity chosen, pattern of activity and psychological consequences

As explained in Chapter One, the focus of health research into women’s bodies – both research concerned with achieving and maintaining physical health and research concerned with achieving positive body image - has been on women’s body weight and adiposity. Comparatively little attention paid to body shape and utility. In particular, aspects of body shape/appearance relating to muscle size and muscle tone (Bottamini, 2006; Cafri, et al., 2002; Kimmel & Mahalik, 2004; Ricciardelli & McCabe, 2004), have received little empirical attention in the context of women, with the muscle dimension of appearance typically being attributed to men and the pursuit of masculinity (McCreary, et al., 2005a). This is despite mounting evidence that women are increasingly interested in achieving shape and weight
change through muscle building and toning activities, and that some are also interested in achieving muscle for its aesthetic appeal (George, 2005; Ginis, et al., 2005; Grogan, et al., 2007).

There is also evidence to suggest that several non-appearance-based motivators of body change that have typically been associated with men and male body image (McCreary, Saucier, & Courtenay, 2005) are also significant to women. The male body image literature in the context of muscle and physical activity includes utilitarian aspects of the body such as physical strength, power, fitness and endurance, physical health and various factors related to identity and self-worth such as gender identity (masculinity), vitality, psychological health and well-being, respect from others, self-esteem and empowerment. On the basis of the male literature, there is clearly insufficient data on women looking at non-appearance based factors related to body image and how these relate to physical activity participation. Further investigation of this emerging evidence is important, as these alternate body change motivations may have more positive psychological foundations than the focus on thinness. Understanding the increasing diversity in the types of activities women are undertaking and their goals for participation may yield valuable insights into the treatment of disordered symptomology.

To address this omission in the empirical literature, the present study was undertaken to evaluate breadth of activities and motivations. Critical to this understanding is not just the motives for initiating physical activity, but maintenance over time. Different motivational regulations (varying along the continuum of intrinsic to extrinsic) have been demonstrated to predict a number of behavioural, cognitive and affective outcomes (Vallerand, 1997). Intrinsic motives are associated with both physical activity adherence, and a variety of other positive psychological outcomes (Buckworth, Lee, Regan, Schneider & DiClemente, 2007; Ryan &
Deci, 2000; Vallerand, 2001). Intrinsic motives are believed to promote physical activity maintenance as they foster flexible and creative responses to drive behaviour that are focused on the task at hand, whereas extrinsic motives foster a more external locus of control, which can be compromised by external contingencies and can undermine the psychological needs and consequently influence behaviour persistence (Buckworth, Lee, Regan, Schneider & DiClemente, 2007; Ryan & Deci, 2000). Consideration must be given to the psychological implications as although clearly maintenance of physical activity over time is important for physical health, it is problematic if this maintenance stems from unhealthy psychological attitudes, emotions and behaviours. Therefore, the second aim of Study Two was to understand the relationship between motives for physical activity and:

i) total weekly activity duration and successful adherence over time,

ii) physical activity types, and

iii) psychopathology.

3.1.4.1 Hypothesis three

H3: Based on previous research demonstrating physical activity adherence is associated with more intrinsic motives (Buckworth, et al., 2007; Ryan & Deci, 2000; Vallerand, 2001), it was hypothesised the motives for physical activity would be relevant to:

(i) amount of physical activity (minutes per week), and

(ii) pattern of activity over time (stopped/decreased or maintained/increased).
3.1.4.2 Hypothesis four

H4: Australian women's physical activity choices will be reflective of their primary motives for physical activity. A traditional focus on weight loss and appearance will be associated with greater involvement in activities thought to control weight (e.g., cardiovascular based group fitness, walking/hiking, running/jogging). The anticipated increased diversity in reasons (see Aim One), is expected to explain increased diversity in activities not traditionally associated with feminine ideas, including weight training.

3.1.4.3 Hypothesis five

H5: It is hypothesised that motives for physical activity will predict psychological indicators; extrinsic motives (such as appearance/weight) will correlate to negative psychological indicators and intrinsic motives (such as health/fitness and social engagement) will be related to positive psychological indicators.

3.1.3 What is the relationship between physical activity, motives, type of activity and successful maintenance over time?

Previous research suggests intrinsically motivated physical activity is likely to increase adherence over time as it fosters more flexible and creative responses to drive participation in the activity, whereas extrinsic motives foster a more external locus of control, which can be compromised by external contingencies and can undermine the psychological needs and consequently influence behaviour persistence (Buckworth, et al., 2007; Ryan & Deci, 2000). However, what is less understood, is how specific activity choices impact on motives and adherence over time. Clearly, there are specific motives for initiating any new behaviour, including commencing physical activity. Participants are anticipating specific outcomes
through their participation in different activities (for example expecting weight loss from cycling, or expecting stress reduction from yoga). These goals may be achieved, or other unintended consequences may also be experienced (for example making a new friendship group through participating in a group fitness class, or feeling a greater sense of empowerment through increases in strength). The importance of this understanding cannot be undervalued, including simply whether participation in physical activity, \textit{independent of the type of activity}, impacts on participation motives over time (due to non-specific improvements in health). For example, women with distorted negative body image may be motivated to commence activity with appearance-based body change motivators (such as weight loss) and may choose to achieve this through strength training due to the increase in metabolism they will likely experience through increased muscle composition. However, if participation in strength training creates experiences of empowerment and health and this changes their maintaining motivators, this could have important therapeutic applications. The focus on participation motives for physical activity has been on initiating motivations, with little empirical attention being given to maintaining motivators, and specifically, whether a change in motivations over time can be predicted based on either physical activity participation generally, or physical activity choice. A baseline must first be established to assess whether physical activity generally impacts on participation motives over time.

3.1.4.4 Hypothesis six

H6: Surveying change retrospectively in order to evaluate how motives for physical activity have changed over time. Due to the dearth of research in the area, it is not possible to predict what pattern(s) of change will be revealed, thus this hypothesis is in the form of an empirical question.
3.1.4.5 Hypothesis seven

H7: Participation in different types of physical activity will lead to a change in motives for participation over time. Specifically, participation in weights-based activities may lead to a decrease in the focus on weight and appearance and an increase in importance of health and fitness motives including feelings of empowerment, self-mastery and athletic gains of strength, endurance, fitness and health (Brace-Govan, 2004; George, 2005; Grogan, et al., 2007).

3.1.4.6 Hypothesis eight

H8: Motives for physical activity will be associated with physical activity maintenance over time.

3.1.5 Investigating the associations between androgyny, physical activity outcomes and psychological consequences

According to Bem’s (1975) theory on sex roles, different situations have culturally standardised behaviours that are stereotypically masculine or feminine. Gender-typed individuals are more likely to suppress behaviours that violate the gender role standard, thereby reducing the range of behavioural responses available to them. Androgynous individuals choose whatever behaviour seems most effective, regardless of its gender stereotyped appropriateness. This behavioural flexibility is more likely to be adaptive, more effective across a range of domains and ultimately lead to greater levels of psychological well-being.
3.1.5.1 Hypothesis nine

**H9**: In alignment with previous research (Shifren, et al., 2003), and the additive model of gender role theory, we speculated that women who reject the confinements of only the traditional feminine gender role, and have higher levels of both feminine and masculine traits (psychological androgyny) would have greater levels of behavioural flexibility in their uptake of physical activity which would be evidenced by greater weekly activity participation (as measured by duration). In extension of this research, we speculated that this behavioural flexibility would also lead to more successful engagement in physical activity over time.

3.1.5.2 Hypothesis ten

**H10**: Although there are conflicting studies, a body of research suggests androgyny (and often masculinity) are associated with higher levels of psychological well-being. Research on gender conformity, however, has found investment in gender ideals has been linked to both positive and negative consequences for the self (Sanchez & Crocker, 2005; Wood, et al., 1997), with the experience of societal pressure to conform to gender ideals negatively predicted self-esteem (Good & Sanchez, 2010). Given the absence of recent research on gender roles in relation to motivation for physical activity participation and in alignment with this previous research, we speculated that rejection of the traditional feminine gender role would be associated with more intrinsic motives (such as health, fitness and social engagement) and positive psychological outcomes (increased self-efficacy and exercise identity) whereas more highly feminine-typed women would have experienced greater pressure to adhere to the traditional hegemonic feminine ideal, and therefore would have more extrinsic motives for physical activity (such as appearance and weight management).
and less favourable psychological outcomes (lower self-efficacy and exercise identity).

3.2 Method

3.2.1 Participants

A sample of 408 adult women, ranging in age from 18 to 73 years ($M=33.69$, $SD=10.09$), participated in the study. Participants were recruited with an emailed invitation and word-of-mouth via a snowball technique through friends and family of participants and the researchers (Goodman, 1961). Participants were provided with information on the nature of the study (type of questions, approximate duration, anonymity, etc.) and the online link to the Plain Language Statement, followed by the study. Interested individuals completed the online questionnaire and were provided with a $20 gift voucher as an honorarium following completion of the questionnaire. The anonymity of participants was protected as the completed questionnaire and the online gift-request forms were stored in separate data files.

3.2.2 Materials

Participants completed an online battery of questionnaires that were presented in the following order (all measures possess adequate published psychometric properties):

Demographic Information. Participants reported their sex, and age.

Exercise Stage of Change. The stage of change for physical activity was assessed using the Stages of Change for Regular Physical Activity Questionnaire (SCRPAQ: Marcus, et al., 1992).
The SCRPAQ consists of one item (i.e., “Do you engage in physical activity regularly?”), with five statements representing the five stages of change: (a) precontemplation (“no, and I do not intend to start in the next 6 months”); (b) contemplation (“no, but I intend to start in the next 6 months”); (c) preparation (“no, but I intend to start in the next 30 days”); (d) action (“yes, for less than 6 months”); and (e) maintenance (“yes, for more than 6 months”). In accordance with the SCRPAQ instructions, regular physical activity was defined for participants as ‘any planned physical activity (e.g., brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed 3 to 5 times per week for 20-60 minutes per session. Physical activity does not have to be painful to be effective but should be done at a level that increases your breathing rate and causes you to break a sweat.’ Using this definition of regular physical activity, participants were asked to select the statement that most closely applied to their current regular physical activity level. Examples of vigorous and moderate activities were also provided to participants to help them categorize their regular activities.

A kappa index of reliability of .78 over a 2-week period for this scale among employed adults has been found previously (Marcus, et al., 1992). Concurrent validity of the SCRPAQ was established by demonstrating a significant association with the 7-day Physical Activity Recall in a previous study of adults at their worksite (Marcus & Simkin, 1993).

**Exercise Identity.** The extent to which participants identified as being an exerciser was assessed using the nine-item Exercise Identity Scale (Anderson & Cychosz, 1994). Participants are asked to select the response that best reflects the extent to which they agree or disagree with each statement using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Examples of the statements include: ‘Physical exercise is a central factor to my self-concept’ and ‘Others see me as someone who exercises regularly’.
This scale demonstrates strong test–retest reliability, internal consistency and convergent validity (Anderson & Cychosz, 1994). For the present study, a high internal consistency was observed (Cronbach’s $\alpha = 0.94$, $M = 42.32$, $SD = 14.16$) (note, throughout this paper internal consistency is reported as Cronbach’s alpha).

**Exercise Self-Efficacy.** The 6-item Exercise Self-Efficacy (short form) instrument measured confidence to be physically active in six specific domains: negative affect, excuse making, being active alone, equipment access, resistance from others, and weather (Benisovich, Rossi, Norman, & Nigg, 1998). Each of the items was rated on a 5-point scale ranging from 1 (not at all confident) to 5 (completely confident). For the present study, adequate high internal consistency was observed ($\alpha = 0.81$, $M = 19.02$, $SD = 5.31$).

**Current physical activities.** Self-reported physical activity (physical activity) was obtained from the last 7 days, using the short, self-administered version of the International Physical Activity Questionnaire (IPAQ: Craig, et al., 2003). The questionnaire collects information on time (i.e. number of sessions and average time per session) spent walking, in moderate intensity physical activity, in vigorous-intensity physical activity and sitting, on weekdays and weekend days. Questions regarding participation in moderate and vigorous physical activity were supplemented by concrete examples of activities commonly performed. Responses from the questionnaire were summed within each category (i.e. vigorous intensity, moderate intensity, walking) to estimate the total amount of time spent in physical activity per week. Total weekly physical activity (in MET-min) was estimated by summing the product of reported time within each item by a MET value specific to each category of physical activity and expressed as a weekly average MET score (where MET is metabolic equivalent; $1 \text{ MET} = \text{resting energy expenditure}$) according to the official IPAQ scoring protocol (www.ipaq.ki.se). Vigorous intensity of physical activity was assumed to correspond to 8
METs, moderate-intensity activity to 4 METs and walking to 3.3 METs (www.ipaq.ki.se). Data were thereafter cleaned for out-of-range values (i.e. total MET-min/week greater than three standard deviations from the mean).

Physical activity participation motives were measured using the Exercise Motivations Inventory version two (EMI-2: Markland & Ingledew, 1997). The instrument comprises 14 scales: Affiliation, Appearance, Challenge, Competition, Enjoyment, Health Pressures, Ill-Health Avoidance, Nimbleness, Positive Health, Revitalisation, Social Recognition, Strength and Endurance, Stress Management, and Weight Management. Each scale has three or four items. The response format is a 6-point Likert scale ranging from 0 (not at all true for me) to 5 (very true for me). Scale scores were computed as the mean of item scores. In the present study, each subscale had adequate internal consistency; Stress Management ($\alpha = .90$), Revitalisation ($\alpha = .75$), Enjoyment ($\alpha = .88$), Challenge ($\alpha = .83$), Social Recognition ($\alpha = .83$), Affiliation ($\alpha = .90$), Competition ($\alpha = .93$), Ill-Health Avoidance ($\alpha = .80$), Positive Health ($\alpha = .87$), Weight Management (.93), Appearance ($\alpha = .84$), Strength & Endurance ($\alpha = .87$), Nimbleness (.90) excluding Health Pressures ($\alpha = .60$), which was not used in the analyses for this reason.

In order to assess change in motives over time as a result of physical activity participation, the EMI-2 was administered twice. The second administration asked participants to consider how important these motives were when they first started their current physical activities (up to a maximum of 12 months ago). The subscales from the second administration of the EMI-2 also had adequate internal consistency; Stress Management ($\alpha = .94$), Revitalisation ($\alpha = .73$), Enjoyment ($\alpha = .91$), Challenge ($\alpha = .87$), Social Recognition ($\alpha = .88$), Affiliation ($\alpha = .94$), Competition ($\alpha = .95$), Ill-Health Avoidance ($\alpha = .88$), Positive Health ($\alpha = .91$), Weight Management (.96), Appearance ($\alpha = .86$), Strength & Endurance ($\alpha = .94$).
Nimbleness (.91), again excluding Health Pressures (α = .67), which was not used in the analyses.

**Subjective wellbeing.** Participants used an 11-point scale anchored between ‘completely dissatisfied’ (0) and ‘completely satisfied’ (10) to respond to the single item used in conjunction with the Personal Wellbeing Index (International Wellbeing Group, 2006) that assesses overall satisfaction with life, or subjective wellbeing (SWB): “Thinking about your own life and personal circumstances, how satisfied are you with your life as a whole?” With the additional benefit of increasing survey brevity, this single item is considered a strong measure of SWB, although less reliable than multi-item scales (International Wellbeing Group, 2006). When responses are converted to a 0 to 100 scale, the normative range of life satisfaction for Australia is 75.9 to 79.2, with a mean of 77.5 (Cummins et al., 2008). For the current sample, mean SWB was 73.55 (SD = 17.98).

**Depression, anxiety and stress.** The short form (21 items) of the Depression Anxiety Stress Scale (DASS-21: Lovibond & Lovibond, 1995a) was used to assess levels of depression, anxiety and stress. Individuals are asked to respond to each item using a four-point scale to indicate the extent to which each item applied to them in the last 2 weeks, ranging from 0 (did not apply to me at all) to 4 (applied to me very much, or most of the time). It has been validated against other Beck Depression and Anxiety Inventories (Lovibond & Lovibond, 1995b) and has been shown to have high concurrent validity (r = 0.84) and reliability. In the present study, subscale internal reliability was adequate; depression (α = .80, M = 3.32, SD = 3.25), anxiety (α = .84, M = 3.33, SD = 3.45), stress (α = .80, M = 3.42, SD = 3.20).

**Androgyny and gender roles.** The Bem Sex Role Inventory (Bem, 1974) contains 20 masculine adjectives (e.g., independent, forceful), 20 feminine adjectives (e.g., affectionate,
sympathetic) and 20 buffer/neutral items (e.g., conscientious, reliable). Respondents report the extent to which they feel each word is a self-descriptor on a 7-point Likert scale ranging from 1 (never or almost never true) to 7 (always or almost always true). Masculine and feminine scores are derived by calculating the mean response to each respective category. These scores are then used to create four classifications based on gender role identification: i) Masculine (high masculine and low feminine identification), ii) Feminine (high feminine identification and low masculine identification), iii) Androgynous (high identification with both masculine and feminine characteristics) and iv) Undifferentiated (low identification with both masculine and feminine characteristics). Evidence for reliability and validity of the BSRI has been reviewed by Bem (1974), Kelly and Worell (2003), Pedhazur and Tetenbaum (2005), and Locksley and Colten (1979). Test-retest reliability has been high for Masculinity and Femininity, with Pearson product-moment correlation coefficients above .90 (Bem, 1974). Internal consistency for both scales has also been satisfactory, with Cronbach's alpha values consistently above .80 (Bem, 1974). Regarding evidence for validity, Bem and coworkers have found that, as predicted, masculinity is related to independent or instrumental behavior, whereas femininity is related to nurturing and expressive behaviors (Bem, 1975, 1977; Bem & Lenney, 1976; Ntoumanis, 2005). Internal consistency for the current study was adequate; Masculine subscale \( (\alpha = .85, M = 4.81, SD = .61) \), Feminine subscale \( (\alpha = .81, M = 4.60, SD = .68) \).

**Drive for Muscularity.** The Drive for Muscularity Scale (DMS: McCreary, 2007) assesses an individual’s emotional, attitudinal and behavioural characteristics of a desire for increased muscle. Respondents are asked to indicate the extent to which a series of attitudes and behaviours are descriptive of themselves. The DMS provides a total score, and a secondary score for both attitudes and behaviours related to drive for muscularity. The DMS was patterned after the Eating Attitudes Test, a measure of attitudes and behaviours associated
with a desire to be thinner. The DMS has 15 self-report items. Respondents use a 6-point scale to indicate level of agreement with statements such as “I lift weights to build up muscle”. The response options range from 1 (not at all like me) to 7 (very much like me). Internal consistency in the present study was adequate ($\alpha = .78$, $M = 2.01$, $SD = 1.06$).

Disordered eating. The Eating Disorder Inventory-3 (EDI-3: Garner, 2004) is a self-report measure of psychological traits or constructs shown to be clinically relevant in individuals with eating disorders. It has been developed as a revision of the EDI-2 (Garner, 1991) and EDI (Garner, Olmstead, & Polivy, 1983). Its primary purpose is to assess psychological domains that are relevant to eating disorders.

The EDI-3 consists of 91 items that require a response on a 6-point scale: Always, Usually, Often, Sometimes, Rarely, or Never. The items are organized onto 12 primary scales, consisting of three eating-disorder-specific scales (Drive for Thinness, Bulimia and Body Dissatisfaction) and nine general psychological scales that are highly relevant to, but not specific to, eating disorders (which were not used in the present study). The EDI-3 yields six composites: i) Eating Disorder Risk (comprising the three eating disorder-specific scales), ii) Ineffectiveness, iii) Interpersonal Problems, iv) Affective Problems, v) Overcontrol, and vi) General Psychological Maladjustment. These scores are calculated by averaging the sum of the scores of each scale that comprises the composite. Within this study, the Drive for Thinness subscale was used, as was the Eating Disorder Risk composite scale. The three subscales used in the current study (either as a subscale or within the Eating Disorder Risk composite), are further described below.

Drive for Thinness. This scale measures the desire to be thinner, concern with dieting, preoccupation with weight, and an intense fear of weight gain. It is calculated from the answers on seven items that assess these four aspects of a desire to be thin. High scores on
this scale can predict binge eating, the development of a formal eating disorder, and severity of eating disorder symptoms. Internal consistency for this scale in the present study was high ($\alpha = .92, M = 9.65, SD = 7.67$).

*Bulimia.* This eight item scale measures the frequency of episodes of uncontrollable overeating (binge eating) and the urge to engage in self-induced vomiting (purging). The sensitivity and specificity make the bulimia subscale an excellent predictor of a Bulimia Nervosa diagnosis (Clausen, Rosenvinge, Friborg, & Rokkedal, 2011). Internal consistency for the current sample was high ($\alpha = .89, M = 4.30, SD = 5.14$).

*Body Dissatisfaction.* This ten-item scale assesses discontent with the overall shape and size of regions of the body that are of particular concern to those who have eating disorders, such as the stomach, hips, thighs and buttocks (Garner, 2004). Body dissatisfaction has been identified as a risk factor for initiating and sustaining extreme weight controlling behaviours that can lead to eating problems in vulnerable females (Garner, 2004). Convergent, discriminant and construct validity have been established for this scale (Stewart & Williamson, 2004). Internal consistency for the current sample was high ($\alpha = .91, M = 18.15, SD = 9.59$).

### 3.2.3 Procedure

The study was approved by the Deakin University Human Research Ethics Committee. Individuals interested in participating in the study were invited to read the online PLS. This statement introduced the principal investigator, and informed participants of the nature of the questionnaire, its general content (including example items from the scales), the approximate time commitment (45 minutes), the potential negative effects of the project, as well as the procedure for requesting the $20 gift voucher for their participation. It was
explained that their contact details would be stored separately to the questionnaire responses to ensure anonymity of their data. Participants were instructed to complete the questionnaire in their own time. After reading the PLS, participants indicated their consent to participate by clicking on the ‘I AGREE’ button online, which directed them to the online questionnaires.

3.3 Results

3.3.1 Data Screening and Testing Assumptions

Prior to analysis, all variables were examined using SPSS FREQUENCIES, SPSS RELIABILITY ANALYSIS and SPSS REGRESSION for accuracy of data entry, missing values, internal consistency, and fit between variable distributions and the assumptions of multivariate analysis. Identified missing values were found to be distributed randomly across cases and variables, with less than 2.5% missing values in each variable. Cases with missing values were retained, and missing values were replaced with variable means. Variables were computed from the mean of the internally consistent items (with item-total correlations greater than .20). All variables showed adequate internal consistency, with Cronbach’s α greater than .65 (the relevant statistics for each variable is provided in the Measures subsection of the Method).

Variables were assessed for normality, linearity, univariate and multivariate outliers. Univariate outliers (values further than three standard deviations from the mean) were replaced with values corresponding to three standard deviations above or below the mean. In accordance with standard practice, as the number of participants was greater than 400, it was deemed unnecessary to transform any skewed or kurtotic variables as the distribution bias from skew dissipates and the underestimation of variance due to kurtosis disappears with large sample sizes (Tabachnick & Fidell, 2007).
Inspection of Mahalanobis distance scores revealed there were no multivariate outliers. Eigenvalues were inspected to ensure that multicollinearity and singularity would not undermine subsequent regression analyses. Multicollinearity was assessed using a two-step procedure advocated by Hair, Anderson, Tatham and Black (1998). In step one, the condition indices of the variables were screened for values approaching 30. The second step was unnecessary as no condition index exceeded the threshold of 30. Tolerance values and variance inflation factor (VIF) statistics also indicated no evidence of multicollinearity in the regression results.

3.3.2 Quantifying the diversity of physical activity participation and motives for participation

3.3.2.1 Hypothesis one

Based on the typology developed in Study One, the relative popularity of a breadth of diverse physical activities that Australian women engage in (on a regular basis) beyond traditional activities associated with weight control and leisure was documented and quantified. The results in Table 3.1 quantify the diversity of physical activities undertaken by women within the previous 12 months, including gender a-typical activities for women such as weights (47.9%) and weight-based group exercise (32.7%).
Table 3.1

*Participation in physical activities within previous 12 months*

<table>
<thead>
<tr>
<th>Physical activity</th>
<th>% participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycling</td>
<td>48</td>
</tr>
<tr>
<td>Jogging/Running</td>
<td>63</td>
</tr>
<tr>
<td>Walking/Hiking</td>
<td>90</td>
</tr>
<tr>
<td>Swimming/Diving</td>
<td>32</td>
</tr>
<tr>
<td>Skiing/Snowboarding</td>
<td>4</td>
</tr>
<tr>
<td>Dance</td>
<td>33</td>
</tr>
<tr>
<td>Yoga</td>
<td>24</td>
</tr>
<tr>
<td>Pilates</td>
<td>20</td>
</tr>
<tr>
<td>Group fitness (cardio)</td>
<td>40</td>
</tr>
<tr>
<td>Group fitness (weights)</td>
<td>33</td>
</tr>
<tr>
<td>Sport (competitive)</td>
<td>15</td>
</tr>
<tr>
<td>Sport (social)</td>
<td>21</td>
</tr>
<tr>
<td>Weights</td>
<td>48</td>
</tr>
<tr>
<td>Boxing/kickboxing</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>6.4</td>
</tr>
</tbody>
</table>
3.3.2.2 Hypothesis two

It was hypothesised that the diversity of physical activities would reflect a diversity of motives for participating in physical activity, and that these motives would extend beyond the desire for weight control and the improvement of appearance.

Motives for exercising were measured using the Exercise Motivations Inventory-2 (EMI-2). These scores represent the importance allocated by participants to particular reasons for engaging in physical activity. Assessing the full breadth of motives was firstly documented using all subscales of the EMI-2. Means and standard deviations are presented in Table 3.2.
Table 3.2

*Exercise Motivations Inventory, Means and Standard Deviations*

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress Management</td>
<td>5.04</td>
<td>1.52</td>
</tr>
<tr>
<td>Revitalization</td>
<td>5.50</td>
<td>1.19</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>5.12</td>
<td>1.44</td>
</tr>
<tr>
<td>Challenge</td>
<td>3.89</td>
<td>1.59</td>
</tr>
<tr>
<td>Social Recognition</td>
<td>2.50</td>
<td>1.37</td>
</tr>
<tr>
<td>Affiliation</td>
<td>3.38</td>
<td>1.75</td>
</tr>
<tr>
<td>Competition</td>
<td>2.58</td>
<td>1.68</td>
</tr>
<tr>
<td>Health Pressures</td>
<td>2.39</td>
<td>1.37</td>
</tr>
<tr>
<td>Ill-Health Avoidance</td>
<td>5.33</td>
<td>1.35</td>
</tr>
<tr>
<td>Positive Health</td>
<td>6.10</td>
<td>1.00</td>
</tr>
<tr>
<td>Weight Management</td>
<td>5.27</td>
<td>1.61</td>
</tr>
<tr>
<td>Appearance</td>
<td>4.91</td>
<td>1.44</td>
</tr>
<tr>
<td>Strength and Endurance</td>
<td>5.51</td>
<td>1.23</td>
</tr>
<tr>
<td>Nimbleness</td>
<td>4.89</td>
<td>1.62</td>
</tr>
</tbody>
</table>

Note. Sub-scale items were endorsed on a 7-point Likert-type response format ranging from (1) ‘strongly disagree’ to (6) ‘strongly agree’

As shown in Table 3.2, whilst weight and appearance are highly endorsed as important motives for physical activity, other diverse motives including Stress Management,
Revitalisation, Enjoyment, Ill-Health Avoidance, Positive Health, Strength and Endurance and Nimbleness are also highly endorsed.

With the diversity of motives for physical activity documented, the second step was to reduce and consolidate these many motives into efficient and minimally-overlapping factors for inferential analyses. The EMI-2 subscales, were subjected to principal components analysis using a varimax rotation with orthogonal transformation, in accordance with Ingledew and Markland (2008). This method emphasizes simplification of the factor loadings and ensures that the rotated factors are still uncorrelated (Lindstron & von kronnring, 1993). A three component solution emerged as the best fit. Enjoyment and Social Recognition were removed from the analysis, as they did not clearly load on one factor. The three component solution explained 64% of the total variance (Table 3.3). This factor structure replicates previous studies that have explored motives for physical activity participation (Ingledew, Markland, & Ferguson, 2009; Ingledew & Markland, 2008). Based on this structure, the following motives for physical activity composite variables were computed. The first component, labelled Appearance/Weight Motive was computed as the mean of Appearance and Weight Management. This component has an eigenvalue of 4.73 and accounts for 36% of the total variance. The second component, labelled Health/Fitness Motive was computed as the mean of Health Pressures, Ill-Health Avoidance, Nimbleness, Positive Health, Revitalisation, Stress Management and Strength and Endurance. This component has an eigenvalue of 1.91 and accounts for 15% of the total variance. The third component, labelled Social Engagement Motive was computed as the mean of Affiliation, Challenge, and Competition. This component has an eigenvalue of 1.69 and accounts for 13% of the total variance. Thereby, the EMI-2 scales are reduced to a manageable number of conceptually coherent higher-order scales.
Table 3.3

*Principal components analysis of Exercise Motivation Inventory 2 (EMI-2) subscales. Three principal components with eigenvalues above 1.0 explained 64% of the total variance.*

*Component loadings <0.20 excluded.*

<table>
<thead>
<tr>
<th>Physical Activity Motive</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>.27</td>
<td>.87</td>
<td></td>
</tr>
<tr>
<td>Weight management</td>
<td></td>
<td>.91</td>
<td></td>
</tr>
<tr>
<td>Health pressures</td>
<td>.43</td>
<td>.21</td>
<td></td>
</tr>
<tr>
<td>Ill-health avoidance</td>
<td>.73</td>
<td></td>
<td>.31</td>
</tr>
<tr>
<td>Nimbleness</td>
<td>.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive health</td>
<td>.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revitalisation</td>
<td>.78</td>
<td>.24</td>
<td></td>
</tr>
<tr>
<td>Stress management</td>
<td>.67</td>
<td>.23</td>
<td></td>
</tr>
<tr>
<td>Strength and endurance</td>
<td>.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affiliation</td>
<td>.04</td>
<td>.83</td>
<td>.02</td>
</tr>
<tr>
<td>Challenge</td>
<td>.49</td>
<td>.66</td>
<td>.08</td>
</tr>
<tr>
<td>Competition</td>
<td>.04</td>
<td>.83</td>
<td>.02</td>
</tr>
<tr>
<td>Eigenvalues</td>
<td>4.73</td>
<td>1.91</td>
<td>1.69</td>
</tr>
<tr>
<td>% variance explained</td>
<td>36</td>
<td>15</td>
<td>13</td>
</tr>
</tbody>
</table>

Notes: N=407. Variance explained = 64%.

Table 3.4 shows the physical activity motives endorsed by participants through the composites, showing Health/Fitness motives were most highly endorsed, followed by Weight/Appearance and lastly Social Engagement.
Table 3.4

*EMI-2 Composites, Means and Standard Deviations*

<table>
<thead>
<tr>
<th>EMI-2 Composite</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance/Weight Composite</td>
<td>5.27</td>
<td>1.61</td>
</tr>
<tr>
<td>Health/Fitness Composite</td>
<td>5.39</td>
<td>1.00</td>
</tr>
<tr>
<td>Social Engagement Composite</td>
<td>3.08</td>
<td>1.22</td>
</tr>
</tbody>
</table>

Note. Sub-scale items were endorsed on a 7-point Likert-type response format ranging from (1) ‘strongly disagree’ to (6) ‘strongly agree’

A repeated-measures ANOVA was used to compare the popularity of the motive composites to assess whether the mean differences were significantly different. A significant effect was found, Wilks’ Lambda = 0.225, F(2, 405), p=0.00. Three paired samples t-tests were used to make post hoc comparisons between physical activity composites, to determine which motive composite means were significantly different. The t-tests identified statistically significant differences between all composites, suggesting that that Australian women are placing different levels of importance on their motives for physical activity and that specifically rate the motives in the following order of importance: (1) Health/Fitness; (2) Appearance/Weight; and (3) Social Engagement.

3.3.3 Assessing the relationships between motives for participating in physical activity, type of activity chosen, pattern of activity and psychological consequences

3.3.3.1 Hypothesis three
It was hypothesised the motives for physical activity would be relevant to:

(i) amount of physical activity (minutes per week), and
(ii) pattern of physical activity over time (stopped/decreased or maintained/increased).

To test the strength of the relationships between the motives in predicting physical activity amount, multiple regression analyses were conducted. Table 3.5 shows that together, the motives explain a small but significant amount of variance, $R^2 = .13$, $F(3,406) = 19.96$, $p < .01$. Social Engagement was the strongest predictor ($\beta = .24$), followed by Health/Fitness motives ($\beta = .21$). Weight/Appearance motives were not significant predictors of physical activity amount.

Table 3.5

*Multiple regression of weekly physical activity time (MET minutes) regressed on motives for physical activity participation*

<table>
<thead>
<tr>
<th>DV</th>
<th>IV</th>
<th>$R^2$</th>
<th>Adj. $R^2$</th>
<th>$B$</th>
<th>$Se$</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$R$</th>
<th>$sr^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>physical activity time</td>
<td>Appearance/Weight</td>
<td>.13*</td>
<td>.12*</td>
<td>-25.17</td>
<td>26.50</td>
<td>-.05</td>
<td>-.95</td>
<td>.06</td>
<td>.00</td>
</tr>
<tr>
<td>(MET minutes)</td>
<td>Health/Fitness</td>
<td>158.66</td>
<td>39.57</td>
<td>.21*</td>
<td>4.10*</td>
<td>.28*</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Engagement</td>
<td>152.38</td>
<td>31.61</td>
<td>.24*</td>
<td>4.82*</td>
<td>.31*</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *$p < .01$.

A logistic regression analysis was conducted to predict physical activity participation pattern (decreased/stopped or increased/maintained) using the motives for physical activity (Appearance/Weight, Health/Fitness, and Social Engagement) as predictors. A test of the full model against a constant only model was statistically significant, indicating that the three
predictors as a group reliably distinguished between participants who decreased/stopped exercising and those who increased/maintained their activity level (chi square=22.88, p<.00, df=3). Nagelkerke’s R² of .07 indicates a weak relationship between prediction and grouping. Prediction success overall was 60.2% (53.4% for increased/maintained and 66.2% for stopped/decreased). The Wald criterion demonstrated that all three predictor variables significantly contribute to the prediction, Appearance/Weight, p=.02, Health/Fitness, p=.01, Social Engagement, p<.01). The Exp (B) value indicates that when the importance of the motives increases, the likelihood of successful engagement with physical activity (increased/maintained pattern) increases with Health/Fitness motives, Exp(B)=1.35, p=.01, and Social Engagement motives, Exp(B)=1.30, p<.01, and decreases with Appearance/Weight motives, Exp(B)=.83, p=.02.

3.3.3.2 Hypothesis four

It was hypothesised that Australian women's choice of physical activity would reflect their underlying motives for participating in physical activity. Most obviously, a traditional focus on weight loss and appearance was expected to be associated with greater involvement in activities thought to control weight (e.g., cardiovascular-based group fitness, walking/hiking, running/jogging).

Descriptive statistics were conducted to initially compare the mean and standard deviation of the importance placed upon motives for participating in physical activity. Participants in each physical activity were compared to those who did not participate in that activity. These activities were not exclusive. Therefore, a participant in one activity may also be a participant in another activity. These scores are presented in Table 3.6.
Table 3.6

Comparison of the importance of motives for physical activity (means and standard deviations) by activity and participation

<table>
<thead>
<tr>
<th>Physical Activity</th>
<th>Appearance/Weight Motives</th>
<th>Health/Fitness Motives</th>
<th>Social Engagement Motives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-participant</td>
<td>Participant</td>
<td>Non-participant</td>
</tr>
<tr>
<td>Cycling</td>
<td>5.01 (1.43)</td>
<td>5.16 (1.41)</td>
<td>5.22 (1.05)*</td>
</tr>
<tr>
<td>Jog/run</td>
<td>4.85 (1.34)</td>
<td>5.22 (1.44)</td>
<td>5.27 (1.10)</td>
</tr>
<tr>
<td>Walk/hike</td>
<td>4.88 (1.44)</td>
<td>5.11 (1.42)</td>
<td>5.20 (1.05)</td>
</tr>
<tr>
<td>Swim/dive</td>
<td>5.08 (1.41)</td>
<td>5.10 (1.45)</td>
<td>5.34 (.98)</td>
</tr>
<tr>
<td>Dance</td>
<td>5.09 (1.38)</td>
<td>5.06 (1.50)</td>
<td>5.31 (.96)</td>
</tr>
<tr>
<td>Yoga</td>
<td>5.08 (1.41)</td>
<td>5.10 (1.48)</td>
<td>5.27 (.98)*</td>
</tr>
<tr>
<td>Pilates</td>
<td>5.08 (1.40)</td>
<td>5.11 (1.51)</td>
<td>5.36 (1.01)</td>
</tr>
<tr>
<td>Group fitness</td>
<td>4.90 (1.45)</td>
<td>5.36 (1.33)</td>
<td>5.29 (1.02)</td>
</tr>
<tr>
<td>(cardio)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group fitness</td>
<td>4.96 (1.43)</td>
<td>5.34 (1.37)</td>
<td>5.35 (1.01)</td>
</tr>
<tr>
<td>(weights)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sport</td>
<td>5.08 (1.45)</td>
<td>5.10 (1.29)</td>
<td>5.38 (1.00)</td>
</tr>
<tr>
<td>(competitive)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sport (social)</td>
<td>5.11 (1.43)</td>
<td>4.99 (1.41)</td>
<td>5.38 (1.03)</td>
</tr>
<tr>
<td>Weights</td>
<td>4.89 (1.43)</td>
<td>5.29 (1.39)</td>
<td>5.20 (1.03)*</td>
</tr>
</tbody>
</table>

* p < .01
A one-way MANOVA was conducted on the three motives for physical activity participation (Health/Fitness, Social Engagement and Weight/Appearance) as a function of participation (yes versus no) in each activity. Due to the number of analyses conducted (one per activity) a more conservative alpha level of .01 was adopted.

Significant multivariate differences were revealed for yoga, $F(3, 390)=6.27, p<.01$, weights, $F(3, 390)=3.92, p<.01$, sport (social), $F(3, 390)=4.50, p<.01$, and sport (competitive), $F(3, 390)=16.81, p<.01$. This suggests that women who participate in these activities place different levels of importance on motives for physical activity than women who do not participate in these activities. To explore this is more detail, the univariate effects were examined. Health/Fitness motives were endorsed as being of greater importance for women who participate in cycling ($F(1, 392)=6.81, p<.01$; partial $\eta^2 =.02$), yoga ($F(1, 392)=13.12, p<.01$; partial $\eta^2 =.03$), and weights ($F(1, 392)=10.58, p<.01$; partial $\eta^2 =.03$) than women who do not participate in these activities. Similarly, Social Engagement motives were endorsed as being of greater importance for women who participate in sport, both social ($F(1, 392)=9.11, p<.01$; partial $\eta^2 =.02$) and competitive ($F(1, 392)=44.23, p<.01$; partial $\eta^2 =.10$) than for women who do not participate in these activities.

This provides initial support for the hypotheses, that women are selecting specific physical activities based on their motives for undertaking physical activity.

3.3.3.3 Hypothesis five

It was hypothesised that the motives for physical activity would predict psychological indicators. Appearance/Weight motives would be more likely to be correlated to negative psychological indicators and Health/Fitness motives and Social Engagement motives would be related to positive psychological indicators. Table 3.7 identifies the significant correlation
between Appearance/Weight and several negative psychological indicators including Eating Disorder Risk, Stress, Anxiety and Depression. Appearance/Weight also correlates significantly with Drive for Muscularity and Drive for Thinness and correlates negatively and significantly with Quality of Life. Conversely, Health/fitness motives correlate positively and significantly with Quality of Life. Social engagement shows a more varied pattern with positive and significant correlations with Drive for Muscularity and Drive for Thinness.

Table 3.7

Bivariate Correlations (Pearson’s r values reported) for EMI-2 Composites, EDI Risk, depression, anxiety, depression, Drive for Muscularity, Drive for Thinness and Quality of Life

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Appearance/Weight</td>
<td>.30**</td>
<td>.23**</td>
<td>.56**</td>
<td>.15**</td>
<td>.17**</td>
<td>.16**</td>
<td>.12*</td>
<td>.60**</td>
<td>-.11*</td>
<td></td>
</tr>
<tr>
<td>(2) Health/ Fitness</td>
<td>.37**</td>
<td>-.02</td>
<td>-.01</td>
<td>-.01</td>
<td>-.05</td>
<td>.03</td>
<td>.06</td>
<td>.17**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Social Engagement</td>
<td>.07</td>
<td>.06</td>
<td>.07</td>
<td>.01</td>
<td>.21**</td>
<td>.15**</td>
<td>.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) EDI Risk</td>
<td>.28**</td>
<td>.30**</td>
<td>.31**</td>
<td>.10*</td>
<td>.87**</td>
<td>-.32**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Stress</td>
<td>.87**</td>
<td>.86**</td>
<td>.09</td>
<td>.30**</td>
<td>-.46**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Anxiety</td>
<td>.85**</td>
<td>.11*</td>
<td>.32**</td>
<td>-.45**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Depression</td>
<td>.10*</td>
<td>.31**</td>
<td>-.48**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) Drive for Muscularity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.11*</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9) Drive for Thinness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.24**</td>
<td></td>
<td></td>
<td></td>
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Note: *p<.05, **p< .01.
3.3.3.4 Hypothesis six

It was hypothesised that over time, participation in physical activity would lead to a change in the importance of motives for participation. To assess the change in motives, a repeated measures ANOVA was conducted on each of the motives comparing the importance of motives as measured at the time of survey in comparison to when participants first started the physical activity.

Mauchly’s test indicated that the assumption of sphericity had been violated (chi-square = 90.0, p <.01), therefore degrees of freedom were corrected using Huynh-Feld estimates of sphericity (epsilon = 0.83). The results show that the importance scores allocated to the three motives differed significantly, $F(1.05, 5.25) = 77.7, p <.001$.

Post hoc tests revealed that Appearance/Weight motives became significantly more important over time than Social Engagement motives ($p<.001$) and Health/Fitness motives also became significantly more important over time than Social Engagement motives (as shown in Figure 3.1). The importance of Weight/Appearance motives did not differ significantly over time in relationship to Health/Fitness motives.
Figure 3.1. Change over time in motives for participating in physical activity, from when activity was first started (or 12 months ago) to current.

3.3.3.5 Hypothesis seven

Consistent with the proposition that participation in weights-based activities may lead to a decrease in the focus on weight and appearance and an increase in importance of health and fitness motives including feelings of empowerment, self-mastery and athletic gains of strength, endurance, fitness and health (Brace-Govan, 2004; George, 2005; Grogan, et al., 2007), it was hypothesised that participation in specific types of physical activities would lead to a change in participation motives over time.

A series of MANOVAs were conducted with participation in each physical activity (yes versus no) as the independent variable and change in the three motive composites
Unexpectedly, a significant multivariate effect was present only for the physical activity of sport (competitive), $F(3, 390)=10.78, p<.01$ which suggests that participation in sport (competitive) may lead to a change in the importance of motives for physical activity participation over time. Further exploration of this result reveals that the increase in the importance allocated to both Health/Fitness motives ($F(1, 392)=8.21, p<.01; \text{partial } \eta^2 = .02$), and Appearance/Weight motives ($F(1, 392)=27.37, p<.01; \text{partial } \eta^2 = .07$), for women who participate in sport (competitive) is significantly greater than for women who do not participate in sport (competitive).

3.3.3.6 Hypothesis eight

Consistent with previous research suggesting intrinsic motives for physical activity are associated with increased adherence to physical activity over time, it was hypothesised that motives for physical activity would predict maintenance of physical activity. Specifically intrinsically oriented motives (Health/Fitness and Social Engagement) would be associated with more successful maintenance than extrinsically oriented motives (Appearance/Weight). This was measured by using Pattern of Physical Activity and Stage of Change.

The correlations presented in Table 3.8 indicate a significant relationship between Health/Fitness motives and Pattern of Physical Activity (maintained/increased), $r=.16, p<.01$. Social Engagement motives was also significantly related to Pattern of Physical Activity (maintained/increased), $r=.18, p<.01$. No significant correlation was identified between Weight/Appearance motives and Pattern of Physical Activity.
Table 3.8

*Bivariate Correlations (Pearson’s r values reported for all variables except Pattern of Physical Activity for which Spearman’s r values are reported) for EMI-2 Composites, Stage of Change, Pattern of Physical Activity and Total Weekly Activity (MET minutes)*

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<th>(4) Stage of Change</th>
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These findings were further confirmed using the ordinal variable, Stage of Change. An ANOVA with the three motive composites (Health/Fitness, Social Engagement and Weight/Appearance) as the independent variables and Stage of Change (Action versus Maintenance) as the dependent variable was conducted to identify any relationships between the importance allocation to motives for change and successful engagement in physical activity. Significant effects were found for Health/Fitness motives, $F(1,396)=18.62$, $p<.01$, and Social Engagement motives $F(1,396)=15.22$, $p<.01$, but not for Weight/Appearance motives. This suggests that the women who have successfully maintained their physical activity for six months or more differ significantly on the importance they allocate to Health/Fitness motives and Social Engagement motives differs in comparison to women who have been exercising for less than six months, but no variation is found on the importance these two groups allocate to Weight/Appearance motives. Further exploration of this result indicates that women who have been exercising for six months or more place significantly
more importance on both Health/Fitness motives ($p<.01$) and Social Engagement motives ($p<.01$) than women who have been exercising for less than six months.

This suggests that whilst Appearance/Weight is strongly endorsed as a motive for participation, it does not correspond to successful engagement in physical activity, as measured either by weekly participation time or by pattern over time.

3.3.4 Investigating the associations between androgyny, physical activity outcomes and psychological consequences

3.3.4.1 Hypothesis nine and hypothesis ten

It was hypothesised that women who identify with non-traditional gender roles would have a more successful pattern of physical activity (maintained or increased over time) and greater total weekly activity. It was also hypothesised that rejection of the traditional feminine gender role would be associated with more intrinsic motives (such as health, fitness and social engagement) whereas more highly feminine-typed women would have experience greater pressure to adhere to the traditional hegemonic feminine ideal, and therefore would have more extrinsic motives for physical activity (such as appearance and weight management).

Gender role identification was quantified using the Bem sex roles categories of Undifferentiated (low feminine and low masculine identification, comprising 25.8% of the present sample), Masculine (high masculine and low feminine identification, comprising 23.1% of the present sample) Feminine (high feminine and low masculine identification, comprising 24.1% of the present sample) and Androgynous (high feminine and high masculine identification, comprising 27% of the present sample).
Table 3.9 shows the correlations between these gender roles and physical measures (total weekly activity and pattern of physical activity) and psychological measures (exercise identity and exercise self-efficacy). In addition to the correlations with motives for physical activity (health/fitness, social engagement and appearance/weight) are also shown.

Significant negative relationships were found between the undifferentiated gender role and total weekly activity, health/fitness reasons, social engagement motives and exercise identity.

Statistically significant positive relationships were found between the Masculine gender role and social engagement motives and exercise identity. The Feminine gender role correlated significantly (and negatively) only with exercise self-efficacy. The Androgynous gender role correlated positively and significantly with total weekly activity, health/fitness motives, social engagement motives, exercise identity and exercise self-efficacy.
Table 3.9

*Means, Standard deviations, and Bivariate Correlations (Pearson’s r values reported) for Gender Role Orientation, Total Weekly Physical Activity, Pattern of Physical Activity and Motives for Physical Activity Participation*

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\[ M = .26, .46, .72, 1.08, 1565.95, 1.53, 5.08, 5.39, 3.08, 42.3, 19.02 \]
\[ SD = .44, .84, 1.3, 1.78, 768.41, .50, 1.42, 1.00, 1.22, 14.16, 5.31 \]

Note: *p<.05, **p<.01.

To further explore physical activity outcomes, motives for activity, and the psychological variables of exercise identity and self-efficacy as a function of gender role orientation, a MANOVA was conducted. A significant multivariate effect for gender role, \( F(18, \)
1126) = 3.78, \( p < .01 \), suggests that these exercise outcome variables combined, differ depending on gender role.

Further inspection of this reveals that each of these variables except Appearance/Weight motives and Pattern of Physical Activity differ significantly on gender role orientation (\( p < .01 \) in all cases, partial eta squared ranges between .05 and .07). This provides some support for the hypotheses, specifically that the gender role can be associated with different physical activity outcomes and psychological outcomes. Tukey’s post hoc analyses were conducted to provide more detailed exploration of the research hypotheses, specifically that rejection of traditional gender roles in women (high femininity, low masculinity) would result in more positive physical and psychological outcomes.

Examination of the post hoc multiple comparisons for total weekly activity (MET minutes) shows significant differences between the total weekly activity between the Undifferentiated and Masculine groups, \( p < .01 \), and the Undifferentiated and Androgynous groups, \( p < .01 \). With reference to Figure 3.2 it is evident that greater levels of total weekly activity are associated with the Androgynous and Masculine groups compared to the Feminine and Undifferentiated groups.
Due to the large number of analysis and the risk of incurring a Type 1 error, a conservative alpha level of .01 was applied to all of the following analysis. Examination of the post hoc multiple comparisons of the importance allocated by participants to motives of Health/Fitness shows significant differences between the importance levels between the Undifferentiated and Masculine groups, $p<.01$, and the Undifferentiated and Androgynous groups, $p<.01$. With reference to Figure 3.3 it is evident that greater importance for Health/Fitness motives for physical activity is associated with the Androgynous group, followed by the Masculine and Feminine groups in comparison to the Undifferentiated group.

*Figure 3.2. Total weekly physical activity undertaken (MET minutes) by Gender Role Orientation.*
Examination of the post hoc multiple comparisons of the importance allocated to motives of Social Engagement shows significant differences only between the importance levels between Undifferentiated and Androgynous groups, \( p < .01 \). With reference to Figure 3.4 it is evident that greater importance for Social Engagement motives for physical activity is associated with the Androgynous group, in comparison to the Undifferentiated group.
Examination of the post hoc multiple comparisons of the level of Exercise Self-Efficacy reported by participants shows significant differences between the importance levels between the Undifferentiated and Masculine groups, \( p < .01 \), and the Undifferentiated and Androgynous groups, \( p < .01 \). With reference to Figure 3.5 it is evident that greater levels of Exercise Self-Efficacy are associated with the Androgynous group and Masculine groups, in comparison to the Undifferentiated group.

*Figure 3.4. Importance of Social Engagement by Gender Role Orientation.*
Examination of the post hoc multiple comparisons of the level of Exercise Identity reported by participants shows significant differences between the importance levels between the Undifferentiated and Masculine groups, $p<.01$, and the Undifferentiated and Androgynous groups, $p<.01$. With reference to Figure 3.6 it is evident that greater levels of Exercise Identity are associated with the Androgynous group and Masculine groups, in comparison to the Undifferentiated group.
3.4 Discussion of Study Two Results

3.4.1 Overview

Study Two was conducted to investigate the associations between psychological and physical health outcomes, and physical activity choices and motives. Specifically Study Two was to document the diversity of physical activities being undertaken by Australian women and to examine the relationship between diverse physical activities, motives for physical activity and successful patterns of physical activity over time and how these related to psychological variables associated with body image and well-being. Of particular interest was the hypothesis that motives for physical activity participation would change over time through participation in specific physical activities.

Figure 3.6. Importance of Exercise Identity by Gender Role Orientation.
3.4.2 Current diversity of physical activities being undertaken by Australian women

Although acceptance of a broader range of physical activities for women has increased in recent times, images and perceptions of athleticism and femininity continue to be quite traditional (slender with some muscle tone), with muscularity being associated with masculinity (Brace-Govan, 2004). However, a growing body of evidence suggests that women are increasingly interested in strength training activities, partially for the aesthetic aim of achieving a more muscular shape, and for a variety of other significant reasons including feelings of empowerment, self-mastery and athletic gains of strength, power and fitness (Brace-Govan, 2004; George, 2005; Grogan, et al., 2007).

Based on this mounting body of evidence, it was hypothesised that Australian women are engaging in a variety of physical activities, including activities that are not typically associated with the desire for weight loss or leisure. This hypothesis was supported. Physical activities not traditionally associated with weight loss or leisure were strongly endorsed by participants. This included weight training and weights-based group physical activity. This was assessed using the typology developed in Study One.

This increased diversity of physical activities supports the proposition that women’s motives for physical activity participation are similarly increasing in diversity.

3.4.3 Diversity in motives for physical activity participation

Historically, women have identified their motives for participation in physical activities as primarily relating to maintenance of the Western feminine ideal. Within the Western world, hegemonic femininity is constructed within a white, heterosexual, and class-based framework, and therefore, accentuates the importance of appearance with the reference point of an ideal feminine body as thin and toned (Krane, et al., 2004). However, a growing
body of evidence suggests that women are increasingly interested in strength training activities, partially for the aesthetic aim of achieving a more muscular shape, and for a variety of other significant reasons including feelings of empowerment, self-mastery and athletic gains of strength, power and fitness (Brace-Govan, 2004; George, 2005; Grogan, et al., 2007). Based on this growing evidence base, it was hypothesised that the diversity of physical activities would reflect a diversity of motives for physical activity participation, and that these motives would extend beyond the desire for weight control and the improvement of appearance.

This hypothesis was supported. Although weight and appearance were highly endorsed as important motives, other diverse motives including Strength and Endurance, Stress Management, Revitalisation, Enjoyment, Ill-Health Avoidance, Positive Health, and Nimbleness were also highly endorsed. When condensed to three principle components, the Health/Fitness Motive was most strongly endorsed, followed closely by Appearance/Weight Motive and lastly Social Engagement.

3.4.4 Relationship between motives for physical activity and type of activity

It was hypothesised that women’s’ choice of physical activity would be reflective of their primary motives for physical activity. That is, a traditional focus on weight loss and appearance would be associated with greater involvement in activities thought to control weight (e.g. cardiovascular based group fitness such as walking/hiking, running/jogging). This hypothesis was partially supported with relationships identified between Health/Fitness motives and the activities of yoga and weights and a relationship between sport (both social and competitive) and Social Engagement motives. Interestingly, a significant relationship was not found between any physical activities and Appearance/Weight motives. This provides
further support for the hypothesis that women’s motives for engaging in physical activity have diversified beyond the historical norm of Appearance and Weight Management.

3.4.5 Relationship between physical activity type and psychological indicators

Based on previous research associating intrinsic motives with psychologically more adaptive outcomes and extrinsic motives with psychologically more maladaptive outcomes (e.g. Buckworth, Lee, Regan, Schneider & DiClemente, 2007; Ryan & Deci, 2000; Vallerand, 2001), it was hypothesised that the motives for physical activity would predict psychological indicators: Appearance/Weight motives would be more likely to be correlated to negative psychological indicators and Health/Fitness motives and Social Engagement motives would be related to positive psychological indicators. This hypothesis was largely supported, with significant correlations found between Appearance/Weight and several negative psychological indicators including Eating Disorder Risk, Stress, Anxiety and Depression. Appearance/Weight also correlates significantly with Drive for Muscularity and Drive for Thinness (as would be expected, given they are both measures of appearance-specific preferences) and correlates negatively and significantly with Quality of Life.

Conversely, Health/fitness motives were positively associated with Quality of Life. Unexpectedly, Social engagement had positive associations only with Drive for Muscularity and Drive for Thinness (both appearance based measures).

3.4.6 Impact of physical activity participation on motives for participating

Previous research on physical activity motives indicates that although many people may start physical activity with the goal of altering physical appearance, these goals shift over time toward improving physical functioning and psychological well-being (Martin &
Lichtenberger, 2002). This is likely to occur through the positive reinforcement resulting from the physical and psychological changes that occur following physical activity. In the present study, a significant change in motives over time was found only for the activity of sport (competitive). In this activity, it was found that women who participate in sport (competitive) have significantly greater increases over time in the importance they allocate to Health/Fitness motives and Appearance/Weight motives when compared to women who do not participate in sport (competitive).

It was not expected that only this one form of activity participation would demonstrate a relationship to change in motives. There are several possible reasons for this result. Training for competitive sports is likely to involve training at greater intensity and potentially with greater knowledge on how to perform activities to get a desired result. This increased intensity and activity specificity is likely to yield a stronger and more direct positive reinforcement of activity to desired results. This may be coupled with a change in their social comparison sub-set. If they shift their social comparison of both peers and media to their sport-specific subculture, the importance of different motives is likely to also shift. As performance in sport is linked to strength, cardiovascular fitness and flexibility, participation in competitive sport is likely to provide a feedback mechanism to continually improve these fitness elements in order to improve performance. Similarly, weight management impacts on performance in that excess weight is likely to decrease performance and optimising weight is likely to improve performance.
3.4.7 Relationship between motives for physical activity and successful engagement in activity over time

Initial engagement in physical activities is an obvious essential starting point for attaining maintenance and therefore motives that initiate physical activity in women are of interest. In line with previous research (Sebire, Standage, & Vansteenkiste, 2011), it was hypothesised that the importance allocated to intrinsic (e.g. Health/Fitness and Social Engagement) relative to extrinsic (e.g. Appearance/Weight Management) motives for physical activity would be positively associated with amount of activity for participants. This hypothesis was supported. Both Health/Fitness motives and Social Engagement motives had strong positive correlations with Total Weekly Activity, whereas Appearance/Weight demonstrated no significant relationship.

However, of far greater interest are the correlates of successful maintenance of physical activity over time. It was expected (as hypothesised above) that participation in physical activity would lead to a change of motives for participation over time. This was not supported. This may be due to several reasons. It may suggest that that is not the experience of participating in physical activity, or the results of activity that create the conditions for maintenance, but instead perhaps a psychological variable that is unique to the participant. Alternatively, it may be that the time point referenced in the survey was not sufficiently meaningful for participants to provide a strong anchoring reference point in their past. This may have led to decreased accuracy in their responses in regard to the motives why they initiated their physical activity (in comparison to their current motives for participation).

It was hypothesised that physical activity maintenance would be positively correlated with intrinsic motives for physical activity participation (Health/Fitness and Social Engagement). This hypothesis was supported. Both of these motives were positive and
significantly correlated with both Pattern of Physical Activity (maintained/increased) and Stage of Change (maintenance). No significant relationships were found between Appearance/Weight motives and either Pattern of Physical Activity or Stage of Change. This suggests that whilst Appearance/Weight is strongly endorsed as a motive for participation, it does not correspond to successful engagement in physical activity, as measured either by time or pattern. Relating this finding back to SDT, it is likely that for women experiencing dissatisfaction with the physical appearance of their body (which is the majority of women in Western cultures, as described in Chapter One, 'normative discontent', see: Krones, et al., 2005; Thompson, et al., 1999) who are then extrinsically motivated to commence physical activity by the goal of changing their physical appearance and experience dissatisfaction from their efforts, may disengage from physical activity due to discouragement in attaining their goal. This impacts on both their physical and psychological health as they discontinue physical activity, and experience the negative health consequences of decreased activity levels, and they fail to satisfy their basic psychological needs of competence and autonomy, thereby impacting on their psychological health.

3.4.8 Relationship between gender role orientation and physical activity participation

According to Bem’s (1975) theory on sex roles, different situations specify culturally normed behaviours that are stereotypically masculine or feminine. Gender-typed individuals are more likely to suppress behaviours that violate the gender role standard, thereby reducing the range of behavioural responses available to them. Androgynous individuals choose whatever behaviour seems most effective, regardless of its gender stereotyped appropriateness. It has been suggested, that this increase in behavioural flexibility will be adaptive and more effective across a range of domains and ultimately lead to greater levels of psychological well-being (Taylor & Hall, 1982) - including resilience (Chun Bun & McBride-
Chang, 2007; Werner, 1995), optimal mental health (Lefkowitz & Zeldow, 2006), high self-esteem and adaptive coping strategies (Huang, et al., 2012), lower depression and adaptive coping skills (Cheng, 2005), leadership effectiveness (Kark, 2012), and reduced interpersonal stress (Hirokawa, et al., 2001). In research relating to body change activities, androgyny is associated with lower levels of eating disorder symptomology (Hepp, et al., 2005) and exercising more frequently (Shifren, et al., 2003).

The findings from Study Two supported this body of previous research, with the Androgynous gender role consistently having a stronger significant relationships to most positive physical and psychological health variables, including total weekly physical activity, intrinsic motives for activity, and higher levels of exercise identity and exercise self-efficacy.

Gender role orientation is an important element in personal development, both with self and others. Gender role is related to general self-perception, self-esteem, body image, and body satisfaction, which are psychological variables that contribute significantly to disordered eating risk (Jackson, et al., 1988; Lewis & Johnson, 1985). The findings from this study suggest gender roles may be an alternative target for mediating a healthy approach to body change activities through physical activity uptake. Although gender roles demonstrated a relationship to a variety of outcomes, no relationship was found between gender roles and successful engagement over time.

3.4.9 Conclusions

In summary, the results of the present study indicate that: i) Australian women are undertaking diverse physical activities which is reflective of diverse motives, beyond traditional motives associated with weight control, appearance and leisure, ii) there is some correlation between types of physical activity being undertaken and motives for participation,
however participation in specific activities does not lead to a change of motives over time and
iii) Health/Fitness and Social Engagement motives for physical activity are related to
successful engagement in activities iv) Appearance/Weight motives are correlated to several
negative psychological indicators, demonstrate no relationship with pattern of activity or
amount of physical activity, and v) Masculine gender role characteristics lead to greater
success with physical activity engagement and the Androgynous role (high levels of both
Masculine and Feminine traits) is the most successful grouping.

Of particular interest in Study Two was i) documenting women’s rates of participation
in the diverse range of physical activities identified in Study One, and their varied individual
motives for participation, and ii) examining the psychological and health implications of the
physical activities within the context of SDT.

Australian women are undertaking very diverse physical activities with almost half of
the surveyed population engaging in gender atypical strength-related activities. This diversity
of activity is reflected in diverse motives for physical activity. Women identify Health/Fitness
motives as being of greatest importance in their motives for physical activity participation.
More traditional motives of Appearance/Weight are allocated almost equal importance to
Health/Fitness motives however these motives are found to be non-discriminatory, as
although they are reported as being of great importance they demonstrates no relationship to
either amount or successful engagement in physical activity. Appearance/Weight motives do,
however, correlate with a variety of negative psychological indicators including eating
disorders, stress, anxiety and depression. The focus in the literature on appearance and weight
is therefore incomplete.

Although associations were found between individual motives and physical activity
outcomes, these relationships were weak. Further investigation is required to establish if
alternative variables can more effectively predict long-term physical activity maintenance. Study Three continues to use the theoretical underpinning of SDT and undertakes a more comprehensive evaluation of motives by assessing relationships between combinations of motivations; that is, ‘motivational profiles’ (Matsumoto & Takenaka, 2004; Ntoumanis, 2002; Vlachopoulos, et al., 2000), and a woman’s adherence to physical activities.

In Study Two, the starting point for examination of change was found to possibly be problematic in providing participants with an anchoring reference point. The timeframe of ‘12 months ago, or when you first started exercising’ may have been too arbitrary. In Study Three, adolescence is used to provide a longer trajectory and a more significant timeframe.
4. Study 3: Motivational Profiles and Physical Activity Outcomes

4.1 Introduction

As discussed in Chapter One, the known health ramifications of the decline in physical activity in developed countries is an international public health concern (Sisson & Katzmarzyk, 2008) with physical inactivity cited as the fourth leading cause of death worldwide (Kohl et al., 2012). Chapter One detailed the immense pressure experienced by women to conform to ideas of hegemonic femininity, and the negative psychological consequences of internalising increasingly unattainable ideals of thinness, including the development of negative body image, and the adoption of unhealthy weight-loss strategies and disordered eating symptomatology (Cash & Brown, 1987; van den Berg, et al., 2002), devaluing other aspects of their self and over-valuing their physical appearance (Cooper & Fairburn, 1992; Fairburn, Shafran, & Cooper, 1999b; Fairburn, et al., 2003; Geller, et al., 2002; Walsh & Garner, 1997). The central aim of the research in this thesis is to better understand the relationship between physical activity and outcomes relating to both physical and psychological health. The relevance of this research is in finding physically and psychologically positive approaches to improving and maintaining physical and psychological health. Studies One and Two answered some of these questions.

The development of the Physical Activity Methods Typology in Study One confirmed that Australian women are undertaking very diverse physical activities. Using this typology, Study Two surveyed participation rates within the diverse types of physical activities, and established the participation in gender atypical activities (such as weight training) is occurring at significant levels with almost half of the surveyed participants participating in weight training. This diversity of activity is reflected in diverse motives for physical activity participation. Women identify Health/Fitness motives as being of greatest importance in their
motives for physical activity. Almost equal importance to Health/Fitness motives however, are the motives of Appearance/Weight, which are found to be non-discriminatory, as although they are reported as being of great importance they demonstrate no relationship to either amount of weekly activity or successful engagement in physical activity. Appearance/Weight motives do, however, correlate with a variety of negative psychological indicators including eating disorders, stress, anxiety and depression. The focus in the literature on appearance and weight is therefore misleading and incomplete.

Motives of Health/Fitness and Social Engagement were both positively related to amount of weekly physical activity, and maintenance over time. This suggests that a re-orientation of the literature toward these motives and outcomes would be worthwhile, and would be a more powerful focus for both psychological and physical health policy aimed at improving physical activity levels.

Consideration of individual motives is a useful starting point for uncovering physically and psychologically healthy pathways to physical activity maintenance, particularly when examining a range of intricate relationships to psychological variables, and indeed most research to-date has focussed on motives in isolation (Ntoumanis, 2002). However, (SDT) argues that singular motives are insufficient for many types of complex behaviours, and examining only individual motives particularly ignores the likelihood that individuals are influenced by a number of diverse motivations for physical activity over longer time periods.

Behaviours are better understood as being motivated by a range of motivations along the continuum from amotivation through extrinsic to intrinsic (see Figure 1.2). The evidence for the multidimensional nature of physical activity motivation is found in previous SDT research, and in Study Two, which found an overlap or co-occurrence of some motives,
suggesting some underlying commonalities between reasons within individual cases that cannot be explained by a linear relationship that directly combines motives in an obvious way.

Given the multidimensional nature of physical activity motivations, previous research suggests different combinations of motives may combine to yield motivational profiles and that these profiles may form the basis of different outcomes relating to physical activity participation (Vallerand & Losier, 1999). Extending upon the individual motives examined in Study Two, Study Three continues to use the theoretical underpinning of SDT and uses a wider lens to evaluate physical activity by assessing relationships between combinations of motivations; that is, ‘motivational profiles’ (Matsumoto & Takenaka, 2004; Ntoumanis, 2002; Vlachopoulos, et al., 2000), and physical activity participation and adherence over time.

In Study Two, some of the hypotheses regarding the retrospective analyses were found to be non-significant (for example, the hypothesis that participation in different types of physical activity would lead to a change in participation motives). As previously discussed, there are several possible reasons for this. One potential reason is that the time point referenced in the survey was not sufficiently meaningful to provide a stronganchoring reference point in the past. This may have led to decreased accuracy in response. In Study Two, the timeframe was ‘12 months ago, or when you first started exercising’. This may have been too arbitrary and it was also limited in providing insight into lifelong activity. In Study Three, adolescence is used to provide a longer trajectory and a more significant time frame.

4.1.1 The relationship between physical activity levels in childhood and adulthood

Longitudinal studies suggest participation in physical activity in childhood and adolescence positively predicts increased levels of adult physical activity (Smith, Gardner, Aggio, & Hamer, 2015; Telama, et al., 2005), and improved health outcomes (Fernandes et
al., 2015; Guldberg-Møller, Hancox, Mikkelsen, Hansen, & Rasmussen, 2015; Ried-Larsen, Grøntved, Kristensen, Froberg, & Andersen, 2015). A conceptual model underlying the relationship between childhood physical activity, adult physical activity and health status has been proposed (Blair et al., 1989) (see Figure 4.1).

Figure 4.1. Relationship between childhood physical activity, adult physical activity and health status (Blair, et al., 1989).

This model proposes three possible models by which physical activity in childhood may influence adult health;

i) Path B: childhood physical activity has a direct beneficial effect on adult health;

ii) Path A and E: childhood physical activity directly improves child health, which influences adult health; or

iii) Path C and D: childhood physical activity may influences adult health through its positive influence on adult physical activity.
This model suggests that health benefits of physical activity are evident in both childhood and adulthood, and that a physically active childhood positively influences lifelong physical activity (Blair, et al., 1989; Trost, 2005).

To-date, the body of research examining lifelong physical activity levels is promising, but scant. An over-reliance on cross-sectional designs makes causal inferences difficult. However, several longitudinal studies, which tracked participants for over 20 years from childhood to adulthood have found significant low to moderate associations between childhood and adult physical activity (Telama, et al., 2005). Other longitudinal studies have examined sport, a specific subset of physical activity, and identified significant associations with adult physical activity (Bélanger et al., 2015; Smith, et al., 2015; Tammelin, Näyhä, Hills, & Järvelin, 2003), this relationship is also consistent with cross-sectional research (Telama, Yang, Laakso, & Viikari, 1997; Trudeau, Laurencelle, & Shephard, 2004; Trudeau & Shephard, 2008). However, these studies fail to consider the psychological underpinnings of physical activity maintenance over time. A significant relationship has been identified, but which psychological factors are mediating or moderating this pathway? Past research has suggested further studies are required to examine the determinants of these relationships that have been identified (Rauner, Jekauc, Mess, Schmidt, & Woll, 2015). Research does, however, generally reflect a relationship between childhood and adult physical activity which provides a rational for further analysis of this pathway. This research aims to contribute to the body of research from a health psychology perspective by considering the motivational contributions to lifelong physical activity. The health and psychological benefits of physical activity have been previously discussed, however it is also worth noting (unsurprisingly) that long term adherence to physical activity has been specifically identified to reduce chronic health conditions (Fernandes, et al., 2015), lower levels of carotid arterial stiffness (Ried-Larsen, et al., 2015), decrease the severity of asthma (Guldberg-Møller, et al., 2015; Rauner,
et al., 2015) and decrease a range of health complications relating to overweight and obesity (Yajnik et al., 2015).

4.1.2 Promoting lifelong physical activity

Children are exposed to a variety of settings which present with opportunities for the promotion of lifelong physical activity such as at school and the home setting (Trost, 2005). The family and home environment has been shown to influence child physical activity through role modelling, encouragement and financial support (Beets, Vogel, Chapman, Pitetti, & Cardinal, 2007). The home environment has however been found to be profoundly different and diverse among children, consequently this presents with difficulties in physical activity promotion (Andersen et al., 2006; Thompson et al., 2010; Trudeau, et al., 2004). The school setting also plays a critical role in children’s physical activity levels and has been proposed to develop lifelong physical activity through the development of skills and knowledge (Trost, 2005; Trudeau & Shephard, 2008).

As school attendance is compulsory in Australia, physical activity information and skill development can reach all children, making it an important setting for promotion of lifelong physical activity (Trudeau & Shephard, 2008). One such avenue for the promotion of physical activity is through the curriculum subject - physical education (PE). Since the 1950s PE has been used as the medium for mass participation in physical activity at schools, with a strong emphasis on the development of skill acquisition for sport (Bailey et al., 2009). Along with the aim to increase childhood and adolescent physical activity, PE also aims to foster the ‘development of lifelong physical activity’ (Lim & Wang, 2009). Research into the long-term benefits of PE participation is however limited.
An American review presented by Wallhead and Buckworth (2004) evaluated the effectiveness of 12 large scale PE interventions, identifying limited effectiveness in helping children meet the physical activity guidelines (Pollock et al., 1998). Of the limited interventions that did show positive results, the follow up time was only three years, insufficient to accurately gauge the effects of PE on lifelong physical activity (McKenzie et al., 1996; Wallhead & Buckworth, 2004). Prospective studies have attempted to understand the relationship between participation in PE and adult physical activity, yet have revealed conflicting results (Cleland, Dwyer, Blizzard, & Venn, 2008; Nelson, Gordon-Larsen, Adair, & Popkin, 2005). Two longitudinal studies previously touched on showed a weak but positive relationship between PE participation and adult physical activity (Tammelin, et al., 2003; Trudeau, et al., 2004). Research reflecting the long term effects of PE is limited and even more so within Australian populations, but there is support for a general positive relationship (Makien, Borodlin, Tammelin, Rahkonen, & Prattala, 2010). The idea that PE influences adult physical activity is appealing, yet the importance of other psychological, social and environmental factors is also critical in attempting to understand the multidimensional nature of lifelong physical activity (Buckworth & Dishman, 2007; Wallhead & Buckworth, 2004).

4.1.3 Barriers to lifelong physical activity

Studies have found a number of factors associated with decreased physical activity specific to different age groups and genders (Zimmermann-Sloutskis, Wanner, Zimmermann, & Martin, 2010). Adulthood is a period characterised by unique changes from childhood (i.e. increased responsibilities and commitments), which have been associated with decreases in physical activity participation (Zick, Smith, Brown, Fan, & Kowaleski-Jones, 2007). The documented age-related decline in physical activity levels (ABS, 2013) is significant (see Figure 1.1). Only 43% of Australian adults are sufficiently active. The highest levels of
physical activity in Australian women were among the 18–24 year olds with 48% of females classed as sufficiently active. Across all 18–24 year olds, this equated to average daily activity of only 32 minutes. Levels of physical activity declined with age, with only one in five women 75 years or over getting sufficient physical activity. Identifying factors that relate to the successful maintenances of physical activity over time is needed to reverse or limit this decline with age.

Research has identified certain factors that may be potential barriers for the initiation and maintenance of physical activity (Schutzer & Graves, 2004). Environmental factors such as unsafe neighbourhoods, policy changes and no proximal recourses for physical activity have been associated with decreased physical activity (Duncan, et al., 2005; Humpel, Owen, & Leslie, 2002; Sallis, et al., 2007). Younger adults typically report time as a significant barrier, and with increasing age, poor health is generally the leading barrier to physical activity (Booth, Bauman, Owen, & Gore, 1997; Booth, Owen, Bauman, Clavisi, & Leslie, 2000; Dishman, 1982). Research has also associated decreased physical activity among females with the adoption of traditional roles (Bell & Lee, 2005). Overall the literature demonstrates the influence of many factors upon adult physical activity and subsequent lifelong physical activity however research fails to account for individual variance in physical activity, and to indicate what factors are most crucial in influencing lifelong physical activity (Schutzer & Graves, 2004). Section One discussed in great detail the individual psychological factors impacting on physical activity, and specifically discussed these in the context of the serious psychological consequences of disordered body image. Importantly, a review comparing different variables influencing physical activity research found motivational variables to be the strongest and most consistent predictors of physical activity in healthy populations (Trost, Owen, Bauman, Sallis, & Brown, 2002). With this in mind, the following
subsections highlight the utility of interpreting physical activity uptake and adherence through the theoretical lens of SDT.

4.1.4 Understanding the Motivations for Physical Activity: SDT

SDT postulates that humans have an innate drive for self-determined behaviour, which is defined by behaviour persistence and psychological well-being. Chapter Three described the meta-theory of SDT in great detail, and four sub-theories it incorporates: BNT, COT, CET, and OIT. Each sub-theory has its own set of detailed hypotheses that cover the major predictions of Self-Determination Theory (Deci & Ryan, 1985). The literature on physical activity and sport supports the applications of each of the sub-theory, and SDT as an overarching theory of human motivation (Ryan & Deci, 2000), as previously discussed in Chapter One.

Study Two supported previous research outcomes in physical activity using the SDT framework, in finding intrinsic motives are predictive of individual adoption of and adherence to physical activity (Chatzisarantis, et al., 2003). The more intrinsically motivated motives of Health/Fitness and Social Engagement were related to both amount of physical activity, and pattern of engagement over time, whereas the more extrinsically motivated motives of Appearance/Weight were non-discriminatory in their ability to predict either amount of activity, or pattern over time.

To date however there has been no known research investigating the types of motivations associated with lifelong physical activity. Research using the conceptual framework of SDT in Physical Education (PE) in schools, however, appears promising, particularly within the context of the existing literature supporting the relationship between childhood and adult physical activity (Standage, Gillison, & Treasure, 2007a).
4.1.4.1 Self-Determination Theory and Physical Education in Schools

An emerging body of research supports the application of SDT for the promotion of student motivation for physical activity. Research supports the role of autonomy-supportive environments, satisfaction of the psychological needs and self-determined motivations in the PE setting in promoting childhood physical activity (Ntoumanis, 2005; Standage, et al., 2003). Research has also found that self-determined forms of motivation positively correspond to a number of desirable responses in PE. This includes higher levels of positive affect (Ntoumanis, 2005) greater concentration (Standage, et al., 2005) higher effort (Ntoumanis, 2001) increased interest (Goudas, Biddle, & Fox, 1994), a preference for attempting challenging tasks (Standage, et al., 2005), and an intention for physical activity in leisure time (Hagger, et al., 2003). The long term effects of PE interventions based on the theoretical framework of SDT in promoting lifelong physical activity have not yet been examined. A review of PE interventions (Wallhead & Buckworth, 2004) identified that the (limited number of) interventions showing positive results were based on theoretical frameworks employing some of the proposition of SDT, such as skill mastery and enjoyment. Adopting a theoretical framework to underpin the structure of PE classes to ensure the outcome of lifelong participation in physical activity is achieved is critical (Parr & Osling, 1998). Research is limited, hence the current study proposes that by drawing on the available motivational physical activity literature of SDT, a more comprehensive understanding may come about the motivations required for lifelong physical activity.

However, motivations for physical activity are multidimensional. Consideration of both the micro (individual motivations) and macro (combinations of motivations) is important from the perspective of research leading to useful policy interventions. Investigating individual motives is useful for understanding the links between each motive and other
variables and indeed, most research in the area of physical activity has considered the
relationship between physical activity motives and outcomes in isolation (Ntoumanis, 2002).
Whilst this is useful when considering initiating and maintaining factors of physical activity
for a specific time period, it ignores the likelihood that individuals are influenced by a number
of diverse motivations for physical activity over longer time periods.

Previous research has suggested that given the multidimensional nature of physical
activity motivation, different combinations of motives combine to yield motivational profiles
and that these profiles may form the basis of different outcomes relating to physical activity
participation (Vallerand & Losier, 1999). The current thesis further proposes to capture the
dynamic nature of motivations which may affect lifelong physical activity may be possible
through the identification of homogenous motivational profiles (Wang & Biddle, 2001).

4.1.4.2 Motivational Profiles

In reference to the large and growing body of research using the theoretical foundation
of SDT, few studies have used motivational profiling as a method for investigating physical
activity engagement, especially within adult populations (Friederichs, et al., 2015; Guerin &
Fortier, 2012; Matsumoto & Takenaka, 2004; Ntoumanis, 2002). Within this limited body of
research, only one study was identified which investigated physical activity maintenance over
time (Matsumoto & Takenaka, 2004) and this study used a questionnaire based on the Stages
of Change Model (Prochaska & DiClemente, 1983). The endorsed statement that classified
participants as maintaining physical activity over time, was “I currently exercise regularly and
I have been doing so for longer than six months”. No research could be identified using
motivational profiling in defined time periods beyond six months. Given less than half of
Australian women are meeting basic physical activity guidelines (ABS, 2013) and the
mounting evidence surrounding the potential benefits of physical activity for both physical and psychological health (as discussed in Study Two), coupled with the initial research suggesting motivational profiling is a useful methodology for analysing physical activity maintenance, further research is warranted.

4.1.4.3 Cluster Analysis and Profile Extraction

The existing body of research examining motivational profiles using the SDT framework has used one of two methods. Either calculating a single score by collapsing the variables of the self-determination continuum across a single index (i.e. the self-determination index) (Wang & Biddle, 2001), or extracting the profiles using cluster analysis and thereby considering the unique contribution of each variable to the cluster solution (Friederichs, et al., 2015; Matsumoto & Takenaka, 2004; Ntoumanis, 2002) From the perspective of the theoretical benefit of examining the complexity of the multidimensional nature of physical activity, consideration of the relative contribution of each type of motivation will be achieved more effectively by the cluster analysis method.

Cluster analysis is a statistical method that groups individuals into clusters based on similar characteristics. The existing studies identify the benefits of using cluster analysis (over dichotomising categories) in that it more accurately captures the multidimensional nature of physical activity motivations. This is particularly relevant when considering long term motivations. Whereas an individual may be motivated (or amotivated) in the short term by a range of immediate concerns (wanting to lose weight for an upcoming event, a health scare, or losing motivation due to traumatic life event), in the long term it is more likely that a range of motivations will be important. Understanding how this range of motivations may together
influence behaviour may yield beneficial information for targeting long term strategies for physical activity maintenance.

Research using motivational profiling among children and adults in the physical activity domain to-date has identified characteristically similar motivational groups and consistently associated similar profiles with certain physical activity outcomes. Specifically, profiles characterised like the traditional ‘self-determined profile’, have been associated with more positive physical activity outcomes such as positive affect, enjoyment, long term intentions to play sport (Ntoumanis, 2002; Vlachopoulos, et al., 2000), higher levels of physical activity and perceived physical self-worth (Wang & Biddle, 2001; Wang, et al., 2002; Wang, et al., 2003). Collectively, this limited number of studies support Vallerland and Losier’s (1999) propositions that distinct motivational profiles can be identified and associated with different physical activity outcomes.

4.1.4.4 Profile Extraction

The characteristically similar motivational groups that have been identified across different studies using SDT when examining physical activity constructs has consistently associated similar profiles with certain physical activity outcomes. Of the three studies identified which assessed aspects of physical activity using motivational profiles in adult populations, cluster solutions of either three or four clusters were found (Friederichs, et al., 2015; Guerin & Fortier, 2012; Matsumoto & Takenaka, 2004). The one study that investigated predominantly active individuals extracted four clusters: a ‘self-determined profile’ characterised by high levels of intrinsic motivation and identified regulation; a ‘moderate motivation profile’ characterised by moderate scores across all types of motivation; a ‘nonself-determined profile’ characterised by higher levels of nonself-determined
motivations; and a ‘amotivated profile’ characterised by high scores in amotivation and low scores across other motivations (Matsumoto & Takenaka, 2004). The results from this study indicated that individuals from the self-determined motivation cluster were more frequently in the maintenance stage of behaviour change than members from the other clusters. The other two studies using motivational profiles for investigating physical activity outcomes investigated participants who were primarily inactive. In these two studies, three cluster solutions were found: these were self-determined (or autonomous) cluster, a motivated (or controlled) cluster and a low motivation cluster (Friederichs, et al., 2015; Guerin & Fortier, 2012). In these studies, participants in the self-determined and motivated clusters displayed higher levels of enjoyment than those from the low motivation cluster (Guerin & Fortier, 2012), and a more active lifestyle and with beneficial scores on the physical activity related psychological measures (Friederichs, et al., 2015).

The initial research in motivational profiling shows promising results. Further research is needed to extend upon the current literature and how motivations combine to influence long-term physical activity maintenance. The only previous study to investigate the influence of motivational profiles on physical activity maintenance used an assessment based on the Stages of Change Model, which did not discriminate beyond a six month maintenance period of time. This research study extended upon previous research to investigate the influence of combinations of motivations for physical activity maintenance from adolescence to adulthood.

4.1.5 Summary

Longitudinal studies suggest participation in physical activity (or specifically sport) in childhood and adolescence positively predicts increased levels of adult physical activity
(Smith, et al., 2015; Telama, et al., 2005), and improved health outcomes (Fernandes, et al., 2015; Guldborg-Møller, et al., 2015; Ried-Larsen, et al., 2015).

To-date, the body of research examining lifelong physical activity levels is promising, but scant, and the research fails to consider the psychological underpinnings of physical activity maintenance over time. The review that follows discusses factors influencing childhood physical activity, and the opportunities for physical activity that have been examined in the past. This research has largely focussed on PE within the schooling system. Evidence will be reviewed which discusses the efficacy of PE interventions, and the barriers of lifelong physical activity. The outcome of this review will highlight the shortcomings of past research in effectively examining the relationship between childhood and adult levels of activity and the absence of research considering individual psychological factors, including the possible motivations underlying the choices for lifelong activity.

In Section 4.1.4, Self-Determination Theory (SDT) was described as a dynamic theory of human motivation which provides a theoretical framework for understanding the psychological foundations on which motivations form. It has been used in a great breadth of psychological research examining motivations across diverse areas, including physical activity. SDT postulates that all behavioural motivation is either extrinsically motivated, intrinsically motivated or amotivated. These descriptors identify the degree to which external values and goals have been internalised, and therefore the degree to which they are self-determined (or autonomous) (Ryan & Deci, 2000). The utility of Self-Determination Theory was described in Chapter One. This description will be expanded up on the review that follows, to further explain the sub-theories within this meta-theory.

From this expanded framework, the discussion will extend from Study Two (individual motives) to the consideration that motivations for physical activity are multidimensional; both
the micro (individual motives) and macro (combinations of motivations) are important from the perspective of research leading to useful policy interventions. Understanding individual motives is an important step in uncovering a psychologically healthy pathway to physical activity maintenance over time; most research in the area of physical activity has considered the relationship between physical activity motives and individual outcomes in isolation (Ntoumanis, 2002). Whilst this is useful when considering initiating and maintaining factors of physical activity for a specific time period, it ignores the likelihood that individuals are influenced by a number of diverse motivations for physical activity over longer time periods.

Previous research has suggested that given the multidimensional nature of physical activity motivation, different combinations of motives combine to yield motivational profiles and that these profiles may form the basis of different outcomes relating to physical activity participation (Vallerand & Losier, 1999). Extending upon the individual motives examined in Study Two, Study Three continues to use the theoretical underpinning of SDT and uses a wider lens to evaluate physical activity by assessing relationships between combinations of motivations; that is, ‘motivational profiles’, and physical activity participation and adherence over time.

This research aims to contribute to the body of research from a health psychology perspective by considering how motivational profiles contribute to lifelong physical activity. The findings from this research may have valuable implications for psychological approaches to reverse the current decline in physical activity participation over the lifespan.
4.1.6 Study Three Aim and Hypotheses

In section 4.1, theory and evidence was provided to support the proposition that motivations for physical activity are multidimensional; that an analysis of individual motives in isolation may be insufficient to describe adequately health behaviour change, and that consideration of singular motives ignores the likelihood that individuals are influenced by a number of diverse motivations for physical activity over longer time periods.

Study Three attempts to understand the relationships between combinations of motivations (motivational profiles) (Matsumoto & Takenaka, 2004; Ntoumanis, 2002; Vlachopoulos, et al., 2000), and physical activity outcomes of participation and lifelong maintenance. The first step of this study involved assessing the individual motives as a comparison to analyse whether individual motives or combinations of motives were more effective predictors of lifelong physical activity participation.

Based on previous research (including the results of Study Two) that identify a positive relationship between more self-determined motives for physical activity and higher levels of participation in physical activity (Vallerand, 2001), it was hypothesised:

H1: Physical activity participation motives will differentially predict physical activity amount and physical activity maintenance over time. Specifically, the continuum of motives (from amotivation to intrinsic regulation) will relate to a continuum of success with physical activity amount and maintenance (with amotivation having a negative relationship to physical activity outcomes through to intrinsic regulation having the greatest positive relationship with physical activity outcomes).

H2: Consistent with previous research in behaviour relating to physical activity (Friederichs, et al., 2015; Guerin & Fortier, 2012; Matsumoto & Takenaka, 2004), it is
expected that patterns of motives (motivational profiles) will be extracted that identify populations with similar combinations of motivations.

The initial research in motivational profiling shows promising results. Specifically, profiles characterised as ‘self-determined’, have been associated with more positive physical activity outcomes such as positive affect, enjoyment, long term intentions to play sport (Ntoumanis, 2002; Vlachopoulos, et al., 2000), adherence (using the Stages of Change classification of ‘maintenance’) (Matsumoto & Takenaka, 2004), higher levels of participation and perceived physical self-worth (Wang & Biddle, 2001; Wang, et al., 2002; Wang, et al., 2003). However, the only previous study to investigate the influence of motivational profiles on physical activity maintenance used an assessment based on the Stages of Change Model, which did not discriminate beyond a six month maintenance period of time (Matsumoto & Takenaka, 2004). The results from this study indicated that individuals from the self-determined motivation cluster were more frequently in the maintenance stage of behaviour change than members from the other clusters (Matsumoto & Takenaka, 2004).

H3: Consistent with the very limited research using motivational profiles to predict lifelong physical activity adherence, it is hypothesised that the extracted motivational profiles will differentially predict physical activity amount and physical activity maintenance over time. Specifically, the profile characterised by highest levels of self-determined motivations, the ‘self-determined profile’ will predict:

(i) higher levels of adult physical activity; and

(ii) higher levels of physical activity maintenance.
4.2 Method

4.2.1 Participants

A sample of 246 women, ranging in age from 18 to 88 ($M = 31.30$, $SD = 12.93$) participated in the study. Participants were recruited over a three-month period through the use of emailed invitations and word-of-mouth via a snowball technique through friends and family of participants and researchers. In addition, advertisements inviting participants to follow a link were placed on Facebook and around Deakin University Burwood campus. An article outlining the research was placed in the Wimmera Mail Times and aired on the Wimmera ABC radio on July 17th 2010. The information provided to interested participants included the nature of the study (type of questions, approximate duration, anonymity, etc.) and the online link to the PLS, followed by the study. Participants were invited to participate if they were aged 18 years or over and had completed their early secondary school years (seven to nine) in an Australian school.

4.2.2 Materials

Participants completed an online battery of questionnaires (totalling 49 questions) that were presented in the following order (all measures possess adequate published psychometric properties):

*Socio-demographic information.* Participants reported their age and gender.

*Exercise Motivation Scale (EMS; Li, 1999).* The EMS consists of 31 items designed to assess six dimensions (amotivation, external, introjected, identified, integrated and intrinsic regulation) along the self-determination continuum. There are four items for every subscale except for amotivation which only has three items. Scores were summed across items for each
subscale. A 6-point Likert-type response format is used ranging (1) ‘strongly disagree’ to (6) ‘strongly agree’. Empirical evidence supports the validity (Li, 1999) and reliability ($\alpha=.75-.90$) of the EMS and its subscales (Wininger, 2007).

**Physical activity engagement.** Physical activity engagement was assessed using the Active Australia Questionnaire (AAQ; Australian Institute of Health and Welfare, 2003). Participants reported the frequency and duration of physical activity in the previous week. The 8-item instrument required participants to recall the frequency and time spent (in minutes and/or hours) in walking for transportation and recreation, moderate intensity and vigorous intensity physical activity engagement. In addition to reporting current (adult) levels of activity, participants were asked to complete the same questions in the context of recalling a typical week in their early high school (year seven to nine) in order to assess adolescent levels of physical activity. Total weekly activity was calculated from the sum of all intensities of activities undertaken for both adult and adolescent activity.

Total activity time for adolescence and adulthood was a product of total time in minutes recorded for each activity (excluding gardening and house work) and double the time spent in vigorous activity to reflect its greater intensity. For the physical activity variables a maximal allowable activity time was truncated for each activity (840 min) to avoid measurement errors due to over reporting. There are two methods for calculating ‘sufficient’ activity for health: a) the accumulation of sufficient time of physical activity participation in a sufficient number of sessions over a week, or b) the accumulation of sufficient time of physical activity over a week (Australian Institute of Health and Welfare, 2003; DHAC, 1999). For the purpose of the current research, calculation of sufficient time was deemed adequate and the percentage of participants achieving sufficient physical activity time in the
current study 45% is comparable to national prevalence estimates for sufficient physical activity time 43% (ABS, 2013) (see Figure 1.1).

Participants were then grouped into ‘insufficiently active’ and ‘sufficiently active’ categories according to standardized definitions from the AAQ guide (Australian Institute of Health and Welfare, 2003) (insufficiently active = <150 minutes of physical activity per week irrespective of number of sessions reported; sufficiently active = >150 minutes of physical activity per week accumulated in 5 or more sessions). Reliability studies have found the questionnaire items to have excellent reliability ($\alpha$=0.71-0.86) and acceptable test-retest reliability and validity (Brown, Bauman, Timperio, Salmon, & Trost, 2002). No previous studies were identified in which recalling physical activity from the distant past had used the AAQ. Several studies however show acceptable reliabilities when comparing baseline physical activity levels with distant recalls of early life physical activity levels (Blair et al., 1991; Falkner, McCann, & Trevisan, 2001). Physical activity maintenance was calculated by subtracting physical activity time in adulthood with physical activity time in adolescence.

### 4.2.3 Procedure

Individuals interested in participating in the study were invited to read the online PLS. This statement introduced the principal investigator, and informed participants of the nature of the questionnaire, its general content (including example items from the scales) and the approximate time commitment (25 minutes). After reading the PLS, participants indicated their consent to participate by clicking on the ‘I AGREE’ button online at which point they were directed to the online questionnaires.
4.3 Results

4.3.1 Data Screening and Testing Assumptions

All variables were inspected using SPSS FREQUENCIES, SPSS RELIABILITY ANALYSIS and SPSS REGRESSION to ensure accuracy of data entry, identify any missing values, assess internal consistency, and to ensure the assumptions of multivariate analysis were met. Missing values were found to be randomly distributed across cases and variables, with less than 5% missing values in each variable. Cases with missing values were retained, and missing values were replaced with computed variable means. Physical activity variables were an exception. All missing data in these variables was replaced with zero, in accordance with AAQ guidelines (Australian Institute of Health and Welfare, 2003). Variables were computed from the mean of the internally consistent items (with item-total correlations greater than .20). All variables showed adequate internal consistency, with Cronbach’s α greater than .68 (the relevant statistics for each variable are provided in the Materials sub-section of the Method). Variables were assessed for normality, linearity, univariate and multivariate outliers. Univariate outliers (values further than three standard deviations from the mean) were replaced with values corresponding to three standard deviations above or below the mean. Analysis of skew identified the Amotivation variable to be slightly skewed (k=8.6), therefore a log transformation was performed for the regression and correlation analysis, physical activity time in adulthood and physical activity maintenance cases identified as ‘outliers’ were not removed, as they were recognised as being representative of the natural variance in physical activity levels seen in the general population. Evaluated skew for physical activity time in adulthood (k=14.1) reveals a high level of skew, therefore a reciprocal transformation was applied to this variable in subsequent regression, correlation and MANOVA analyses.
Post-transformation, the data met the assumptions of linearity and homoscedasticity of residuals. To ensure that multicollinearity and singularity would not undermine subsequent regression analyses, eigenvalues were inspected. Multicollinearity was assessed using a two-step procedure advocated by Hair, Anderson, Tatham and Black (1998). In the first step, the condition indices of the variables were screened for values approaching 30. As no condition index exceeded the threshold of 30, there was no need to proceed to the second step. Furthermore, tolerance values and VIF statistics also indicated that there was no evidence of multicollinearity in the regression results.

4.3.2 Testing Hypotheses Relevant to Aim One

4.3.2.1 Hypothesis one

It was hypothesised that physical activity participation motives will differentially predict physical activity amount and maintenance over time. Specifically, the continuum of motives (from amotivation to intrinsic regulation) will relate to a continuum of success with physical activity amount and maintenance (with amotivation having a negative relationship to physical activity outcomes through to intrinsic regulation having the greatest positive relationship with physical activity outcomes).

The individual relationships between physical activity motives and physical activity outcomes were examined. It is expected that the more self-determined motives will positively correlate, i) with each other; and ii) with greater levels of physical activity amount in adulthood and maintenance.

Correlations were examined between age, motivations, physical activity time in adulthood and physical activity maintenance, as shown in Table 4.1.
Table 4.1

*Correlations between age, motivation, weekly activity participation (adolescence and adulthood) and activity maintenance*

Note: *p<.05, **p< .01.

<table>
<thead>
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<td>1.Age</td>
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<td>-.01</td>
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<td>-.39**</td>
<td>-.25**</td>
<td>-.00</td>
<td>-.14*</td>
<td>-.12</td>
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<td>3.External regulation</td>
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<td>-.09</td>
<td>-.08</td>
<td>.13*</td>
<td>-.04</td>
<td>-.17**</td>
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<td>4.Introjected Regulation</td>
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<td>6.Integrated Regulation</td>
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<td>.17**</td>
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<td>7. Intrinsic regulation</td>
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<td>9. Physical activity time (min) adulthood</td>
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<td>10.physical activity maintenance time (min)</td>
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<td>(M)</td>
<td>30.24</td>
<td>1.68</td>
<td>2.52</td>
<td>3.93</td>
<td>5.08</td>
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<tr>
<td>(SD)</td>
<td>12.78</td>
<td>.79</td>
<td>1.05</td>
<td>.95</td>
<td>.67</td>
<td>.91</td>
<td>.82</td>
<td>414.48</td>
<td>360.48</td>
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Table 4.1 shows that intercorrelations amongst the motives (BREQ-2 subscales) ranged from weak to strong and exhibited a graded pattern of relationships whereby adjacent motivational constructs (e.g. identified and intrinsic regulations) were more positively associated with one another than distal constructs (e.g. amotivation and intrinsic regulation). This is consistent with past research and theory (Matsumoto & Takenaka, 2004; Ryan & Deci, 2007). Table 4.1 also shows that physical activity outcomes (physical activity in adolescence,
adulthood and physical activity maintenance over time) were positively associated with autonomous (identified and intrinsic) regulations and negatively associated with controlling (external and introjected) regulations or amotivation with the one exception of external regulation having a weak, positive association with physical activity time in adolescence. Overall, the correlations between the motives and physical activity outcomes are few, small and weak.

Hierarchical multiple regression analyses were conducted to test the efficacy of the motives in predicting physical activity time in adulthood and physical activity maintenance. The effects of age were controlled for by including this variable in step one of the regression. After controlling for age, $R^2=.06, F(1,240)=15.6, p<.00$, the SDT motives predict an additional small but significant amount of variance, $R^2 change=.05, F(6,240)=4.3, p<.00$. Within these motives, only Intrinsic Regulation has a significant interaction, as shown in Table 4.2. When physical activity maintenance was the dependent variable, no significant relationship is found. This suggests either that motivations are of limited importance in relation to the physical activity variables or that, as predicted, motivational profiles (i.e., patterns of motivation) rather than motivation types per se, constitute the factor of primary significance. The latter possibility was investigated by exploring the relationship between the physical activity outcomes and motivational profiles. These profiles were extracted using cluster analysis.
Table 4.2

*Hierarchical Regression of physical activity in Adulthood Regressed on Age (Step 1) and Behavioural Regulation Subtypes (Step 2)*

<table>
<thead>
<tr>
<th></th>
<th>IV</th>
<th>$R^2$</th>
<th>Adj. $R^2$</th>
<th>$\Delta R^2$</th>
<th>B</th>
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<td>.06**</td>
<td>-7.02</td>
<td>1.78</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.25**</td>
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<td></td>
<td></td>
<td></td>
<td>3.95**</td>
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<tr>
<td>Step 2</td>
<td>Age</td>
<td>-7.39</td>
<td>1.77</td>
<td>-.26</td>
<td>-4.17</td>
<td>-.25**</td>
<td>.07</td>
<td></td>
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<td></td>
<td>Amotivation</td>
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<td></td>
<td>External</td>
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<td>-.14</td>
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<td>.00</td>
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<td>Introjected</td>
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<td>.05*</td>
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<td>.01</td>
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<td>-.56</td>
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<td></td>
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<td>.16</td>
<td>.00</td>
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<tr>
<td></td>
<td>Intrinsic</td>
<td>90.71</td>
<td>39.12</td>
<td>.21*</td>
<td>2.32*</td>
<td>.20*</td>
<td>.02</td>
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</table>

*Note:* *p<.05, **p<.01.*

4.3.2.2 Hypothesis two

SPSS k-means cluster analysis with 10 iterations was conducted on the physical activity motives to extract motivational ‘profiles’. These profiles reflected common patterns of motivations across all participants. Cluster model solutions from 2 to 15 clusters were compared on the basis of each model's Silhouette coefficient of cohesion and separation. The
largest average silhouette width (indicating the optimal cluster solution: (Kaufman & Rousseeuw, 1990) was identified in the three and four model clusters. The four cluster model was judged to be the most parsimonious, having relatively even cluster sizes (the exception being cluster four) and the meaningfulness of the clusters extracted (see below). Furthermore, all six motives were significant and equally relevant in differentiating between the four clusters, as evidenced by their similar error variances. The four-cluster solution was also appealing due to its correspondence with previous research (Matsumoto & Takenaka, 2004).

The four-cluster solution is plotted in Figure 4.2. Inspection of these profiles revealed the following:

1. ‘self-determined profile’ \( (n=82, 32\%) \) that is characterised by high levels of self-determined types of motivation;
2. ‘moderate motivation profile’ \( (n=77, 31\%) \) that is characterised by moderate scores on all the SDT motivations;
3. ‘nonself-determined profile’ \( (n=57, 23\%) \) that is characterised by higher levels of nonself-determined motives relative to self-determined motivations;
4. ‘amotivation profile’ \( (n=36, 14\%) \) that is characterised by high levels of amotivation relative to other types of motivation.

These profiles are consistent with past research (Matsumoto & Takenaka, 2004).
4.3.2.3 Hypothesis three

To explore the relationship between the physical activity outcomes as a function of motivational profile, a MANOVA was conducted. A significant multivariate effect is present for both physical activity in adulthood, $F(3, 248)=4.3, p<.01$ and physical activity maintenance, $F(3, 248)=3.9, p<.05$, indicating these outcomes can be differentiated based on profile membership. Each has a small partial $\eta^2 = .02$. This provides initial support for the hypotheses that the profiles can be associated with different physical activity outcomes. To further explore the research hypotheses, specifically that the most positive physical activity outcomes would be associated with the ‘self-determined profile’, Tukey’s post hoc analyses were conducted. Post hoc multiple comparisons show significant differences for physical activity time in adulthood, $p<.02$ and physical activity maintenance $p<.04$, between the ‘moderate motivation profile’ and the ‘nonself-determined profile’ and similarly significant

![Motivational profiles for four cluster solution](image-url)
differences for physical activity time in adulthood, \( p < .02 \) and physical activity maintenance \( p < .05 \), between the ‘moderate motivation profile’ and the ‘amotivated profile’. With reference to Figure 4.3 it is evident that more positive physical activity outcomes are associated with the ‘moderate motivation profile’ compared to the ‘nonself-determined profile’.

![Figure 4.3](image)

**Figure 4.3.** Weekly adult physical activity (minutes) and physical activity maintenance (minutes) by motivational profile.

These results suggest that i) meaningful and separable motivation profiles can be identified and extracted, ii) these profiles are comparable to previous research involving physical activity motives (Matsumoto & Takenaka, 2004), iii) these profiles are differentially associated with certain behavioural outcomes in the physical activity domain and iv) self-determined motivations are important in relation to physical activity maintenance, as reflected by the higher levels of these motivations when comparing the ‘moderate motivation profile’ to the ‘nonself-determined profile’ and ‘amotivated profile’. Contrary to the hypotheses, the profile associated with the greater levels of adult physical activity and greater levels of physical
activity maintenance from adolescent to adulthood was not the ‘self-determined profile’ but rather the ‘moderate motivation profile’.

4.4 Discussion of Study Three Results

4.4.1 Overview

Study Three was conducted to investigate the influence of motivation profiles on i) adult physical activity levels and ii) patterns of physical activity maintenance from early adolescence to adulthood. Previous research in the physical activity domain using motivation profiling has associated profiles dominated by self-determined types of motives with more positive physical activity outcomes, including physical activity participation and preliminary findings of activity maintenance (Matsumoto & Takenaka, 2004; Wang & Biddle, 2001). Based on these previous findings, it was hypothesised that characteristically similar profiles would be extracted in the current study, and that the profile dominated by self-determined motives would be the most potent predictor of lifelong physical activity levels.

4.4.2 Physical activity participation motives

The first step in investigating the efficacy of motivational profiles in providing a more comprehensive understanding of physical activity maintenance involved assessing the ability of individual participation motives to predict physical activity amount in adulthood and physical activity maintenance over time. This then yields a comparison to the motivational profiles to assess whether individual motives or combinations of motives are more effective predictors. The current study predicted the continuum of motives (from amotivation to intrinsic regulation) would relate to a continuum of success with physical activity amount and maintenance (with amotivation having a negative relationship to physical activity outcomes
through to intrinsic regulation having the greatest positive relationship with physical activity outcomes), in line with previous research (e.g.: Chatzisarantis, et al., 2003; Matsumoto & Takenaka, 2004; Ryan & Deci, 2007; Vallerand, 2001). The correlations between physical activity outcomes (physical activity in adolescence, adulthood and physical activity maintenance over time) were positively associated with autonomous (identified and intrinsic) regulations and negatively associated with controlling (external and introjected) regulations or amotivation, with the one exception of external regulation having a weak, positive association with physical activity time in adolescence. Overall, the correlations between the motives and physical activity outcomes were found to be few, small and weak.

Hierarchical multiple regression analyses found, the SDT motives predict a small but significant amount of variance in relationship to amount of physical activity in adulthood. Within these motives, only Intrinsic Regulation had a significant interaction. No significant relationship was found between the SDT motives and lifelong physical activity maintenance.

This suggests either that motivations are of limited importance in relation to the physical activity variables or that, as predicted, motivational profiles (i.e., patterns of motivation) rather than motivation types per se, constitute the factor of primary significance. The latter possibility was investigated by exploring the relationship between the physical activity outcomes and motivational profiles.

4.4.3 Extraction of motivational profiles

Four clusters of motivational profiles were extracted with participants demonstrating patterns of motives consistent with previous research in behaviour relating to physical activity (Friederichs, et al., 2015; Guerin & Fortier, 2012; Matsumoto & Takenaka, 2004). This supports the theoretical proposition that motivations underpinning physical activity
participation are multidimensional. Further, it supports the aim of Study Three in examining whether combinations of physical activity motivations (motivational profiles) form the basis of different outcomes relating to physical activity participation, and will prove useful in identifying the motivational characteristics predictive of long term activity maintenance.

4.4.4 Motivational profiles differentially predict physical activity amount and physical activity maintenance over time

The existing body of research in motivational profiling associates profiles characterised as ‘self-determined’ with more positive physical activity outcomes such as positive affect, enjoyment, long term intentions to play sport (Ntoumanis, 2002; Vlachopoulos, et al., 2000), higher levels of participation and perceived physical self-worth (Wang & Biddle, 2001; Wang, et al., 2002; Wang, et al., 2003). However, the only previous study to investigate the influence of motivational profiles on physical activity maintenance used an assessment based on the Stages of Change Model, which did not discriminate beyond a six month maintenance period of time (Matsumoto & Takenaka, 2004). The results from this previous study indicated that individuals from the self-determined motivation cluster were more frequently in the maintenance stage of behaviour change than members from the other clusters (Matsumoto & Takenaka, 2004).

In contrast, Study Three examined lifelong physical activity, an entirely new research subset, and found participants characterised by the ‘moderate profile’ to be associated with more positive adult physical activity levels and patterns of physical activity maintenance, compared to participants characterised by the ‘nonself-determined profile’. Specifically, the ‘moderate profile’ was associated with higher levels of physical activity time in adulthood and an increase in physical activity time from adolescence to adulthood. These results still however
support the importance of self-determined motivations, as reflected by the higher levels of these motives in the ‘moderate motivation profile’. They also further suggest that the most positive outcomes relating to lifelong physical activity are associated with not only self-determined motivations but also nonself-determined motives, specifically a balanced array of both these different types of motives.

Although the results do not coincide with past research associating the traditional ‘self-determined profile’ with the most positive physical activity outcomes, this may in part be a reflection of the different research focus on lifelong physical activity motivations. The results suggest that the most optimal motivations for lifelong physical activity may reflect a balanced array of physical activity motivations.

From a practical perspective these results imply that a balance of motivations may play an important role in lifelong physical activity. This has implications for interventions attempting to promote lifelong physical activity, suggesting that fostering a balanced array of motives may be most applicable for promoting lifelong physical activity. The intuitive logic of this finding can be matched to previous research and the theoretical foundations of SDT through the consideration of specific examples, as follows. Previous research (including Study Two, and Hypothesis One of Study Three) have found physical activity participation levels are positively related to the continuum of SDT motives (from amotivation through to intrinsic motivation). Intrinsic motives indicate that an individual is participating for the enjoyment and intrinsic pleasure they experience from participation. At any given moment in time, a participant who is assessed as participating in physical activity for intrinsic motives may be doing so for reasons including the feelings of strength and optimal wellbeing they experience and associate with the activity; the enjoyable social element of their activity; the ongoing boost to their self-esteem they experience at being good at their chosen activity – or a range of other
positive feelings that relate to the satisfaction of the three universal psychological needs identified in SDT: competence, autonomy and relatedness (Ryan & Deci, 2000). However, if they experience a significant change to their personal circumstances (such as a severe injury or illness; a substantial change in parenting or work responsibilities; or a psychological trauma) their intrinsic motivation at that moment may diminish and if they have no other element of behavioural regulation within their motivational profile, their physical activity levels may not be maintained. Conversely, if they are within the ‘moderate’ profile, and have a balance of other types of behavioural regulation in their repertoire, then these may be activated to maintain their activity levels. For example, if their intrinsic motivation is reduced, they may still be motivated by extrinsic motives (e.g. “my doctor told me to increase my activity” or “my workplace requires me to participate in regular physical activity”) and thereby maintain higher levels of lifelong physical activity; they are differently motivated at different life stages.

4.4.5 Conclusions

In summary, the results of the present Study Three suggest that the optimal motivations for lifelong physical activity may reflect a balance of motives, rather than just a focus on the self-determined (e.g., intrinsic) motivations. As there is no previous research pertaining to lifelong physical activity motivations, the current research can only speculate when attempting to explain why the moderate motivational profile was associated with the most positive physical activity outcome relating to lifelong physical activity.
5. General Discussion

5.1 Overview

The primary goal of this research was to provide a comprehensive, up-to-date understanding of motivations underlying physical activity participation and maintenance in women. The focus on physical activity arose from its complex dual role as a significant contributor to both physical and psychological health. The steadily declining rates of physical activity in the Western world have contributed to a global epidemic of obesity (Tsai, et al., 2014) and a range of associated chronic health conditions, with physical inactivity being the fourth leading cause of death worldwide (Kohl, et al., 2012), and the problem is more significant in women than in men (WHO, 2010). This issue is compounded by the addition of the psychological dimensions relating to physical activity. Paradoxically, while women are experiencing physical health issues relating to weight gain, they are experiencing psychological health issues relating to thinness and weight loss. Pressures on women to conform to narrow, unrealistic, and increasingly unattainable ideals of thinness promoted by the media, peers, and family members (Thompson, et al., 1999), are thought to contribute to a preoccupation with weight, food, the subjective overestimation of one’s own weight (Bruch, 1962), the development of negative body image, and the adoption of unhealthy weight-loss strategies and disordered eating symptomatology (e.g. Cash & Brown, 1987; van den Berg, et al., 2002). However, the focus of research relating to both public health and body image/disordered eating has been on thinness/weight loss rather than other diverse areas such as body function or shape. In more recent years, the undocumented changes that have been anecdotally occurring in female body image preferences warrant further empirical attention both as an end in and of itself, and in their impacts on physical activity participation and adherence over
time, and whether these choices may have more positive psychological foundations than the focus on thinness.

The current literature has not kept pace with the recent explosion in physical activity methods that women are anecdotally participating in (e.g. CrossFit, PowerYoga, High Intensity Interval Training), or why this increase in diversity has occurred. In order to understand the relevance of this change, the necessity of constructing a new measure and a typology to categorise these methods was evident. This typology was required to facilitate further research to understand the motivations underpinning the contemporary activity choices of Australian women, and how these choices relate to outcomes impacting on physical health (participation in physical activity over time) and psychological health (including eating disorder risk, stress, anxiety, depression and the impact of gender role differences).

From the understanding garnered from examination of relationships between singular motives, an alternative perspective of understanding was extracted from examining combinations of motivations. Previous research using the SDT framework, has suggested that given the multidimensional nature of physical activity motivation, different combinations of motives combine to yield motivational profiles and that these profiles may form the basis of different outcomes relating to physical activity participation. In the context of the current studies, assessing how different combinations of motivations may differentially predict physical activity adherence over time is of particular interest.

This thesis reports the results of three studies. The first study was preliminary work required to address the absence of assessment tools in the literature that measure and usefully categorise the full breadth of activities currently being undertaken by Australian women in the general population, and the outcomes of physical activity participation. Out-dated measures of physical activity exist, but a cultural shift has occurred in what women are doing which has
not been included in existing measures (evidenced by the examples of the growing popularity of CrossFit, BodyPump, HIIT and “boot camp” styled group fitness classes). Study One was conducted with the aim of developing a contemporary and comprehensive typology of physical activities engaged in by women. It was intended that this typology would include both ‘typical’ activities (such as aerobic exercise) associated with the pursuit of the thin feminine ideal, (for which there are existing measures) as well as ‘atypical’ activities associated with altering physical body shape and functionality in other ways and for other reasons (for which there is no comprehensive measure that has been used for women). Study One required not only a survey to identify the range of activities, but also to develop a classification system in order to operationalise the activities into meaningful categories for the purpose of further research.

According to SDT, self-determined motivation is built on the foundation of the satisfaction of three universal psychological needs: competence, autonomy and relatedness (Ryan & Deci, 2000). Controlling or amotivated behaviour arises when these needs are not met. According to SDT, an individual’s behaviour will be differently motivated depending upon their beliefs regarding the outcome of a particular action. Therefore for the purposes of research, operationalising physical activity behaviours is a necessary first step to explain behaviour. In the context of physical activity participation, this assumes that an individual has outcome-specific expectations regarding a characteristic of a physical activity choice. Therefore, in addition to the typology of physical activity methods and (and utilising the theoretical framework of SDT), a list of potential and relevant outcomes from physical activity participation was required. A systematic examination of the descriptive marketing information associated with physical activity methods was undertaken. This was strengthened by interviews with health professionals and laypeople, and a typology of physical activity methods was extracted, in addition to a measure of patterns of physical activity participation.
Study Two used the physical activity typology and measure of patterns of participation to document and quantify women’s rates of participation in each activity, their outcomes, and their motives for participation. Historically, muscularity has generally been viewed as inappropriate for women (Choi, 2000). The thin ideal has been composed of not only avoiding ‘fatness’ but avoiding muscularity (Grogan & Wainwright, 1996). Although acceptance of physical activities for women has increased, images and perceptions of athleticism and femininity continue to be quite traditional (slender with some muscle tone), with muscularity being associated with masculinity (Brace-Govan, 2004). The attainment of a muscular physique is therefore a deviation from the Western cultural norm. However, a growing body of evidence suggests that women are increasingly interested in strength training activities, partially for the aesthetic aim of achieving a more muscular shape, and for a variety of other significant reasons including feelings of empowerment, self-mastery and athletic gains of strength, power and fitness (Brace-Govan, 2004; George, 2005; Grogan, et al., 2007). These trends have received little empirical attention in the context of women because the muscle dimension of body shape and appearance and identification of the body in terms of its utility have typically been attributed to men and the pursuit of masculinity (McCreary, Saucier, & Courtenay, 2005b). The gradual shift away from gender typical activities toward increasing diversity of physical activity, including strength training, has not been well documented, nor have the reasons been well documented.

In keeping with the aim of being comprehensive and exploring typical as well as atypical physical activities, Study Two included an evaluation of motives for participating in physical activities, which included appearance but also utilitarian goals such as increased strength, muscle and body functionality, and the pursuit of personal empowerment and wellbeing. The psychological and health implications of the physical activities and motives surveyed were examined in the context of SDT. Specifically, relationships were examined
between particular motive-activity combinations and i) body image disturbances; ii) positive psychological indicators relating to body image (including quality of life and gender roles); iii) predictors of successful physical activity engagement over time.

Study Three extended this understanding to include a more comprehensive evaluation of motives by assessing relationships between combinations of motivations; that is, ‘motivational profiles’ (cf. SDT), and a woman’s choice of and adherence to physical activities. Understanding individual motives is an important step in uncovering a psychologically healthy pathway to physical activity maintenance over time, and most research in the area of physical activity has considered the relationship between physical activity motives and outcomes in isolation (Ntoumanis, 2002). Whilst this is useful when considering initiating and maintaining factors of physical activity for a specific time period, it ignores the likelihood that individuals are influenced by a number of diverse motivations for physical activity over longer time periods.

Self-Determination Theory, supported by previous research, suggests that given the multi-dimensional nature of physical activity motivation, different combinations of motives combine to yield motivational profiles and that these profiles may form the basis of different outcomes relating to physical activity participation (Vallerand & Losier, 1999). Extending upon the individual motives examined in Study Two, Study Three aimed to use the theoretical underpinning of SDT to use a wider lens to evaluate physical activity by assessing relationships between combinations of motivations; that is, ‘motivational profiles’ (Matsumoto & Takenaka, 2004; Ntoumanis, 2002; Vlachopoulos, et al., 2000), and physical activity participation and lifelong participation.

The initial research in motivational profiling shows promising results. Specifically, profiles characterised as ‘self-determined’, have been associated with more positive physical
activity outcomes such as positive affect, enjoyment, long term intentions to play sport
(Ntoumanis, 2002; Vlachopoulos, et al., 2000), adherence (using the Stages of Change
classification of ‘maintenance’) (Matsumoto & Takenaka, 2004), and higher levels of
participation and perceived physical self-worth (Wang & Biddle, 2001; Wang, et al., 2002;
Wang, et al., 2003). However, the only previous study to investigate the influence of
motivational profiles on physical activity maintenance used an assessment based on the
Stages of Change Model, which did not discriminate beyond a six month maintenance period
of time (Matsumoto & Takenaka, 2004). The results from this study indicated that individuals
from the self-determined motivation cluster were more frequently in the maintenance stage of
behaviour change than members from the other clusters (Matsumoto & Takenaka, 2004).
Consistent with the very limited research using motivational profiles to predict physical
activity maintenance, Study Three aimed to use motivational profiles to differentially predict
physical activity amount and lifelong maintenance.

Ultimately, the utility of this research is in providing a more comprehensive
understanding of females and their relationship to their bodies. By increasing the understanding
of motivators for different body ideals it may be possible to promote and encourage women to
shift away from goals of appearance, toward physical fitness and strength as a way of promoting
healthier behaviours and healthier attitudes to the body and to body change; and to achieve the
physical health benefits related to successful engagement in physical activity over time.

5.2 Diversity of physical activities undertaken by Australian women

A growing body of evidence has documented the shift in women’s participation in
physical activity. This evidence is multi-faceted, and includes increasing breadth of
participation options in competitive sports (Incledon, 2005); an explosion in the types of
available physical activity for women (e.g. CrossFit, BodyPump, HIIT, Power Yoga); and cross-sectional research suggesting (for example) that women are increasingly interested in strength training activities (Brace-Govan, 2004; George, 2005; Grogan, et al., 2007). To-date, these trends have received little empirical attention beyond qualitative studies (Brace-Govan, 2004; Gimlin, 2002; Grogan, et al., 2007) of specific subsets of women (body builders, weightlifters and other athletes). One possible reason for this gap in the literature is the lack of an appropriate instrument capable of measuring the breadth of physical activities being undertaken by Australian women today. Study One addressed this shortcoming and developed a contemporary, comprehensive typology of physical activity methods using qualitative content analysis to extract fifteen categories of physical activity methods. This was found to satisfactorily represent physical activity participation with sufficient breadth to capture the diversity of participation methods, whilst possessing a usable number of categories for research purposes. The development of the comprehensive contemporary typology of physical activity methods confirmed the preliminary past research, and anecdotal evidence suggesting Australian women are participating in an increased diversity of physical activities, beyond the typical activities associated with weight control and the slim ideal. Study Two utilised this typology to document and quantify relative participation rates in these activities. Gender atypical activities for women were strongly endorsed, including weights (47.9%) and weight-based group exercise (32.7%). This significant change warrants further empirical attention to understand the ramifications of this change and to assess whether this significant increased diversity in activity choice is reflective of a change in activity motives, as would be suggested by theoretical rationale of SDT, particularly given the context of an overall decline in physical activity participation (ABS, 2013). Given the known overall decreasing rates of physical activity at a population level (ABS, 2013), and the identified increased diversity of gender atypical physical activity participation identified in this study suggests, the logical
sequelae is that participation in gender a-typical physical activities is, to some extent (and potentially only within a subset of the female population) replacing participation in traditional feminine physical activities.

Utilising the typology developed in Study One in further empirical testing across a range of different research settings and within different sub-populations would be helpful for validating the instrument. The typology could also be used outside of research settings, for example in health assessments (which are commonly undertaken prior to allied health visits, or prior to undertaking a new exercise program at a fitness centre) in order to broadly assess physical activity participation type, instead of simply frequency or duration.

Although participants of this research resided in Australia, the outcomes of these studies can likely be generalised to other Western countries with similar socio-economic and cultural characteristics (to the extent that the results can be generalised, as discussed in the limitations section below). Globalisation results in rapid transmission of new trends. Evidence of this within the physical activity domain, includes the expansion of commercial programs including BodyPump which is offered in over 80 countries (Les Mills, 2015), Zumba Fitness which is offered in over 180 countries (Zumba Fitness, 2015), and CrossFit which expanded from 13 individual locations in 2005 to over 10000 locations in 2014, and the privately owned business is now valued at over $US40 million (Fainaru-Wada, 2014). In the same way that the beauty industry have discovered the profit potential of expanding their marketing to males, with a reported 70% increase in beauty and personal care launches specifically targeted at men in the six years to 2012 (CGI Magazine, 2013), perhaps the typically male areas within the fitness industry have discovered that reshaping their sociocultural messaging to include woman will double their potential market, and considerably expand their profit base.
Improvements to the psychological health of women may be an unintentional positive consequence of this commercial venture.

The results from this research do not allow for consideration of whether the increased diversity in physical activity identified in women is due to a convergence of gendered activity (women expanding from only gender typical activities into activities also being undertaken by males), or whether the diversity identified in women includes a new sub-set of physical activities that i) were not previously being undertaken by women, ii) and not currently being undertaken by men. Future research could investigate this question by including men in the sample. The increased diversity in women’s physical activity participation is an interesting independent finding. Of greater interest, is the extent to which this diversity reflects a change in women’s participation motives, as discussed in the following section.

5.3 Diversity of motives for participating in physical activity

Historically, women have identified their motives for participation in physical activities as primarily relating to maintenance of the Western feminine ideal. Within the Western world, hegemonic femininity is constructed within a white, heterosexual, and class-based framework, and therefore, accentuates the importance of appearance with the reference point of an ideal feminine body as thin and toned (Krane, et al., 2004). However, a growing body of evidence suggests that women are increasingly interested in strength training activities, partially for the aesthetic aim of achieving a more muscular shape, and for a variety of other significant reasons including feelings of empowerment, self-mastery and athletic gains of strength, power and fitness (Brace-Govan, 2004; George, 2005; Grogan, et al., 2007). The results from Study Two supported this evidence, finding the diversity of physical activities identified in Study One reflected diverse motives for participating in physical
activity. Whilst Weight and Appearance were highly endorsed as important motives, other diverse motives were ranked as more important, including (in order of importance) Positive Health; Strength and Endurance; and Revitalisation. Stress Management, Enjoyment, Ill-Health Avoidance, and Nimbleness were also highly endorsed. When condensed to three principle components, the Health/Fitness Motive was most strongly endorsed, followed closely by Appearance/Weight Motive and lastly Social Engagement (see Table 3.3).

This research also investigated the relationship between motives and physical activity choice. Based on SDT, which proposes that behaviour is underpinned by motives, it was hypothesised that women’s choice of physical activity would be reflective of their primary motives for physical activity, specifically, a traditional focus on weight loss and appearance would be associated with greater involvement in activities thought to control weight (e.g. cardiovascular based group fitness such as walking/hiking, running/jogging). This association was found with a limited subset of activities. Participants who identified Health/Fitness motives of primary importance were more likely to be participating in yoga and weight training, whereas those who identified Social Engagement motives as more important were more likely to be participating in sport (both social and competitive). Interestingly, a significant relationship was not found between any physical activities and Appearance/Weight motives. This is an interesting preliminary finding that warrants further empirical investigation. Given the raft of negative psychological indicators associated with Appearance/Weight motives, and to a much lesser extent, Social Engagement Motives (discussed in Chapter Three and summarised below), this preliminary finding associating Health/Fitness Motives to yoga and weight training suggests the diversification of physical activities being undertaken by women, and the increased diversity of motives may be shaping psychological consequences in a healthier direction. As discussed in Chapter One, the
confirmation of the increased diversity in activity choices and motives is directly relevant to psychological and physical health implications.

5.4 Psychological health implications

In alignment with previous research associating intrinsically motivated behaviour to psychologically adaptive consequences and extrinsically motivated behaviour to more psychologically maladaptive consequences (e.g., Buckworth, et al., 2007; Ryan & Deci, 2000; Vallerand, 2001), the present study found Appearance/Weight motives to be associated with Eating Disorder Risk, Stress, Anxiety and Depression, Drive for Muscularity and Drive for Thinness (as would be expected, given they are both measures of appearance-specific preferences). It was also negatively associated with Quality of Life. These results very clearly indicate that choosing to participate in physical activity from the driving motivator of Appearance/Weight is hazardous to an individual’s psychological health. From a clinical and health psychology perspective the increased risk of engaging in disordered eating, unhealthy body change activities (relating to both thinness and muscularity) and increased likelihood of stress, anxiety, depression and decreased quality of life are highly concerning.

Conversely, Health/Fitness motives were positively associated with Quality of Life. Unexpectedly, Social Engagement motives, were associations only with Drive for Muscularity and Drive for Thinness (both appearance based measures). The three composite variables comprising Social Engagement are Affiliation, Challenge and Competition. Affiliation and Challenge have been consistently characterised as intrinsically motivated (Frederick & Ryan, 1993; Markland, Inglede, Hardy, & Grant, 1992) however perhaps the variable of Competition is a good example of the misleading perception that behavioural motivation is an intrinsic-extrinsic dichotomy (Markland & Inglede, 1997) as it comprises
the contrasting elements such as ‘liking to win’ and ‘having fun’. Motivation may be better represented on a continuum ranging from completely non-self determined to completely self-determined. This mix of motivations within the one composite of Social Engagement may explain why the results were not as clear cut.

Given the highly concerning psychological implications of Weight/Appearance motives (and of Social Engagement motives, to a much lesser extent) in contrast to the more positive association of Health/Fitness motives, the current thesis was interested in whether engagement in physical activity over time (both generally, and specific to different activity types) leads to a change in motives for physical activity participation. If participation in different types of activity leads to a change in motives (toward or away from intrinsic motives), this would be a useful target for future interventions. Over time, participation in physical activity led to an increase only in the importance of both Health/Fitness and Weight/Appearance motives relative to Social Engagement motives. In regard to specific activity types, only participation in Sport (competitive) was found to lead to a change in the importance of motives over time, with both Health/Fitness motives and Appearance/Weight motives increasing in their importance over time. This lack of clear results in regard to changing motives over time may have been because i) there is little change in motives over time; ii) the retrospective study design did not provide a sufficient ‘anchoring’ point in the past to provide a reference point for an accurate reflection of motives; and iii) individual motives are insufficient when considering the multi-dimensional nature of physical activity motivation, especially when looking beyond a single time reference point.

The final psychological variable investigated in this research was gender roles. In support of previous research, it was found that the Androgynous women, categorised as individuals who score above the median average on both masculinity and femininity (Bem,
1974), consistently had a stronger associations to most positive physical and psychological health variables, including total weekly physical activity, intrinsic motives for activity, and higher levels of exercise identity and exercise self-efficacy. Examination of the graphical representations of Tukey’s post hoc analyses within this research would suggest that the additive androgyny hypothesis (Taylor & Hall, 1982) was supported, whereby androgynous women were not limited by suppressing behaviours that violated the feminine gender role standard, and instead benefitted from the behavioural flexibility available in their responses. This is a significant target for future research and potential clinical interventions. Although there are some conflicting results, previous research finds androgyny is associated with engaging in physical activity more frequently (Shifren, et al., 2003), lower levels of eating disorder symptomatology (Hepp, et al., 2005), resilience (Chun Bun & McBride-Chang, 2007; Werner, 1995), optimal mental health (Lefkowitz & Zeldow, 2006), high self-esteem and adaptive coping strategies (Huang, et al., 2012), lower depression and adaptive coping skills (Cheng, 2005), leadership effectiveness (Kark, 2012), and reduced interpersonal stress (Hirokawa, et al., 2001). Research on gender conformity, however, has found investment in gender ideals has been linked to both positive and negative consequences for the self, (Sanchez & Crocker, 2005) with the experience of societal pressure to conform to gender ideals negatively predicting self-esteem (Good & Sanchez, 2010; Wood, et al., 1997).

When considered within the context of the other research findings from this thesis, that women are engaging in increasingly diverse physical activity methods and their motives for doing so are increasing in diversity and that this increased diversity is related primarily to positive psychological and physical health consequences, the positive psychological and physical outcomes of androgyny are further strengthening the case for the positive ramifications of the shift that is occurring towards increased behavioural diversity in women.
As with the variable of androgyny, the increased diversity also has positive implications for physical activity.

5.5 Physical health implications

In alignment with previous research (e.g. Ntoumanis, 2002; Ryan & Deci, 2007; Sebire, et al., 2011; Vallerand, 2001; Vansteenkiste, et al., 2011; Vallerand, 2001; Vansteenkiste, et al., 2005), Study Two identified that the more intrinsically oriented individual motives of Health/Fitness and Social Engagement\(^2\) were associated with higher levels of weekly physical activity, and more successful maintenance over time, whereas the more extrinsically oriented motives of Appearance/Weight demonstrated no significant relationship to physical activity engagement or maintenance. Similarly in Study Three, analyses of individual motivations found intrinsically oriented motives were more predictive of engagement in physical activity, although no relationship was found to lifelong participation. Although these associations were found between individual motives and physical activity outcomes in both studies within this research, the relationships were weak, and as mentioned, no relationship was found to lifelong maintenance of activity. Further investigation was undertaken to assess whether assessing the multidimensional nature of physical activity through combinations of motivations, ‘motivational profiles’ (Matsumoto & Takenaka, 2004; Ntoumanis, 2002; Vlachopoulos, et al., 2000), could more effectively predict long-term physical activity maintenance. In addition, the more significant timeframe of adolescence to adulthood was used to as means to i) providing a stronger anchoring reference point for participants when considering their retrospective participation motives and, ii) a longer trajectory which is more reflective of one

\(^2\) Although Social Engagement is generally considered to be an intrinsic motivation, see commentary in Section 5.4 for additional information.
of the primary aims of this research - to increase understanding of variables contributing to lifelong physical activity maintenance.

Consistent with previous research using motivational profiles within the SDT framework to examine physical activity outcomes (Friederichs, et al., 2015; Guerin & Fortier, 2012; Matsumoto & Takenaka, 2004), four motivational profiles were identified, which supports the theoretical proposition that motivations underpinning physical activity participation are multidimensional.

In contrast, to previous research, the current study found participants characterised by the ‘moderate profile’ to be associated with more positive adult physical activity levels and patterns of physical activity maintenance, compared to participants characterised by the ‘nonself-determined profile’. Specifically, the ‘moderate profile’ was associated with higher levels of physical activity time in adulthood and an increase in physical activity time from adolescence to adulthood. This is a new finding, that initially appears to be inconsistent with the existing body of research in motivational profiling, which largely associates profiles characterised as ‘self-determined’ with more positive physical activity outcomes such as positive affect, enjoyment, long term intentions to play sport (Ntoumanis, 2002; Vlachopoulos, et al., 2000), higher levels of participation and perceived physical self-worth (Wang & Biddle, 2001; Wang, et al., 2002; Wang, et al., 2003). However, the only previous study to investigate the influence of motivational profiles on physical activity maintenance used an assessment based on the Stages of Change Model, which did not discriminate beyond a six month maintenance period of time (Matsumoto & Takenaka, 2004). The results from this previous study indicated that individuals from the self-determined motivation cluster were more frequently in the maintenance stage of behaviour change than members from the other clusters (Matsumoto & Takenaka, 2004). However, the present thesis examined lifelong physical activity
activity, an entirely new research subset. The initial apparent inconsistency may still align with previous research when given further consideration. Firstly, the results presented in this thesis still strongly support the importance of self-determined motivations, as reflected by the higher levels of these motives in the ‘moderate motivation profile’. However, they also suggest that the most positive outcomes relating to lifelong physical activity are associated with not only self-determined motivations but also nonself-determined motives, specifically a balanced array of both these different types of motives. The intuitive logic of this finding can be matched to previous research and the theoretical foundations of SDT through the consideration of specific examples, as follows. Previous research (including Study Two, and Hypothesis One of Study Three) have found physical activity participation levels are positively related to the continuum of SDT motives (from amotivation through to intrinsic motivation). Intrinsic motives indicate that an individual is participating for the enjoyment and intrinsic pleasure they experience from participation. At any given moment in time, a participant who is assessed as participating in physical activity for intrinsic motives may be doing so for reasons including the feelings of strength and optimal wellbeing they experience and associate to the activity; the enjoyable social element of their activity; the ongoing boost to their self-esteem they experience at being good at their chosen activity - or a range of other positive feelings that relate to the satisfaction of the three universal psychological needs identified in SDT: competence, autonomy and relatedness (Ryan & Deci, 2000). However, if they experience a significant change to their personal circumstances (such as a severe injury or illness; a substantial change in parenting or work responsibilities; or a psychological trauma) their intrinsic motivation at that moment may diminish and if they have no other element of behavioural regulation within their motivational profile, their physical activity levels may not be maintained. Conversely, if they are within the ‘moderate’ profile, and have a balance of other types of behavioural regulation in their repertoire, then these may be activated to maintain their activity levels. For example, if their
intrinsic motivation is reduced, they may still be motivated by extrinsic motives (e.g. “my doctor told me to increase my activity” or “my workplace requires me to participate in regular physical activity”) and thereby maintain higher levels of lifelong physical activity; they are differently motivated at different life stages. This has implications for interventions attempting to promote lifelong physical activity, suggesting that fostering a balanced array of motives may be most applicable for promoting lifelong physical activity.

5.6 Relevance of research outcomes

The research reported in this thesis was driven by two central health issues: i) declining rate of physical activity in women leading to widespread obesity and related chronic health conditions (WHO, 2010); and ii) the significant psychological consequences experienced by women through pressures to conform to the slim ideal. The challenge presented is to identify psychologically healthy pathways to physical activity engagement and long term maintenance.

Study Two clearly demonstrated that choosing to undertake physical activity from the underlying motivation of altering appearance or weight is highly hazardous to psychological health and less likely to achieve physical health benefits as these motivations demonstrated no associations to weekly activity amount or maintenance over time. As discussed in Chapter One, this emphasises the damaging effect of the pervasive thin ideal. However, given this research has identified women are engaging in increasingly diverse physical activities and their participation is underpinned by increasingly diverse motives, this may suggest that the precursor to these motives is an increasingly diverse series of sociocultural messages and influences that are shaping women’s ideas and aspirations in regard to body image. The increasing interconnectedness of the world, or globalisation, has been exponentially accelerated in the past decade with increasing access to the internet, especially for individuals
in developed countries. This has led to rapid exposure to a vast array of cultural diversity, including an immense diversity in the representation of women. For example, female participation rates in worldwide national parliaments over the past ten years have almost doubled (Inter-Parliamentary Union and UN Women, 2015); there is a steady increase in the visibility of women’s sport in the media with a strong focus on the performance and achievements of female athletes (Patel, 2015); and the diversity of physical forms deemed to be socially attractive is increasing, with pop-star celebrities like Madonna, Gwen Stefani and Pink highlighting their strength and muscul arity. The results from this study suggest that encouraging women to look beyond the traditional limited perspective whereby feminine value is entrenched in the physical form of the thin ideal, and instead place higher value on non-appearance-based factors is likely to increase both physical and psychological health. This was further highlighted by the results within this study identifying androgynous women (those who had high feminine and masculine traits) had the most positive psychological and physical health outcomes. Encouraging women to look beyond the appearance-based thin ideal is a partially idealistic aim, as ‘beauty’ product marketing and profit generation relies heavily on creating an unachievable ideal of femininity that women will endlessly strive toward (Johnston & Taylor, 2008), however, the results of this research suggest this may be naturally transpiring. This may be due to the ease with which information is disseminated in the current day. Further research investigating the precursors to the increasing diversity in physical activity types and motives is warranted.

Another implication from this research concerns the common public health strategy of applying a ‘one size fits all’ approach to public health messages. In this particular instance, there is a danger of crossed messaging whereby eating-disordered women’s concerns with body weight could be amplified by messages around the dangers of overweight and obesity, and conversely a lack of strength in the messaging around the chronic health impacts of
physical inactivity may insufficiently motivate women who need to increase their physical activity levels. A more targeted, individualised approach is required, whereby an individual’s personal array of psychological and physical health characteristics are used to create a personalised intervention.

SDT proposes that physical activity motivations are multidimensional, and supports the contribution of multiple types of motives toward a behaviour change. Previous research has found more ‘self-determined’ profiles to be associated with successful outcomes regarding physical activity (and other domains), however the current research found the ‘moderate profile’ to have the most successful association to lifelong physical activity, a construct never previously investigated using motivational profiles (to the author’s knowledge). This does not undermine the importance of self-determined motives (as reported in previous studies), but suggests that over the lifespan it is important to maintain a balanced array of motivations. Perhaps it points toward an ‘additive model’ of motivation (c.f. additive androgyny hypothesis Taylor & Hall, 1982) whereby the foundation of more self-determined motives is powerful, but the addition of the moderate amounts of the full spectrum of other motives within a motivation profile is even more beneficial. Starting from the experiences of children in physical activity (in active play, sport and PE), this would mean creating the autonomy-supportive environments that have been suggested by the existing body of literature which focus on satisfaction of the three basic psychological needs (competence, relatedness and autonomy) and enhancing self-determined motivations (Ntoumanis, 2005; Standage, et al., 2003), but then understanding at different times across the lifespan other motives will be needed, so ensuring other motives are introduced (for example through messages including external expectations of basic physical activity requirements and recommendations from health professionals).
Finally, it must be acknowledged that the results from the research reported in this thesis were not substantial or clear-cut. This suggests that the outcomes, both physical and psychological, are not related only to specific physical activity types, specific motives, or combinations of the two, or even motivational profiles. Other factors must be relevant in determining the potency of physical activity motives. These strengths or vulnerabilities point to a more detailed evaluation at the individual level - focusing on ‘person-centered’ research rather than ‘variable-centered’ research (Kaufman & Rousseeuw, 1990). These are areas for future research, as discussed below.

5.7 Future research

Firstly, concurrent consideration of some of the additional factors outlined in Section 4.1.3 (barriers to physical activity) may contribute moderating or mediating factors that enhance the potency of the findings within this thesis. Additionally, as discussed in Section 5.4, this research has established that women are undertaking an increased diversity of physical activity types and this behaviour is underpinned by very diverse motives, but the precursor to those motives was not investigated. Possible influences were discussed, however having an empirical understanding of the sociocultural messages, or other influences of those motives would provide another potential valuable intervention target.

Study Three used a retrospective research design to investigate long-term differences in behaviour from a motivational perspective, which was very ambitious, as retrospective designs are inherently unreliable and difficult to validate. However, given the difficulties in conducting longitudinal research over the life-span, and the comparative short time-frame associated with most prospective research into physical activity change, coupled with the recommendations from health professionals that physical activity should be lifelong (hence this is the true research target), retrospective research may be a worthwhile focus for future
research. This approach is much more common research in the eating disorder field, in which area it is common to ask adults with an eating disorder about their attitudes and behaviours in adolescence (in a case-control design). Expanding the body of literature using retrospective designs within this field would start to build the evidence base and likely refine the methodology. Of course, using longitudinal designs across the lifespan would be ideal.

Likewise, given the promising initial research using motivational profiles for examining predictors of physical activity outcomes (Friederichs, et al., 2015; Guerin & Fortier, 2012; Matsumoto & Takenaka, 2004; Ntoumanis, 2002), and the unique contribution made by this study in predicting long-term physical activity, further use of motivation profiles for understanding physical activity behaviour is warranted. Whilst the utility of understanding direct and unique associations between each motivation type with other variables has been demonstrated, it ignores the likelihood that i) individuals are influenced by a number of diverse motivations for physical activity (especially when considering extended time periods); ii) consistent, identifiable patterns of motivations exist in the population; and iii) these identifiable patterns of motivations (‘motivational profiles’) have unique relationships to other variables, beyond the contribution of the individual motives within the profile, as demonstrated by this research.

Additionally, it may be useful to extend the use of motivational profiles to disordered eating research. Previous research using SDT has suggested that women who are more globally self-determined, across different life domains, have a buffer against the sociocultural pressures perpetuated by the thin ideal and are less likely to experience bulimic symptoms (Pelletier, et al., 2004). Similarly, other research has found appearance-oriented motivations to be associated with more problematic weight control behaviours (de Souza, et al., 2010) and
bulimic symptomology (Verstuyf, et al., 2012). It would be interesting to see if motivational profiles add any additional worthwhile understanding to this existing picture.
5.8 Limitations

The following limitations are detailed to ensure they are taken into consideration and improved upon in future research. Firstly, the typology developed in Study One reduced the full breadth of identified physical activity methods down to 15 categories. This is clearly a simplification of the reality of the breadth of physical activities being undertaken; the typology is only a proxy measure for what participants are doing, and the 15 categories provide a number of items that can be usefully used within qualitative research.

When examining the relationship between physical activity type and change in motives over time (Study Two), participants were asked to reflect on their ‘most important’ physical activity method (as the lack of experimental design meant some participants could be undertaking multiple types of physical activity types). The construct ‘most important’ was not adequately operationalised, and the concurrent participation in multiple types of physical activity may have confounded the results relating to these questions.

Due to the very limited research in using motivational profiles, little is known of the stability of motivational profiles over time, particularly in the domain of physical activity. Study Three measured motivations only once, and assumed stability over time. There is no previous research using motivational profiles to support or undermine this assumption, however, Study Two identified that a shift can occur in the importance allocated to different motives for behaviour, through participation in physical activity. It is unknown to what extent intrinsic and extrinsic motivations may shift, and may shift simultaneously (cf. Harter, Whitesell, & Kowalski, 1992) and whether that shift would occur to the degree that it would alter an individual’s membership within a specific motivational profile. Further exploration of motivational profile stability, ideally using a longitudinal design, would strengthen the body of research in this field.
Within the reported research, a convenience sample of participants was used, who were recruited via snowball method, with a voucher gratuity offered. This self-selection may have increased the likelihood that people who were more interested in physical activity, or receiving the voucher, were motivated to participate which diminishes the ability to generalise the results to the greater population. Also, the survey was accessible only via the internet, which limited the access for persons unable to access the internet. Additionally, only women who were already participating in physical activity were asked to participate (as motives for physical activity outcomes were of central interest), however this may have influenced the extracted motivational profiles, and therefore skewed the results. Inclusion of all women, including sedentary women, would have been more representative of the general population.

The data is cross-sectional which makes it impossible to infer the presence or direction of causal relationships. Although cross-sectional designs have their limitations, part of the research involved investigating the relationship between physical activity choice and motives, therefore participants could not be randomly allocated to different physical activity methods in order to then investigate the psychological and physical sequelae. In research investigating motives underlying behavioural choices, the naturalistic phenomenon being studied cannot be easily investigated by randomised-controlled trials, however where possible, future research should investigate longitudinal and experimental designs to better uncover the relationship between cause and effects.

Finally, these results rely on data extracted from self-report questionnaires. Questionnaires are used extensively in psychological research for two primary reasons: i) they generally provide a faster, simpler, more convenient method of large-scale data collection; and ii) they allow for measurement of constructs which are not able to be outwardly observed (Gravetter & Wallnau, 2013). Using a self-report questionnaire was useful in the present
research for both of these reasons. It allowed for large-scale data collection, and it facilitated the investigation motives underlying physical activity choices, within the framework of Self-Determination Theory. However, self-report questionnaires have several limitations. Whereas they assume accuracy and honesty (as the anonymity of self-report questionnaire is proposed to limit participants’ need to provide socially desirable or acceptable responses), they are, in fact, associated with measurement error (Ainsworth, 2009) especially when used retrospectively, as occurred in this research. When asked to recall their motives for physical activity, and their current and adolescent estimates of physical activity time, participants may have been subject to recall biases, which can lead to both over and underestimates of time (Bassett et al., 2000). This measurement error would likely be increased in recalling adolescent activity levels. Although recalling physical activity levels from the distant past has been used in previous research (e.g. Blair, et al., 1991; Falkner, et al., 2001; Malina, 1996) time periods of under ten years are much more typical. Despite these limitations, self-report measures of physical activity are generally accepted as a valid way to gauge population physical activity levels (Ainsworth, 2009; Australian Institute of Health and Welfare, 2003). Additionally, in Study Three physical activity maintenance was calculated only from the two physical activity measurement points of adolescence and adulthood. This simplistic method lacks any granularity that would be found from additional time points, or the pattern of activity measurement used in Study Two. Self-report questionnaires also assume participants can meaningfully introspect on their motivations (and other internal processes and personal characteristics) and that the style of cognitive processing invoked by the questions leads to realistic and representative responses that provide meaningful data for analysis. Ideally, a longitudinal design, with more frequent data assessment points, incorporating data independent of self-report (such as accelerometer measurements of physical activity
participation rates) would reduce the ambiguity of the results and allow for more causal inferences to be made.

5.9 Summary and Conclusion

The central aim of the three studies described and discussed in this thesis was to provide a comprehensive, up-to-date understanding of motivations underlying physical activity participation and maintenance in women, and how these relate to outcomes in physical and psychological health. The relevance of this research is in finding psychologically healthy approaches to physical activity engagement and long term maintenance in order to address the health issues i) declining rate of physical activity in women leading to widespread obesity and related chronic health conditions (WHO, 2010); and ii) the significant psychological consequences experienced by women through pressures to conform to the slim ideal.

The results of the first study confirmed the diversity of physical activities being undertaken by Australian women, and this led to the creation of a comprehensive typology of physical activity for women, and an outcomes measure on physical activity patterns of engagement. Study Two documented and quantified women’s rates of participation in the diverse range of physical activity identified in Study One, and confirmed the diversity of activities reflected diverse motives for participation, with significant endorsement of gender a-typical motives, such as Strength and Endurance. Study Two also confirmed that intrinsic motives for physical activity participation are more predictive of successful outcomes in physical activity, and that choosing to participate in physical activity from the driving motivator of Appearance/Weight is hazardous to an individual’s psychological health. Psychological androgyyny was found to be predictive of optimal physical activity outcomes
and psychological health indicators. Finally, the third study supported the utility of examining physical activity motivation from a multidimensional perspective using motivational profiles. The ‘moderate profile’ was found to be associated with more positive adult physical activity levels and lifelong physical activity maintenance. This result was taken to suggest that having a balanced array of all motivational types is the most useful buffer to maintaining lifelong activity levels.

Firstly, the diversity in women’s physical activity choices and motives has increased. The likely driver to this increased diversity is increasingly diverse sociocultural influences and messaging which is expanding the limited traditional perspective of feminine value being entrenched only in the physical form of the thin ideal, and adding other dimensions to value, such as performance in sport and employment, and other body attributes to aspire toward, including strength. Based on the male literature (discussed in Chapter One) and the results reported in this thesis, it is likely that this expansion into placing higher value on non-appearance-based factors will lead to increases in both physical and psychological health.

Secondly, as the ‘moderate profile’ was associated with the most positive lifelong physical activity levels, successful promotion of lifelong physical activity needs to consider developing strategies that consider a balanced array of motivations across the lifespan, which would likely start with a foundation of developing an autonomy-supportive environment in childhood which focuses on satisfaction of the three basic psychological needs and enhancing self-determined motivations.

More generally, the results of this thesis support the value of an additional dimension in the measurement of physical activity in women, whereby not only frequency, duration and intensity are measured, but also the type of activity. A contemporary typology now exists with which to do this. Although this typology still requires validation against biometric measures,
and other measures of physical activity types (although they have limitations, see Chapter Two for further detail) to confirm its construct validity and thus use as an instrument in future physical activity research, it is a promising innovation. An analysis of activity type is not only feasible and meaningful (with the creation of this comprehensive contemporary typology) but also has the potential to provide insight into the motivations that underpin women’s preferences for and maintenance of activity. Moreover, the present study has revealed interesting and potentially important relationships between physical activities and psychological health that are likely to be of interest to clinical psychologists working in the area of body image and disordered eating, and health psychologists working in the area of health behaviour change. Based on the potential utility of these outcomes, future researchers are encouraged to pursue research in these areas. In particular, future research is warranted into the sociocultural (or other) precursors to the diversity in physical activity motives (away from weight and appearance) for preventative application of the findings to positive body image development. Similarly, if the ‘moderate profile’ is confirmed as predictive of lifelong physical activity maintenance, this can be applied preventively to the significant public health issue of declining rates of physical activity.
References


CGI Magazine. (2013). Focus Still on Men's Care as a Growth Category for Beauty. *CGI Magazine*.


Krane, V. (2001a). We can be athletic and feminine, but do we want to? Challenges to femininity and heterosexuality in women's sport. *Quest, 53*, 115-133.


Medibank, P. (2007). The cost of physical inactivity: what is the lack of participation in physical activity costing Australia?


Prentice, D. A., & Carranza, E. (2002). What women and men should be, shouldn’t be, are allowed to be, and don’t have to be: The contents of prescriptive gender stereotypes. *Psychology of Women Quarterly, 26*, 269–281.


Appendix A: Interview Schedules

Semi-structured interview questions for physical activity participants
1. What types of physical activity have you participated in over the last 12 months?

For each activity mentioned, ask the following questions:

2. Describe the activity.
3. What did you have to do to take part in the activity?
4. Describe the physical environment where you generally participated in this activity
5. Describe your experience of the activity
6. Was there any equipment involved?
7. Were other people involved?
8. What did you find appealing about this type of physical activity?
9. What did you find unappealing about this type of physical activity?
10. What were the good things or positive aspects of this activity?
11. What were the bad things or negative aspects of this activity?
12. Is there anything else you would like to describe about your experience of this physical activity?
13. Can you think of any other activities that we haven’t discussed that you have participated in over the last 12 months?

Follow with questions 1-13 above

Semi-structured interview questions for health professionals
1. What are the common types of physical activity you hear about in your work?

For each activity mentioned, ask questions 2-8:

2. Describe the activity.
3. What do participants need to do to take part in the activity?
4. What are the positive aspects of this type of physical activity?
5. In what ways does this activity appeal to its participants?
6. What are the negative aspects of this type of physical activity?
7. What, if any, are the unappealing aspects of this physical activity for participants?
8. Is there anything else you would like to describe about this type of physical activity?
9. What are some of the less common, or unusual types of physical activity you have heard about?

Follow with questions 2-8 above
Appendix B: Questionnaire Battery Used in Study Two
My name is Helen Donovan and I am conducting a research project with Dr Alexander Mussap, Senior Lecturer in the School of Psychology at Deakin University, towards a Doctorate of Psychology. This means that I will be preparing a research thesis. I would like to invite you to participate in this research by completing the following on-line survey.

I am conducting a research project designed to explore the diversity of body image ideals in Australian women. It is expected that the results of this research project will help to reveal the motivations behind women’s dieting and exercise behaviour. This will be valuable information for psychologists who routinely treat body image problems and eating disorders in women.

If you agree to participate, you will be asked to complete the following on-line questionnaire. It is estimated to take between 30-45 minutes to complete. We are seeking information from women aged over 18 years of age (if you are not aged over 18, please do not complete the questionnaire). Your consent will be indicated by you, by electronically submitting your responses to the survey and by clicking on the ‘I Agree’ button at the conclusion of this page. The responses will be entirely anonymous.

You will be asked questions about your exercise patterns and reasons for exercising, how you relate to your body, the types of body change behaviours you may have engaged in, the way you feel generally and how you feel about yourself. Here are some examples of statements and questions to which we will ask you to respond:

- What is your marital status?
- What is your sexual orientation?
- What is your religious affiliation?
- I felt that life wasn't worthwhile
- I have the thought of trying to vomit in order to lose weight.

As this study is completely voluntary you are under no obligation to consent to participation and you may withdraw at any stage for any reason, or not answer questions which you feel are too personal or intrusive.

If any questions cause you distress, please do not continue with this study. If you are on a Deakin University campus, we encourage you to seek assistance from a qualified university counsellor available free of charge to all enrolled Deakin student in Level 2, Building B, of the Melbourne campus (03 92446300). The Eating Disorders Foundation of Victoria (www.eatingdisorders.org.au, (03) 98850318, or 1300 550 236 for non-metro callers) and LifeLine (13 11 14) are available to provide free, confidential counselling and referral for the cost of a local call. Alternatively, if you are currently receiving treatment we strongly recommend that you seek assistance from your regular clinic or agency.

To compensate you for your time and effort, we would like to offer you a $20 Myer-Coles gift card. To request this gift card, please complete the Gift Request Form at the conclusion of the survey. These details will be stored separately to the questionnaire. This way, your identity will not be associated with your anonymous responses on the questionnaire.

All aspects of the study, including results, will be strictly confidential and only the researchers will have access to information on participants. Storage of the data collected will adhere to the University regulations and kept in secure, password-protected computer at Deakin University for 6 years after which it will be destroyed. A report of the study may be submitted for publication, and individual participants will not be identifiable in such a report, as only aggregated data will be reported.

If you have any queries or would like to be informed of the aggregate research finding, please contact Dr Alexander Mussap (mussap@deakin.edu.au; phone: (03) 925 17103). Should you have any concerns about the conduct of this research project, please contact Silvia Rametta, Deakin University Executive Officer, Human Research Ethics, Deakin University, 221 Burwood Highway, Burwood VIC 3125. Tel: (03) 9251 7123 (International +61 3 9251 7123). E-mail: research-ethics@deakin.edu.au.

Thank you.
Please indicate that you have read and understood the information provided here and that you agree to participate in this study by clicking the “I agree” button below.

[I AGREE]

[I DO NOT AGREE]
The motivation and maintenance of exercise in women

*Please note that only women should complete this survey*

Please provide the following information:

<table>
<thead>
<tr>
<th>Your sex:</th>
<th>□ Male</th>
<th>□ Female (only females to complete this questionnaire)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Your age:</th>
<th>(years)</th>
</tr>
</thead>
</table>

**QUESTIONS ABOUT YOUR EXERCISE HABITS**

Exercise is any *planned* physical activity (e.g., brisk walking, aerobics, jogging, cycling, swimming, rowing, yoga, dancing, weight training, walking your dog, playing sport, etc.). Exercise does not have to be strenuous or painful to be effective but should be done at a level that increases your breathing rate and causes you to break a sweat.

According to this definition, do you exercise at least once a week for at least 10 minutes each session? *(Choose one below).*

- □ Yes, I have been for MORE than 6 months.
- □ Yes, I have been for LESS than 6 months.
- □ No, but I intend to start in the next 30 days.
- □ No, but I intend to start in the next 6 months.
- □ No, and I do NOT intend to in the next 6 months.
**QUESTIONS ABOUT YOURSELF AND EXERCISE**

Please circle the number that best reflects the extent to which you agree or disagree with each statement regarding your exercise participation.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

1. I consider myself an exerciser.  1 2 3 4 5 6 7
2. When I describe myself to others, I usually include my involvement in exercise.  1 2 3 4 5 6 7
3. I have numerous goals related to exercise.  1 2 3 4 5 6 7
4. Physical exercise is a central factor to my self-concept.  1 2 3 4 5 6 7
5. I need to exercise to feel good about myself.  1 2 3 4 5 6 7
6. Others see me as someone who exercises regularly.  1 2 3 4 5 6 7
7. For me, being an exerciser means more than just exercising.  1 2 3 4 5 6 7
8. I would feel a real loss if I were forced to give up exercising.  1 2 3 4 5 6 7
9. Exercise is something I think about often.  1 2 3 4 5 6 7
# YOUR VIEWS ON EXERCISE

Use the following key to help guide your answers:

<table>
<thead>
<tr>
<th>Not true for me</th>
<th>Sometimes True for me</th>
<th>Very true for me</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1. I exercise because other people say I should. 0 1 2 3 4
2. I feel guilty when I don’t exercise. 0 1 2 3 4
3. I value the benefits of exercise. 0 1 2 3 4
4. I exercise because it’s fun. 0 1 2 3 4
5. I don’t see why I should have to exercise. 0 1 2 3 4
6. I take part in exercise because my friends/family/partner say I should. 0 1 2 3 4
7. I feel ashamed when I miss an exercise session. 0 1 2 3 4
8. It’s important to me to exercise regularly. 0 1 2 3 4
9. I can’t see why I should bother exercising. 0 1 2 3 4
10. I enjoy my exercise sessions. 0 1 2 3 4
11. I exercise because others will not be pleased with me if I don’t. 0 1 2 3 4
12. I don’t see the point in exercising. 0 1 2 3 4
13. I feel like a failure when I haven’t exercised in a while. 0 1 2 3 4
14. I think it is important to make the effort to exercise regularly. 0 1 2 3 4
15. I find exercise a pleasurable activity. 0 1 2 3 4
16. I feel under pressure from my friends/family to exercise. 0 1 2 3 4
17. I get restless if I don’t exercise regularly. 0 1 2 3 4
18. I get pleasure and satisfaction from participating in exercise. 0 1 2 3 4
19. I think exercising is a waste of time. 0 1 2 3 4
HOW VIGOROUSLY DID YOU EXERCISE OVER THE LAST 7 DAYS?

In answering the following questions, Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

1a. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling? Think about only those physical activities that you did for at least 10 minutes at a time. ___ Days per week.

1b. How much time in total did you usually spend on one of those days doing vigorous physical activities?

___ Hours ___ Minutes or [square] None

2a. Again, think only about those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities, like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

___ Days per week.

2b. How much time in total did you usually spend on one of those days doing moderate physical activities?

___ Hours ___ Minutes or [square] None

3a. During the last 7 days, on how many days did you walk for at least 10 minutes at a time? This includes walking at work and at home, walking to travel from place to place and any other walking that you did solely for recreation, sport, exercise or leisure.

___ Days per week.

3b. How much time in total did you usually spend walking on one of those days?

___ Hours ___ Minutes or [square] None

The last question is about the time you spent sitting on weekdays, while at work, at home, while doing course work and during leisure time. This includes time spent sitting at a desk, visiting friends, reading, travelling on a bus, or sitting or lying down to watch television.

4. During the last 7 days, how much time did you spend sitting on a week day?

___ Hours ___ Minutes
WHICH EXERCISES HAVE YOU DONE AT LEAST 10 TIMES IN THE PREVIOUS 12 MONTHS?
☐ Cycling
☐ Jogging/Running
☐ Walking/Hiking
☐ Swimming/Diving
☐ Skiing/Snowboarding
☐ Dancing
☐ Yoga
☐ Pilates
☐ Aerobics - Cardio (e.g. cycling classes, Bodyattack etc.).
☐ Aerobics - Weights (e.g. Bodypump, Powerbar etc.).
☐ Sport - competitive
☐ Sport - social
☐ Weight training/resistance exercise
Other - please provide details______________
Other - please provide details______________

From these exercises, please select ONE exercise that you consider to be the MOST IMPORTANT
☐ __________

When did you FIRST start doing this exercise?

Month: ____ Year: ____
**PATTERN OF EXERCISE**

Please choose ONE of the following descriptions that best matches your pattern of exercise FROM WHEN YOU FIRST STARTED EXERCISING TO NOW.

**TICK ONE**

<table>
<thead>
<tr>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>I maintained my overall level of exercise. I exercised regularly and consistently.</td>
<td></td>
</tr>
<tr>
<td>I decreased and/or stopped my overall level of exercise over time.</td>
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<tr>
<td>I increased my overall level of exercise gradually over time.</td>
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<tr>
<td>I stopped and started my overall level of exercise repeatedly.</td>
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<tr>
<td>I have not engaged in any exercise at all in the last 12 months.</td>
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</table>

**HOW IMPORTANT WERE EACH OF THE FOLLOWING FACTORS IN DETERMINING YOUR PHYSICAL ACTIVITY PATTERN OF EXERCISE?**

<table>
<thead>
<tr>
<th>Factor</th>
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<th>7</th>
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<tbody>
<tr>
<td>Other commitments and priorities (family, work, etc.).</td>
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<tr>
<td>Success in achieving the expected results (e.g., reached ideal weight, reached ideal fitness, etc.).</td>
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<tr>
<td>Reduced physical ability (due to illness, injury, physical fatigue).</td>
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<tr>
<td>Decreased motivation and interest in exercise.</td>
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<tr>
<td>Increased physical ability (greater fitness, improved strength).</td>
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<tr>
<td>Increased motivation and interest in exercise.</td>
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<tr>
<td>Change in my routine or circumstances (seasonal sporting activities, travel, moved house, changed job, moved closer or further from gym).</td>
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<tr>
<td>Failure to achieve the expected results (e.g., did not lose enough weight, did not gain enough fitness, etc.).</td>
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<td>Other... please explain:</td>
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</table>
RIGHT NOW, HOW IMPORTANT TO YOU ARE THE FOLLOWING REASONS FOR EXERCISING?

Use the following key to help guide your answers:

<table>
<thead>
<tr>
<th>Not at all important</th>
<th>Moderately important</th>
<th>Extremely important</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
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<td>4</td>
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<td>7</td>
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</tbody>
</table>

RIGHT NOW, how important are each of these reasons for exercising, regardless of whether or not you actually exercise?

1. To stay slim.  
2. To avoid ill-health.  
3. Because it makes me feel good.  
4. To help me look younger.  
5. To show my worth to others.  
6. To give me space to think.  
7. To have a healthy body.  
8. To build up my strength.  
9. Because I enjoy the feeling of exerting myself.  
10. To spend time with friends.  
11. Because my doctor advised me to exercise.  
12. Because I like trying to win in physical activities.  
13. To stay/become more agile.  
14. To give me goals to work towards.  
15. To lose weight.  
16. To prevent health problems.  
17. Because I find exercise invigorating.  
18. To have a good body.  
19. To compare my abilities with other people.  
20. Because it helps to reduce tension.  
21. Because I want to maintain good health.  
22. To increase my endurance.  
23. Because I find exercising satisfying in and of itself.  
24. To enjoy the social aspects of exercising.  
25. To help prevent an illness that runs in my family.  
26. Because I enjoy competing.  
27. To maintain flexibility.  
28. To give me personal challenges to face.  
29. To help control my weight.  
30. To avoid heart disease.
<p>| | | | | | | | | | |</p>
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>31.</td>
<td>To recharge my batteries.</td>
<td>1</td>
<td>2</td>
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<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>To improve my appearance.</td>
<td>1</td>
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<td>6</td>
<td>7</td>
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</tr>
<tr>
<td>33.</td>
<td>To gain recognition for my accomplishments.</td>
<td>1</td>
<td>2</td>
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<td>6</td>
<td>7</td>
<td></td>
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<tr>
<td>34.</td>
<td>To help manage stress.</td>
<td>1</td>
<td>2</td>
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<td>7</td>
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<tr>
<td>35.</td>
<td>To feel more healthy.</td>
<td>1</td>
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<td>7</td>
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</tr>
<tr>
<td>36.</td>
<td>To get stronger.</td>
<td>1</td>
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<tr>
<td>37.</td>
<td>For enjoyment of the experience of exercising.</td>
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<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
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</tr>
<tr>
<td>38.</td>
<td>To have fun being active with other people.</td>
<td>1</td>
<td>2</td>
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<td>5</td>
<td>6</td>
<td>7</td>
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<tr>
<td>39.</td>
<td>To help recover from an illness/injury.</td>
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<td>2</td>
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<td>6</td>
<td>7</td>
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<tr>
<td>40.</td>
<td>Because I enjoy physical competition.</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>To stay/become flexible.</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>To develop personal skills.</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>Because exercise helps me to burn calories.</td>
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<td>2</td>
<td>3</td>
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<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>To look more attractive.</td>
<td>1</td>
<td>2</td>
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<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>To accomplish things that others are incapable of.</td>
<td>1</td>
<td>2</td>
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<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>To release tension.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>To develop my muscles.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>Because I feel at my best when exercising.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
<td>6</td>
<td>7</td>
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</tr>
<tr>
<td>49.</td>
<td>To make new friends.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>6</td>
<td>7</td>
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<tr>
<td>50.</td>
<td>Because I find physical activities fun, especially when competition is involved.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
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</tr>
<tr>
<td>51.</td>
<td>To measure myself against personal standards.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>To improve my ability to defend myself physically.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>53.</td>
<td>To cope with sadness/depression.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>54.</td>
<td>To feel sexy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>55.</td>
<td>To alter the appearance of a specific area of my body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>56.</td>
<td>To gain a sense of personal empowerment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

**RIGHT NOW**, thinking about your own life and personal circumstances, how satisfied are you **with your life as a whole?**

![Satisfaction Scale](image)
In the previous page you gave us your current reasons for exercising. Now we would like you to think back to when you first started your current MOST IMPORTANT exercise (exercise named here) and consider why you originally started exercising.

**When you first started exercising** how **IMPORTANT TO YOU** were each of the following reasons for exercising?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Not at all important</th>
<th>Moderately important</th>
<th>Extremely important</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Staying slim.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Avoiding ill-health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. Making me feel good.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. Helping me to look younger.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. Showing my worth to others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. Giving me space to think.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. Having a healthy body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8. Building up my strength.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9. Because I enjoyed the feeling of exerting myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10. Spending time with friends.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11. Because my doctor advised me to exercise.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12. Because I liked trying to win in physical activities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13. Staying/becoming more agile.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>14. Giving me goals to work towards.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>15. Losing weight.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16. Preventing health problems.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>17. Because I found exercise invigorating.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>18. Having a good body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>19. Comparing my abilities with other people.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>20. Because it helped to reduce tension.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>21. Because I wanted to maintain good health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>22. Increasing my endurance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>23. Because I found exercising satisfying in and of itself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>24. Enjoyment of the social aspects of exercising.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>25. Prevention of an illness that runs in my family.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Number</td>
<td>Reason</td>
<td>Score</td>
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<td>--------</td>
<td>----------------------------------------------------------------------</td>
<td>-------</td>
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</tr>
<tr>
<td>26</td>
<td>Because I enjoyed competing.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Maintaining flexibility.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Giving me personal challenges to face.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Helping me to control my weight.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Avoiding heart disease.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Recharging my batteries.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Improving my appearance.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Gaining recognition for my accomplishments.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Helping me to manage stress.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Feeling more healthy.</td>
<td>1 2 3 4 5 6 7</td>
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</tr>
<tr>
<td>36</td>
<td>Getting stronger.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Enjoying the experience of exercising.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Having fun being active with other people.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Helping recovery from an illness/injury.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Because I enjoyed physical competition.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Staying/becoming flexible.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Developing personal skills.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Because exercise helped me to burn calories.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Looking more attractive.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Accomplishing things that others are incapable of.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Releasing tension.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Developing my muscles.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Because I felt at my best when exercising.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Making new friends.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Because I found physical activities fun, especially when competition was involved.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>Measuring myself against personal standards.</td>
<td>1 2 3 4 5 6 7</td>
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<td>Improving my ability to defend myself physically.</td>
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<td>Coping with sadness/depression.</td>
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<tr>
<td>54</td>
<td>Feeling sexy.</td>
<td>1 2 3 4 5 6 7</td>
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<td>55</td>
<td>Altering the appearance of a specific area of my body.</td>
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<td></td>
</tr>
<tr>
<td>56</td>
<td>Gaining a sense of personal empowerment.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
When you first started exercising, thinking about your own life and personal circumstances, how satisfied were you with your life as a whole?

YOUR EXERCISE CONFIDENCE

This part looks at how confident you are to exercise when other things get in the way. Read the following items enter in the box the number that best expresses how each item relates to you in your leisure time. Please answer using the following 5-point scale:

<table>
<thead>
<tr>
<th>Not at all confident</th>
<th>Somewhat confident</th>
<th>Moderately confident</th>
<th>Very confident</th>
<th>Completely confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. I am under a lot of stress.  1 2 3 4 5
2. I feel I don’t have the time. 1 2 3 4 5
3. I have to exercise alone. 1 2 3 4 5
4. I don’t have access to exercise equipment. 1 2 3 4 5
5. I am spending time with friends or family who do not exercise. 1 2 3 4 5
6. It’s raining or snowing. 1 2 3 4 5
QUESTIONS ABOUT HOW YOU FEEL

Please read each statement and circle a number 0, 1, 2, or 3 which indicates how much the statement applied to you over the past week.

The rating scale is as follows:

<table>
<thead>
<tr>
<th>Did not apply to me at all</th>
<th>Applied to me to some degree, or some of the time</th>
<th>Applied to me a considerable degree, or a good part of the time</th>
<th>Applied to me very much, or most of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

1. I found myself getting upset by quite trivial things. 0 1 2 3
2. I was aware of dryness of my mouth. 0 1 2 3
3. I couldn't seem to experience any positive feeling at all. 0 1 2 3
4. I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion). 0 1 2 3
5. I just couldn't seem to get going. 0 1 2 3
6. I tended to over-react to situations. 0 1 2 3
7. I had a feeling of shakiness (e.g., legs going to give way). 0 1 2 3
8. I found it difficult to relax. 0 1 2 3
9. I found myself in situations that made me so anxious I was most relieved when they ended. 0 1 2 3
10. I felt that I had nothing to look forward to. 0 1 2 3
11. I found myself getting upset rather easily. 0 1 2 3
12. I felt that I was using a lot of nervous energy. 0 1 2 3
13. I felt sad and depressed. 0 1 2 3
14. I found myself getting impatient when I was delayed in any way (e.g., lifts, traffic lights, being kept waiting). 0 1 2 3
15. I had a feeling of faintness. 0 1 2 3
16. I felt that I had lost interest in just about everything. 0 1 2 3
17. I felt I wasn't worth much as a person. 0 1 2 3
18. I felt that I was rather touchy. 0 1 2 3
19. I perspired noticeably (e.g., hands sweaty) in the absence of high temperatures or physical exertion. 0 1 2 3
20. I felt scared without any good reason. 0 1 2 3
21. I felt that life wasn't worthwhile. 0 1 2 3
22. I found it hard to wind down. 0 1 2 3
23. I had difficulty in swallowing. 0 1 2 3
24. I couldn't seem to get any enjoyment out of the things I did. 0 1 2 3
25. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat). 0 1 2 3
<table>
<thead>
<tr>
<th>Item</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not apply to me at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied to me to some degree, or some of the time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied to me to a considerable degree, or a good part of the time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied to me very much, or most of the time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26 I felt down-hearted and blue.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>27 I found that I was very irritable.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>28 I felt I was close to panic.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>29 I found it hard to calm down after something upset me.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>30 I feared that I would be &quot;thrown&quot; by some trivial but unfamiliar task.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>31 I was unable to become enthusiastic about anything.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>32 I found it difficult to tolerate interruptions to what I was doing.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>33 I was in a state of nervous tension.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>34 I felt I was pretty worthless.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>35 I was intolerant of anything that kept me from getting on with what I was doing.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>36 I felt terrified.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>37 I could see nothing in the future to be hopeful about.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>38 I felt that life was meaningless.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>39 I found myself getting agitated.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>40 I was worried about situations in which I might panic and make a fool of myself.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>41 I experienced trembling (e.g., in the hands).</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>42 I found it difficult to work up the initiative to do things.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
QUESTIONS ABOUT WHO YOU ARE

Rate yourself on each item, on a scale from 1 (never or almost never true) to 7 (almost always true).

<table>
<thead>
<tr>
<th>Never or almost never true</th>
<th>Usually not true</th>
<th>Sometimes true</th>
<th>Occasionally true</th>
<th>Often true</th>
<th>Usually true</th>
<th>Always or almost always true</th>
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</thead>
<tbody>
<tr>
<td>1. Self reliant</td>
<td>1 2 3 4 5 6 7</td>
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<tr>
<td>2. Yielding</td>
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<tr>
<td>3. Helpful</td>
<td>1 2 3 4 5 6 7</td>
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<td>4. Defends own beliefs</td>
<td>1 2 3 4 5 6 7</td>
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<td>5. Cheerful</td>
<td>1 2 3 4 5 6 7</td>
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<td>6. Moody</td>
<td>1 2 3 4 5 6 7</td>
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<td>7. Independent</td>
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<td>8. Shy</td>
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<tr>
<td>9. Conscientious</td>
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<tr>
<td>10. Athletic</td>
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<tr>
<td>11. Affectionate</td>
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<td>12. Theatrical</td>
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<td>13. Assertive</td>
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</tr>
<tr>
<td>14. Easily flattered</td>
<td>1 2 3 4 5 6 7</td>
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<tr>
<td>15. Happy</td>
<td>1 2 3 4 5 6 7</td>
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<td>16. Strong personality</td>
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<tr>
<td>17. Loyal</td>
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<tr>
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<tr>
<td>20. Feminine</td>
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<tr>
<td>21. Reliable</td>
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<tr>
<td>22. Analytical</td>
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<td>23. Sympathetic</td>
<td>1 2 3 4 5 6 7</td>
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<td>24. Jealous</td>
<td>1 2 3 4 5 6 7</td>
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<td>25. Leadership ability</td>
<td>1 2 3 4 5 6 7</td>
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<td>26. Sensitive to other’s needs</td>
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<td>27. Truthful</td>
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<td>28. Willing to take risks</td>
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<td>29. Understanding</td>
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<td>30. Secretive</td>
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<td>2</td>
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<td>31. Makes decisions easily</td>
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<td>32. Compassionate</td>
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<td>33. Sincere</td>
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<td>34. Self-sufficient</td>
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<td>35. Eager to soothe hurt feelings</td>
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<td>36. Conceited</td>
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<td>37. Dominant</td>
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<td>38. Soft spoken</td>
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<td>39. Likeable</td>
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<td>2</td>
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<td>40. Masculine</td>
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<td>41. Warm</td>
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<td>42. Solemn</td>
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<td>43. Willing to take a stand</td>
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<td>44. Tender</td>
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<td>45. Friendly</td>
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<td>46. Aggressive</td>
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<td>47. Gullible</td>
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<td>48. Inefficient</td>
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<td>49. Acts as a leader</td>
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<td>50. Childlike</td>
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<td>51. Adaptable</td>
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<td>52. Individualistic</td>
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<td>53. Does not use harsh language</td>
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<td>54. Unsystematic</td>
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<td>55. Competitive</td>
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<td>56. Loves children</td>
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<td>57. Tactful</td>
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<tr>
<td>58. Ambitious</td>
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<td>2</td>
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<td>59. Gentle</td>
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<td>2</td>
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<tr>
<td>60. Conventional</td>
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</table>
QUESTIONS ABOUT YOUR WEIGHT AND YOUR MUSCLES

Please read each question carefully and fill select the circle which corresponds to your answer.

HOW OFTEN DOES EACH OF THE FOLLOWING APPLY TO YOU?

<table>
<thead>
<tr>
<th></th>
<th>never</th>
<th>rarely</th>
<th>sometimes</th>
<th>often</th>
<th>very often</th>
<th>always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I eat sweets and carbohydrates without feeling nervous.</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>2.</td>
<td>I think about dieting.</td>
<td>○</td>
<td>○</td>
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<tr>
<td>3.</td>
<td>I feel extremely guilty after overeating.</td>
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<td>4.</td>
<td>I am terrified of gaining weight.</td>
<td>○</td>
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<tr>
<td>5.</td>
<td>I exaggerate or magnify the importance of weight.</td>
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<tr>
<td>6.</td>
<td>I am preoccupied with the desire to be thinner.</td>
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<tr>
<td>7.</td>
<td>If I gain a kilogram, I worry that I will keep gaining.</td>
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<td>○</td>
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<tr>
<td>8.</td>
<td>I wish that I were more muscular.</td>
<td>○</td>
<td>○</td>
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<tr>
<td>9.</td>
<td>I lift weights to build up muscle.</td>
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<td>○</td>
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<tr>
<td>10.</td>
<td>I use protein or energy supplements.</td>
<td>○</td>
<td>○</td>
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<tr>
<td>11.</td>
<td>I drink weight-gain or protein shakes.</td>
<td>○</td>
<td>○</td>
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<tr>
<td>12.</td>
<td>I try to consume as many calories as I can in a day.</td>
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<td>○</td>
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<tr>
<td>13.</td>
<td>I feel guilty if I miss a weight training session.</td>
<td>○</td>
<td>○</td>
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<tr>
<td>14.</td>
<td>I think I would feel more confident if I had more muscle mass.</td>
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<tr>
<td>15.</td>
<td>Other people think I work out with weights too often.</td>
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<td>16.</td>
<td>I think that I would look better if I gained 5 kilos in bulk.</td>
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<td>○</td>
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<td>17.</td>
<td>I think about taking anabolic steroids.</td>
<td>○</td>
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<tr>
<td>18.</td>
<td>I think that I would feel stronger if I gained a little more muscle mass.</td>
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<td>○</td>
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<tr>
<td>19.</td>
<td>I think that my weight training schedule interferes with other aspects of my life.</td>
<td>○</td>
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<tr>
<td>20.</td>
<td>I think that my arms are not muscular enough.</td>
<td>○</td>
<td>○</td>
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<tr>
<td>21.</td>
<td>I think that my chest is not muscular enough.</td>
<td>○</td>
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<tr>
<td>22.</td>
<td>I think that my legs are not muscular enough.</td>
<td>○</td>
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QUESTIONS ABOUT YOU AND YOUR THOUGHTS ON EATING

Please read each question carefully and fill select the circle which corresponds to your answer.

HOW OFTEN DOES EACH OF THE FOLLOWING APPLY TO YOU?
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<thead>
<tr>
<th></th>
<th>I think that my stomach is too big.</th>
<th>never</th>
<th>rarely</th>
<th>sometimes</th>
<th>often</th>
<th>very often</th>
<th>always</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>I wish that I could return to the security of childhood.</td>
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<tr>
<td>2.</td>
<td>I eat when I am upset.</td>
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<td>3.</td>
<td>I stuff myself with food.</td>
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<td>4.</td>
<td>I wish that I could be younger.</td>
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<tr>
<td>5.</td>
<td>I get frightened when my feelings are too strong.</td>
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<td>6.</td>
<td>I think that my thighs are too large.</td>
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<tr>
<td>7.</td>
<td>I feel ineffective as a person.</td>
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<tr>
<td>8.</td>
<td>I think that my stomach is just the right size.</td>
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<tr>
<td>9.</td>
<td>Only outstanding performance is good enough in my family.</td>
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<tr>
<td>10.</td>
<td>The happiest time in life is when you are a child.</td>
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<tr>
<td>11.</td>
<td>I am open about my feelings.</td>
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<td>12.</td>
<td>I trust others.</td>
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<td>13.</td>
<td>I feel alone in the world.</td>
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<td>14.</td>
<td>I feel satisfied with the shape of my body.</td>
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<td>15.</td>
<td>I feel generally in control of things in my life.</td>
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<tr>
<td>16.</td>
<td>I get confused about what emotion I am feeling.</td>
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<td>17.</td>
<td>I would rather be an adult than a child.</td>
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<tr>
<td>18.</td>
<td>I can communicate with others easily.</td>
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<tr>
<td>19.</td>
<td>I wish I were someone else.</td>
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<td>20.</td>
<td>I can clearly identify what emotion I am feeling.</td>
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<tr>
<td>21.</td>
<td>I feel inadequate.</td>
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<tr>
<td>22.</td>
<td>I have gone on eating binges where I felt that I could not stop.</td>
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<tr>
<td>23.</td>
<td>As a child, I tried very hard to avoid disappointing my parents and teachers.</td>
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<td>24.</td>
<td>I have close relationships.</td>
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</table>
## HOW OFTEN DOES EACH OF THE FOLLOWING APPLY TO YOU?

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</thead>
<tbody>
<tr>
<td>26.</td>
<td>I like the shape of my buttocks.</td>
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<td>27.</td>
<td>I don’t know what’s going on inside me.</td>
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<td>28.</td>
<td>I have trouble expressing my emotions to others.</td>
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<tr>
<td>29.</td>
<td>The demands of adulthood are too great.</td>
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<td>30.</td>
<td>I hate being less than best at things.</td>
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<td>31.</td>
<td>I feel secure about myself.</td>
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<td>32.</td>
<td>I think about bingeing (overeating).</td>
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<td>33.</td>
<td>I feel happy that I am not a child anymore.</td>
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<tr>
<td>34.</td>
<td>I get confused about whether or not I am hungry.</td>
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<tr>
<td>35.</td>
<td>I have a low opinion of myself.</td>
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<td>36.</td>
<td>I feel that I can achieve my standards.</td>
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<tr>
<td>37.</td>
<td>My parents have expected excellence of my.</td>
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<td>38.</td>
<td>I worry that my feelings will get out of control.</td>
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<td>39.</td>
<td>I think my hips are too big.</td>
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<td>40.</td>
<td>I eat moderately in front of others and stuff myself when they’re gone.</td>
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<td>41.</td>
<td>I feel bloated after eating a normal meal.</td>
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<td>42.</td>
<td>I feel that people are happiest when they are children.</td>
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<td>43.</td>
<td>I feel that I am a worthwhile person.</td>
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<td>44.</td>
<td>When I am upset, I don’t know if I am sad, frightened or angry.</td>
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<td>45.</td>
<td>I feel that I must do things perfectly or not do them at all.</td>
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<td>46.</td>
<td>I have the thought of trying to vomit in order to lose weight.</td>
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<td>47.</td>
<td>I need to keep people at a certain distance (feel uncomfortable if people get too close).</td>
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<td>48.</td>
<td>I think that my thighs are just the right size.</td>
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<td>49.</td>
<td>I feel empty inside (emotionally).</td>
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<td>50.</td>
<td>I can talk about personal thoughts or feelings.</td>
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<td>51.</td>
<td>The best years of your life are when you become an adult.</td>
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<td>52.</td>
<td>I think my buttocks are too large.</td>
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<td>53.</td>
<td>I have feelings I can’t quite identify.</td>
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<td></td>
<td>HOW OFTEN DOES EACH OF THE FOLLOWING APPLY TO YOU?</td>
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<td>54.</td>
<td>I eat or drink in secrecy.</td>
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<td>55.</td>
<td>I think that my hips are just the right size.</td>
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<td>56.</td>
<td>I have extremely high goals.</td>
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<td>57.</td>
<td>When I am upset, I worry that I will start eating.</td>
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<td>58.</td>
<td>People I really like end up disappointing me.</td>
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<tr>
<td>59.</td>
<td>I am ashamed of my human weaknesses.</td>
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<td>60.</td>
<td>Other people would say that I am emotionally unstable.</td>
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<td>61.</td>
<td>I would like to be in total control of my bodily urges.</td>
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<td>62.</td>
<td>I feel relaxed in most group situations.</td>
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<td>63.</td>
<td>I say things impulsively that I regret having said.</td>
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<td>64.</td>
<td>I go out of my way to experience pleasure.</td>
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<td>65.</td>
<td>I have to be careful of my tendency to abuse drugs.</td>
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<td>66.</td>
<td>I am outgoing with most people.</td>
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<td>67.</td>
<td>I feel trapped in relationships.</td>
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<td>68.</td>
<td>Self-denial makes me feel stronger spiritually.</td>
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<td>69.</td>
<td>People understand my real problems.</td>
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<td>70.</td>
<td>I can’t get strange thoughts out of my head.</td>
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<td>71.</td>
<td>Eating for pleasure is a sign of moral weakness.</td>
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<td>72.</td>
<td>I am prone to outbursts of anger or rage.</td>
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<td>73.</td>
<td>I wish that people give me the credit I deserve.</td>
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<td>74.</td>
<td>I have to be careful of my tendency to abuse alcohol.</td>
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<td>75.</td>
<td>I believe that relaxing is simply a waste of time.</td>
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<td>76.</td>
<td>Others would say that I get irritated easily.</td>
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<td>77.</td>
<td>I feel like I am losing out everywhere.</td>
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<td>78.</td>
<td>I experience marked mood shifts.</td>
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<td>79.</td>
<td>I am embarrassed by my bodily urges.</td>
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<td>80.</td>
<td>I would rather spend time by myself than with others.</td>
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<tr>
<td>81.</td>
<td>Suffering makes you a better person.</td>
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<td>82.</td>
<td>I know that people love me.</td>
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<tr>
<td>83.</td>
<td>I feel like I must hurt myself or others.</td>
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<td>84.</td>
<td>I feel that I really know who I am.</td>
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</table>
THANK YOU for participating in this study
Gift Request Form

To compensate you for your time and effort, we would like to offer you a $20 Myer-Coles gift card. To request this gift card, please provide your details below. These details will be stored separately from the questionnaire. This way, your identity will not be associated with your anonymous responses on the questionnaire.

I wish to request a $20 Coles-Myer Gift Card to compensate me for my participation.

NAME: 
ADDRESS: 

[Boxes for address details]
Appendix C: Questionnaire Battery Used in Study Three

**WHAT DO I THINK ABOUT BEING ACTIVE?**

Please only complete the questionnaire if you are 18 years or older and you completed your early high school education years 7-9 in Australia.

Your age? □ Years

The following questions relate to how physically active you were when you were young and how active you are currently.

**Physical Activity**

**Physical activity** is a broad term meaning any movement of your body that uses up energy. Physical activity includes activities that you do such as:

- structured or planned activities (such as sport or organised recreation activities like yoga, walking groups or aerobics classes)
- unstructured or lifestyle activities (such as household chores, gardening, walking to and from public transport or cycling for fun).

**SECTION 1: WHAT MOTIVATES US TO BE PHYSICALLY ACTIVE**

**Instructions**: The following statements describe your motivations to be active. If you consider yourself to be an ‘active’ person, please indicate your level of agreement with each statement.

If you do not consider yourself to be a physically active person currently, please respond to each statement hypothetically - that is, if you were physically active, what would motivate you to continue?

Please indicate your agreement with the following statements:

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<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Moderately Disagree</th>
<th>Moderately Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<tbody>
<tr>
<td>1. For the pleasure it gives me to experience positive sensations from the activity.</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<td>2. For the satisfaction it gives me to increase my knowledge about this activity.</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<td>3. Because other people believe that it’s a good idea for me to exercise.</td>
<td>□</td>
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<td>□</td>
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<td>4. Because I must exercise to feel good about myself.</td>
<td>□</td>
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<td>5. Because I believe that regular exercise is a good way to enhance my overall development.</td>
<td>□</td>
<td>□</td>
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<td>6. Because it is consistent with what I value.</td>
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<td>7. I can’t understand why I am doing this.</td>
<td>□</td>
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<td></td>
<td>Because I feel pressure from others to participate.</td>
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<td>9.</td>
<td>Because I think that exercise allows me to feel better</td>
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<td>about myself.</td>
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<td>10.</td>
<td>For the pleasure I experience while learning about</td>
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<td>this activity.</td>
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<td>11.</td>
<td>For the satisfaction I feel when I get into the flow</td>
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<td>of this activity.</td>
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<td>12.</td>
<td>Because I feel I have to do it.</td>
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<td>13.</td>
<td>To satisfy people who want me to exercise.</td>
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<td>14.</td>
<td>Because exercising is an important aspect of how I</td>
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<td></td>
<td>perceive myself.</td>
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<td>15.</td>
<td>For the pleasure of understanding this activity.</td>
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<td>16.</td>
<td>I have no idea.</td>
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<td>17.</td>
<td>For the pleasure of mastering this activity.</td>
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<td>18.</td>
<td>Because I think it is a good thing for my personal</td>
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<td>growth.</td>
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<td>19.</td>
<td>For the pleasure I experience when I feel completely</td>
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<td>absorbed in the activity.</td>
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<td>20.</td>
<td>For the satisfaction I feel while I try to achieve</td>
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<td>my personal goals during the course of this activity.</td>
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<td>21.</td>
<td>Because I would feel guilty if I did not take the</td>
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<td></td>
<td>time to do it.</td>
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<td>22.</td>
<td>Because I value the way exercise allows me to make</td>
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<td></td>
<td>changes in my life.</td>
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<td>23.</td>
<td>It is not clear to me anymore.</td>
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<td>24.</td>
<td>Because I think exercise contributes to my health.</td>
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<td>25.</td>
<td>To comply with expectations of others (e.g.,</td>
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<td>friends).</td>
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<td>26.</td>
<td>For the enjoyment that comes from how good it feels</td>
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<td>to do the activity.</td>
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<td>27.</td>
<td>Because I enjoy the feelings of discovering more</td>
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<td>about this activity.</td>
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<td>28.</td>
<td>Because I enjoy the feelings of improving through</td>
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<td>participating in this activity.</td>
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<td>Because I feel that changes that are taking place</td>
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<td>through exercise are becoming part of me.</td>
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<td>30.</td>
<td>For the pleasure I experience while trying to</td>
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<td>become the person I want to be.</td>
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<td>31.</td>
<td>Because I would feel ashamed if I was not doing</td>
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<td>anything to improve my current situation.</td>
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SECTION 2: TELL US ABOUT YOUR CURRENT PHYSICAL ACTIVITY

Instructions: The next questions are about any physical activities that you may do in a typical week. Please answer the questions based on the past year.

1. In a typical week, how many times have you walked continuously for at least 10 minutes, for recreation, exercise or to get to or from places?
   [Times]

2. What do you estimate was the total time that you spent walking in a continuous way during a typical week? (In hours and/or minutes).
   [Hours] [Minutes]

3. In a typical week, how many times did you do any vigorous household chores, gardening or heavy yard work, which made you breathe harder or puff and pant?
   [Times]

4. What do you estimate was the total time that you spent doing vigorous household chores, gardening or yardwork, in a typical week? (In hours and/or minutes).
   [Hours] [Minutes]

The next questions exclude household chores, gardening or yard work:

5. In a typical week, how many times did you do any vigorous physical activity which made you breathe harder or puff and pant? (e.g., jogging, cycling, aerobics, competitive tennis).
   [Times]

6. What do you estimate was the total time that you spent doing this vigorous physical activity in a typical week? (In hours and/or minutes).
   [Hours] [Minutes]

7. In a typical week, how many times did you do any other more moderate physical activities that you have not already mentioned? (E.g. gentle swimming, social tennis, golf).
   [Times]

8. What do you estimate was the total time that you spent doing these activities in a typical week? (In hours and/or minutes).
   [Hours] [Minutes]
SECTION 3: HOW PHYSICALLY ACTIVE WERE YOU IN YOUR EARLY TEENS

Now we would like to know about how active you were in your early teens (first couple of years of high school).

Instructions: The next questions are about any physical activities you did during your early teens (adolescence). When answering these questions, think about a typical school week during years 7 to 9 of high school.

1. In a typical week (during your early adolescence), how many times did you walk continuously for at least 10 minutes, for recreation, exercise or to get to or from places?

   Times

2. What do you estimate was the total time that you spent walking in a continuous way during a typical week in your early adolescence? (In hours and/or minutes).

   Hours  Minutes

3. In a typical week (during your early adolescence), how many times did you do any vigorous household chores, gardening or heavy yard work, which made you breathe harder or puff and pant?

   Times

4. What do you estimate was the total time that you spent doing vigorous household chores, gardening or yard work, in a typical week during your early adolescence? (in hours and/or minutes)

   Hours  Minutes

The next questions exclude household chores, gardening or yard work:

5. In a typical week (during your early adolescence), how many times did you do any vigorous physical activities which made you breathe harder or puff and pant? (E.g. jogging, cycling, competitive tennis).

   Times

6. What do you estimate was the total time that you spent doing these vigorous physical activities in a typical week during your early adolescence? (In hours and/or minutes).

   Hours  Minutes

7. In a typical week (during your early adolescence), how many times did you do any other more moderate physical activities that you have not already mentioned? (E.g. gentle swimming, social tennis, golf).

   Times

8. What do you estimate was the total time that you spent doing these activities in a typical week during your early adolescence? (In hours and/or minutes).

   Hours  Minutes
SECTION 4: DEMOGRAPHIC INFORMATION

Could you please provide some information about you:

1. Your sex:
   - [ ] Male
   - [ ] Female

You have reached the end of the survey. Thank you for your time. Click the button below to submit your anonymous answers. By doing this, you are giving your consent to participate in this research.