EXAMINING REASONS FOR PARTICIPATION IN SPORT AND EXERCISE USING THE PHYSICAL ACTIVITY AND LEISURE MOTIVATION SCALE (PALMS)

Debadeep Roy Chowdhury

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DOCTOR OF APPLIED PSYCHOLOGY DEGREE

January 13, 2012

SCHOOL OF SOCIAL SCIENCE AND PSYCHOLOGY

FACULTY OF ARTS, EDUCATION AND HUMAN DEVELOPMENT

VICTORIA UNIVERSITY

ABSTRACT

The purpose of the present study was to validate the Physical Activity and Leisure Motivation Scale (PALMS). This included examining the internal consistency and criterion validity of the PALMS, as well as testing the proposed model of PALMS subscales in a confirmatory factor analysis. This study also looked at the various reasons people nominate for engaging in physical activities. A community sample of 202 volunteer participants, 120 males and 82 females, aged 18 to 71 years, was recruited from various organizations, clubs, and leisure centres. The participants represented different forms of physical activity namely, Australian Football League (AFL), gym-based exercise, tae kwon do, tennis, and yoga. Results indicate that the PALMS has a robust factor structure (CMIN/DF = 2.22; NFI = 0.95; CFI = 0.97; RMSEA = 0.078). The PALMS also demonstrated good internal consistency with a Cronbach's alpha (α) of 0.79. The α values for the PALMS subscales ranged from .80 to .99. In terms of criterion validity, Spearman's rho (r_s) indicated a strong positive correlation between the REMM and the PALMS (r_s = .9). The correlations between each PALMS sub-scale and the corresponding sub-scale on the validated REMM were also high and varied from .76 to .95.

In the present study, significant motivational differences were also found between several key demographic variables. Results indicate that females rated appearance as the primary motive for engaging in physical activity, whereas males rated affiliation as their priority. The participants who engaged in physical activity due to social reasons were more interested in affiliation, others' expectations, and appearance and least motivated by mastery. The participants who were subscribed to a club placed more emphasis on competition/ego. AFL participants were more interested in affiliation than the rest of the sample. Also, gym-

based exercisers were more motivated by physical health and appearance, while tennis players placed more emphasis on competition/ego. Tae kwon do players and individuals engaging in yoga rated psychological health and mastery as principal motives for engaging in physical activity. The present study supports the reliability and the criterion and construct validity of the PALMS as a measure of participation motivation. Scope for future research and implications for practice are also addressed.

DECLARATION

I, Debadeep Roy Chowdhury, declare that the Doctor of Applied Psychology (Sport) thesis entitled "Examining reasons for participation in sport and exercise using the Physical Activity and Leisure Motivation Scale (PALMS)" is no more than 40,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Signature: Date:

DEDICATION

I dedicate this thesis to my family and everyone else who has helped me become the person I am today.

ACKNOWLEDGEMENTS

I would like to express my heartfelt gratitude and sincere appreciation to Professor Tony Morris for his invaluable guidance and incredible patience throughout the research. His dedication to duty coupled with wealth of knowledge not only helped me amass essential professional skills but also taught me crucial life lessons. This journey would not have been possible without him and I will forever be indebted to him for it.

LIST OF PUBLICATIONS AND PRESENTATIONS

The present research has recently been presented at the 6th Asian South Pacific Association of Sport Psychology (ASPASP) Congress held in Taipei, Taiwan from 11th – 14th November 2011 and the 5th Victorian Sport Psychology Conference held in Melbourne, Australia from 19th – 21st December. The list of the recent publications and presentations are as follows:

- RoyChowdhury, D., & Morris, T. (2012, July). *Confirmatory factor analysis of the Physical Activity and Leisure Motivation Scale (PALMS) in an Australian multi-activity sample.* Paper to be presented at the International Convention on Science, Education and Medicine in Sport, Glasgow, Scotland.
- RoyChowdhury, D., & Morris, T. (2011, December). *Why we do what we do: Examining participant motivation in physical activity*. Paper presented at the 5th Victorian Sport Psychology Conference, Melbourne, Australia.
- RoyChowdhury, D., & Morris, T. (2011, December). *Internal consistency and criterion validity of the Physical Activity and Leisure Motivation Scale (PALMS).* Poster presented at the 5th Victorian Sport Psychology Conference, Melbourne, Australia.
- RoyChowdhury, D. & Morris, T. (2011, November). *Examining participant motivation using the Physical Activity and Leisure Motivation Scale (PALMS).* Paper presented at the 6th Asian South Pacific Association of Sport Psychology International Congress, Taipei, Taiwan.

- RoyChowdhury, D., & Morris, T. (2011, November). *Validating the Physical Activity and Leisure Motivation Scale (PALMS)*. Poster presented at the 6th Asian South Pacific Association of Sport Psychology International Congress, Taipei, Taiwan.

- RoyChowdhury, D., & Morris, T. (2011, November). *Examining Participant Motivation using the Physical Activity and Leisure Motivation Scale (PALMS)*. Paper presented at the Hangzhou Institute of Sport Conference on Sport and Science, Hangzhou, China.

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Chapter 1

Introduction

Modern society is witnessing a sharp decline in individual adherence to physical activity. With the advent and excessive use of technology, people have become content with engaging in sedentary jobs and leisure activities. This is one of the major causes of lifestyle-related illnesses. Physical inactivity is linked to many major causes of mortality and morbidity, including heart disease, cancer, diabetes, and depression (Armstrong, Bauman, & Davies, 2000). Thus, it is imperative to motivate people to undertake more physical activity (Lloyd-Jones, Yuling, Labarthe, Mozaffarian, Appel, & Van Horn, 2010; Frederick-Recascino & Morris, 2004).

One of the most prominent factors that stimulate and maintain individuals' participation in physical activity is their motivation. For example, individuals who are intrinsically motivated to participate in a physical activity (e.g., who are motivated by factors, that are about the activity, such as enjoyment or skill development and mastery), tend to participate over a longer period of time, as compared to extrinsically motivated individuals, who engage in a physical activity due to factors that are not related to the activity itself, such as rewards, improved health, looking good (Frederick & Ryan, 1993). Therefore, by determining individuals' motivation for an activity, health professionals can use this knowledge to create awareness that will not only prove beneficial on an individual level, but also help the community by reducing lifestyle-related illnesses. More specifically, equipped with this knowledge, health professionals, such as physical educators, can develop effective interventions to motivate people to engage in physical activity, thereby increasing physical activity adherence.

A number of questionnaires have been developed to measure participation motivation. These include the 28-item Sport Motivation Scale (SMS; Fortier, Vallerand, Biere, & Provencher, 1995), the 44-item Exercise Motivation Inventory (EMI; Markland & Hardy, 1993), the 69-item EMI-2 (Markland & Ingledew, 1997), the 32-item Exercise Motivation Scale (EMS; Li, 1999), the original 30-item Participation Motivation Questionnaire (PMQ; Gill, Gross, & Huddleston, 1983), along with its various versions, the 23-item Motivation for Physical Activity Measure (MPAM; Frederick & Ryan, 1993), the 30-item MPAM-Revised (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997) and the 73-item Recreational Exercise Motivation Measure (REMM; Rogers & Morris, 2003). These questionnaires, however, have not been developed from a combination of empirical study and association with theory and hence lack the comprehensiveness needed to cater for the different motives for participation that are found in both the sport and exercise domains.

A recently developed measure of participation motivation, the Recreational Exercise Motivation Measure (REMM), developed by Rogers and Morris (2003), provides information about individuals' motivation to participate in physical activity. However, the sizeable length of the REMM (73 items) drew some criticisms particularly in relation to its use in applied contexts. Consequently, a shorter measure, called the Physical Activity and Leisure Motivation Scale (PALMS), was developed by selecting the five strongest items on each of the eight factors in the REMM, producing a 40-item measure. The shorter version is proposed to be more effective because it is succinct in nature and helps to minimize the detrimental effects of boredom and fatigue (Morris & Rogers, 2004).

The development of the PALMS is an important step in determining individuals' participation in physical activity. The present study will conduct a confirmatory factor

analysis (CFA) to validate the PALMS. Another aim of the present study is to examine people's reasons to engage in sport, exercise, and leisure activities, using the PALMS. More specifically, this study will compare the range of motives for participation in team sport, individual sport, and recreational exercise. This aim is intended to redress an imbalance in previous research, where much of the research in this field has been devoted to competitive sport (Chantal, Guay, Dobreva-Martinova & Vallerand, 1996; Morris, Clayton, Power, & Han, 1995; Rogers, Morris, & Moore, 2008). Furthermore, the REMM has been found to be a reliable and valid measure (Rogers & Morris, 2003). Since the PALMS was developed by selecting the strongest items in the REMM (Morris & Rogers, 2004), it is plausible that, like the REMM, the PALMS will be reliable and valid. Thus, it would be valuable to examine if this new measure (PALMS) is as reliable and consistent as the longer "parent" measure (REMM). The criterion validity of the PALMS, therefore, will be examined by correlating each of the eight subscales of the PALMS with the corresponding subscales on the REMM.

When researchers have compared rankings of importance of motives in different sports or physical activity types, they have reported systematic differences. In the largest study of this kind, Morris et al. (1995) examined the participation motives of 2,601 Australians, who participated in team sports, racquet sports, individual body movement sports, recreational exercise activities, and martial arts. In discriminant function analyses of ratings of importance on a 50-item version of the Participation Motivation Questionnaire, Morris and his colleagues found that team sport athletes rated affiliation more highly than the other participants, racquet sport competitors rated challenge higher than any other group, exercise participants rated health most highly, and martial arts competitors were especially interested in developing skills that trained the body and mind. These predictable differences

should be shown by questionnaires that purport to measure motives for participation in physical activity. Thus, identifying the most important motives for different kinds of physical activities is one way to examine the construct validity of the PALMS. It is predicted that team sport (Australian Football League or AFL) players will rate affiliation higher than exercise (gym) or martial arts (tae kwon do) and yoga participants. Similarly, it is predicted that exercise participants will rate physical health more highly than AFL and tae kwon do and yoga participants, while tae kwon do players and individuals practising yoga will rate psychological health and skill development higher than AFL players and exercisers.

Researchers have often found that self-report instruments are subject to faking good. Even when there is no apparent benefit to be gained from responding in a socially desirable way, many people still do so (Seol, 2007). Thus, it is important to the psychometric properties of a new measure to check whether it is prone to social desirability responding. One way to do this is to use a lie scale or a measure specifically designed to identify people who are disposed to fake good. Testing for a correlation between scores on a social desirability instrument like the Shortened Marlowe-Crowne Social Desirability Scale (SM-C-SDS; Reynolds, 1982) and a new measure like the PALMS is one way to examine whether the new measure encourages social desirability responding. It is predicted that there will be no significant correlation between any subscale of the PALMS and the SM-C-SDS.

Finally, this study has some important implications. Apart from adding knowledge to the literature about the measurement of participation motivation and the most important motives for people in various activities, this study will aid health professionals to create awareness and motivate people to participate in physical activity, which should not only

prove beneficial on an individual level, but also help the community by reducing lifestyle-related illnesses.

Chapter 2

Review of Literature

In the first section of this chapter, the literature on participation in physical activity is reviewed. The next section considers motivation in sport and exercise contexts. Achievement Goal Theory (AGT) and Self-Determination Theory (SDT) are briefly addressed in the following sections. Next the measures of participation motivation are examined. The following two sections discuss the development of the Recreational Exercise Motivation Measure (REMM) and the Physical Activity and Leisure Motivation Scale (PALMS). Motivational differences between demographic variables are then examined. The final section of this chapter outlines the aims of the present study.

Participation in Physical Activity

The benefits of physical activity (PA) have been well documented in the literature (Lloyd-Jones et al., 2010; Frederick-Recascino & Morris, 2004). Despite this, a large proportion of the population in western countries are physically inactive, which is linked to many major causes of mortality and morbidity, including heart disease, cancer, diabetes, and depression (Armstrong, Bauman, & Davies, 2000). Physical inactivity, for adults, refers to not engaging in any form of moderate-intensity physical activity for at least 30 minutes on most days. Globally, physical inactivity is estimated to cause two million deaths per year (WHO, 2006). An estimated 30% of the global ischaemic heart disease burden, 27% of diabetes and 21% to 25% of breast and colon cancer burden is attributable to physical inactivity (WHO, 2009). In Australia, 70% of people aged 15 years and above, have been classified as having a sedentary lifestyle or having low exercise levels; physical inactivity

contributing to 6,400 deaths per year (Stephenson, Bauman, Armstrong, Smith, & Bellow, 2000).

With rapid technological advances, people are increasingly settling for a sedentary lifestyle. As the present study was conducted in Australia with a local sample, I have only reported Australian statistics about sedentary lifestyle. For instance, statistics reported recently indicated that 70% of Australians aged 15 years and over were classified as sedentary or having low exercise levels, and that this figure has not changed significantly in the last decade (Australian Bureau of Statistics, 2006). Also, the ABS data indicated that people aged 15 years and over who were sedentary or exercised at low levels were more likely to be classified as having a long-term health condition, experience very high levels of psychological distress, and be obese than people who exercised at moderate or high levels. It has also been noted that around 36% of people aged 18 years and over were sedentary in the two weeks prior to interview in 2007-08, up four percentage points from 32% in 2001, and the proportion of people who exercised at moderate levels decreased slightly, from 24% in 2001 to 22% in 2007-08 (Australian Bureau of Statistics, 2011). Clearly, there is an insistent need to motivate people to undertake physical activity and reduce the effects of life-style related illnesses.

To promote exercise adherence, researchers have tried to understand why people engage in any form of physical activity (Francis & James, 2011; Kravitz, 2011; Morris, Clayton, Power, & Han, 1995; Frederick & Ryan, 1993; Gill, Gross, & Huddleston, 1983). Researchers in this domain have focused predominantly on sport and exercise involvement (Morris, Clayton, Power, & Han, 1995; Frederick & Ryan, 1993). Consequently, measures were either developed or adapted that lent themselves to the field of competitive sport

(Frederick-Recascino & Morris, 2004; Chantal, Guay, Dobreva-Martinova & Vallerand, 1996; Pelletier, Fortier, Vallerand, Tuson, Briere, & Blais, 1995; Morris et al., 1995). On the other hand, there has been a paucity of research investigating participant motivation for a range of non-competitive physical activities. This can only be balanced by developing and validating measures that would reflect a range of motives for participation in physical activity, both competitive and non-competitive.

Motivation in Sport and Exercise

It is imperative to understand what motivates people to undertake any form of physical activity. Motivation has been defined as the energy and direction of behaviour (Deci, 1980; Deci & Ryan, 1985). While the energy component of motivation reflects the amount of effort devoted in a particular activity, the direction component refers to the individual's unique level of personal interest in the task. The energy and direction of any behaviour, i.e., the motivation, may be different for different individuals. For instance, it is plausible that the motivation for physical activity of a recreational exerciser jogging on suburban roads while listening to music will be quite different from the motivation for physical activity of a footy player struggling his way through a crowded scrum to win a contested mark. It is therefore worthwhile to know what will drive and sustain individuals' motivation.

Over the years, a number of researchers have grappled with the concept of motivation and its correlates. Freud maintained that motivated behaviour is primarily driven by instinctual needs (Freud, 1923; Hull, 1943). On the other hand, Skinner (1971) focused on how individuals were haled to behave based on the incentives that they were offered by environmental contingencies. The domain of sport and exercise, in particular, has witnessed

the emergence of a variety of theoretical frameworks, such as need for achievement theory (Atkinson, 1964), attribution theory (Weiner, 1979, 1985), theory of competence motivation (Harter, 1978), theory of goal setting (Locke & Latham, 1984), and self-efficacy theory (Bandura, 1977, 1986). Two theories that have steered much of the research on motivation in sport and exercise context are Achievement Goal Theory (AGT; Nicholls, 1989) and Self-Determination Theory (SDT; Deci & Ryan, 1985, 1991).

Achievement Goal Theory (AGT)

In the past 20 years, theoretical frameworks, such as Achievement Goal Theory (AGT; Nicholls, 1989), have guided motivation research in sport and exercise settings. Nicholls (1989) suggested two major goal states, namely task and ego involvement. According to Nicholls (1989), ego-involved individuals are mainly concerned with their ability or score in comparison to others, whereas task-involved individuals have self-referenced perceptions of their demonstrated abilities. In other words, task-involved individuals focus on mastering the task, while ego-involved individuals experience competence through outperforming others. Further, this distinction emanates as a result of socializing experiences, where children interact with significant others who reinforce a particular goal perspective.

A number of researchers have used AGT to understand motivational goal orientations in competitive sport (e.g., Duda, 1988, 1989; Fry & Newton, 2003; Waldron & Krane, 2005) and recreational sport and exercise (e.g., Duda & Tappe, 1988; Escarti & Gutierrez, 2001; Xiang, McBride, & Bruene, 2003). Some researchers have argued that the two achievement goals in AGT cannot sufficiently account for the wide range of goals

people have for engaging in physical activity that have been identified in a number of studies (Maehr & Braskamp, 1986; Whitehead, 1995; Rogers, Morris, & Moore, 2008).

Self-Determination Theory (SDT)

Another theoretical approach that provides an insight into motivational processes is Self-Determination Theory (SDT; Deci & Ryan, 1985, 1991). SDT assumes that humans possess an innate proactive tendency to engage in their physical and social surroundings to assimilate and accommodate ambient knowledge (Niemiec & Ryan, 2009). Further, this tendency or drive encompasses three primary psychological needs, namely autonomy, competence, and relatedness with others (Deci, 1980; Deci & Ryan, 1985, 1991). Autonomy refers to individuals' subjective experience of behaviour as volitional and an expression of their self. The need for competence refers to individuals' feelings of being effective in their interactions with the world. Finally, relatedness refers to having a sense of belongingness and connection with others. Of these three needs, research in participation motivation has focused on the needs for autonomy and competence, which, when combined, form the basis of another dichotomy of intrinsic and extrinsic motivation. The purpose of the present study was to examine the motives for participation in sport and exercise. I have, therefore, only looked at the intrinsic-extrinsic dichotomy within the SDT and did not consider the other mini-theories within SDT (e.g., stages of self-regulation) as they are not pertinent for my study.

Intrinsic motivation refers to engaging in an activity for the pleasure and inherent satisfaction. Intrinsically motivated individuals experience choice in their behavioural dispositions and an optimum level of challenge, thereby fulfilling their needs for autonomy and competence. For instance, a soccer player who is driven to train for the inherent fun and

challenge involved in the game is said to be intrinsically motivated. Extrinsic motivation, on the other hand, refers to engaging in an activity for instrumental reasons, such as external pressures or rewards. Extrinsically motivated individuals experience little optimal challenge or autonomy. For example, an athlete who competes in a game because of the pressures from the coach or need for status or approval from family or friends is said to be extrinsically motivated.

Deci and Ryan (2000) examined intrinsic-extrinsic aspirations, or *goal contents*, and their differential effects on overall well-being. They suggested that intrinsically-oriented goal contents, such as personal growth or social affiliation, enhance contentment as they are more conducive to facilitate the psychological needs of autonomy and competence. Conversely, extrinsically-oriented goal contents, such as pursuit of financial rewards or fame, inhibit satisfaction as they are based on external eventualities.

In line with this research, Markland and Ingledew (2007) maintained that different participation motives carry different functional significance depending on their intrinsic-extrinsic orientation. Intrinsic motives, such as enjoyment, and challenge, that are autonomous in nature, are more likely to be maintained in the long term. On the other hand, extrinsic motives, such as improving appearance and competing with others, that are internally controlling in nature, are less likely to engender long-term commitment. Understanding participant motivation is particularly important in this context. An individual might engage in physical activity either for the inherent pleasure or to compete for social attention. Consequently, the individual's self-worth might become contingent on the goal orientation (Sheldon, Ryan, Deci, & Kasser, 2004). For example, a tae kwon do player might engage in martial arts in order to gratify his/her intrinsic need to master the skills,

whereas a recreational gym exerciser might engage in weight training to satisfy his/her extrinsic need to enhance physical appearance. Thus, different goal orientations will have varying influence on individuals' decisions to engage in physical activity. An adequate understanding of the goal orientations will, therefore, aid health practitioners provide individuals with accurate advice to engage in appropriate activities thereby maximizing their satisfaction. This will not only help individuals gain pleasure out of their involvement and sustain the necessary motivation, it will also help the community by reducing a number of lifestyle-related illnesses that carry a heavy economic burden.

Measurement of Participation Motivation

The preceding theoretical review indicates that understanding motives for participation in sport and physical activity is important to the promotion of physical activity in the general population. To increase understanding, it is essential to measure motives for participation in physical activity. Researchers have used different approaches to develop standardized instruments to examine and study participation motives. The first approach to study participation motivation involves examining the theoretical correlates of the different motives for physical activity.

The 28-item Sport Motivation Scale (SMS; Fortier, Vallerand, Biere, & Provencher, 1995) and the 32-item Exercise Motivation Scale (EMS; Li, 1999) were developed based on the intrinsic-extrinsic dichotomy within SDT (Deci & Ryan, 1985, 1991). The seven sub-scale SMS (namely intrinsic motivation to know, accomplish things, and experience stimulation, external regulation, introjected regulation, identified regulation, and a scale for amotivation) and the eight sub-scale EMS (namely intrinsic motivation to learn, to accomplish and experience sensation, external regulation, introjected regulation, identified

regulation, integrated regulation, and amotivation) view individuals' motivation on a continuum with intrinsic and extrinsic motivation as the polar opposites. Though these instruments were developed to identify individuals' level of motivation on a continuum, they are unlikely to cover the broad range of motives that individuals nominate for engaging in physical activity.

The 44-item Exercise Motivation Inventory (EMI; Markland & Hardy, 1993) was developed to examine a range of reasons for engaging in exercise. It consists of 12 sub-scales, namely, stress management, weight management, recreation, social recognition, enjoyment, appearance, personal development, affiliation, ill health avoidance, competition, fitness, and health pressures. Though the EMI has demonstrated good validity in several studies (e.g., Ingledew, Hardy, & de Sousa, 1995; Markland, Ingledew, Hardy, & Grant, 1992), it has a number of issues. For example, the EMI failed to assess fitness-related reasons for exercising (e.g., strength, and endurance). Also, the health-related scales were negatively worded (e.g., health pressures and ill-health) though researchers suggest that physical movement could have a positive motivational force (e.g., Duda & Tappe, 1989; Kasser & Ryan, 1996). Furthermore, the EMI caters to only those individuals who currently exercise and does not take into account the motives of non-exercisers. Consequently, the 69-item Exercise Motivation Inventory-2 (EMI-2; Markland & Ingledew, 1997) was developed by adding a positive fitness scale and splitting the fitness scale into strength and endurance and nimbleness. Though the EMI-2 has been rigorously tested on factorial validity and invariance of the factor structure across gender (Markland & Ingledew, 1997), it still does not acknowledge participation motives related to the competitive aspects of appearance

found in other studies on exercise (e.g., Rogers, Tammen, & Morris, 1999). Also, the sizeable length of the EMI-2 raises questions regarding boredom and fatigue.

Frederick and Ryan (1993) conducted a study to examine the variance caused by gender and type of activity in participant motivation in the context of SDT. Consequently, the authors developed the 23-item Motivation for Physical Activity Measure (MPAM) that identified three motivational factors, namely, interest/enjoyment, competence motivation, and body-related motivation. The factor structure was derived based on literature review, pilot studies, and SDT. The interest/enjoyment and competence motivation factors within the MPAM reflected intrinsic foci, whereas the body-related factor corresponds to an extrinsic orientation. Frederick and Ryan (1993) found that motivation orientation for physical activity differed as a function of the type of activity. Interest/enjoyment and competence motivation were found to be particularly high for individual sports, whereas body-related motivation was found to be associated with fitness activities. Furthermore, individual sport participants seemed to engage in physical activity for inherent reasons, whereas fitness group participants were involved in physical activity due to instrumental reasons. Though the MPAM was a good measure of participant motivation, it had some weaknesses. First, it was standardized on a small sample. Second, it assessed broad motives for participation, but did not take into account other motives (e.g., social motives) that might influence attendance in and adherence to physical activity. Further, the MPAM was developed with an emphasis on adherence-oriented outcome and as such did not consider the potential importance of participants' experiences. To cater for these concerns, Ryan, Frederick, Lepes, Rubio, and Sheldon (1997) developed the 30-item Motivation for Physical Activity Measure – Revised (MPAM-R) with five categories, namely fitness, appearance,

competence, enjoyment, and social. The body-relation factor from the MPAM was split into two factors, fitness and appearance. Further, items relating to social motives were added in the new version. Though the MPAM and MPAM-R have been developed to measure motives for participation, they do so in a retrospective fashion to fit motives to the intrinsic/extrinsic dichotomy of the SDT. Also, these instruments were developed to assess motives for participation in exercise only, and hence did not cover reasons for sport participation. Thus, although the development of these instruments was informed by theory, they were unable to assess the broad range of participation motives that were identified in research on physical activity.

A second approach to study participant motivation in sport and/or exercise has been atheoretical. This has usually involved an empirical exploration of participation motives. In a pioneering study, Gill, Gross, and Huddleston (1983) used this approach and asked adolescents the reasons for participation in physical activity, employing open-ended questions. Using the acquired information, Gill et al. devised the 30-item Participation Motivation Questionnaire (PMQ) by presenting the stated reasons as items preceded by phrases like ‘I want to’ and ‘I like to’. Subsequently, Gill et al. administered the PMQ to 1,138 adolescents at a multi-sport summer camp. After conducting an exploratory factor analysis (EFA), they found eight factors underlying the PMQ, namely achievement, team (affiliation/social), fitness, energy release, to be with others, skill, friends, and fun.

Similarly, a number of researchers have used versions of the PMQ to examine motives for participation in a range of sport and/or exercise domains. Gould, Feltz, and Weiss (1985) developed a 30-item 3-point Likert scale and administered it to 365 swimmers with an age range of 8 to 19 years. They conducted a factor analysis and found seven

factors, namely achievement/status, team atmosphere, excitement/challenge, fitness, energy release, skill development, and friendship. Klint and Weiss (1987) developed a 32-item version of the PMQ with responses on 5-point Likert scales and administered it to 67 gymnasts with an age range of 8 to 16 years. Though they did not conduct factor analysis, the top rated items that emerged out of discriminant function analysis included learning skills, getting in shape, improving skills, fun, staying in shape, and challenge. In the same year, Longhurst and Spink (1987) developed a 27-item version of the PMQ with responses on 5-point Likert scales and administered it to 404 athletes (athletics, netball, cricket, and Australian football) with an age range of 8 to 18 years. Factor analysis of the data yielded four factors namely team/achievement, situational, status, and fitness. In another study, Brodkin and Weiss (1990) developed a 37-item version of the PMQ with responses on 5-point Likert scales and administered it to 100 swimmers with an age range of 6 to 74 years. They conducted factor analysis of the data, which revealed seven factors, namely health/fitness, social status, affiliation, energy release, significant others, fun, and other swimming specific characteristics.

Morris and Han (1991) examined motives for participation in physical activity with a life span sample who participated in a non-competitive physical activity, tai chi. They developed a 40-item version of the PMQ with responses on 5-point Likert scales and administered it to 228 tai chi participants with an age range of 9 to 70 years. They conducted a factor analysis and found 11 factors, namely aesthetic, philosophical, improve existing medical condition, exercising body and mind together, non-competitive, health, skill, energy release, social, status, and fun. Morris, Power, and Pappalardo (1993) developed a 44-item version of the PMQ with responses on 5-point Likert scales and administered it to 346 table

tennis players with an age range of 10 to 80 years. Factor analysis of the data produced 8 factors, namely health/fitness, fun, challenge, social, skill development, aesthetic/philosophy, status, and relaxation.

Buonamano, Cei, and Mussino (1995) developed a 32-item version of the PMQ with responses on 7-point Likert scales and administered it to 2,589 athletes with an age range of 9 to 18 years. After conducting a factor analysis, they found six factors, namely success/status, fitness/skill, extrinsic rewards, team, friendship/fun, and energy release. Sutherland and Morris (1997) developed a 50-item version of the PMQ with responses on 5-point Likert scales and administered it to 293 athletes with an age range of 13 to 15 years. Factor analysis of the data produced nine factors, namely health, challenge, relaxation, status, social, environment, fun, affiliation, and skills.

Kirkby, Kolt, and Liu (1999) developed a 30-item version of the PMQ with responses on 3-point Likert scales and administered it to 383 gymnasts with an age range of 8 to 15 years. They subjected the data to factor analysis and found seven factors, namely excitement, affiliation, social cohesion, action, miscellaneous, somatic (fitness/exercise), and status (win/energy release/be important). In the same year, Kolt, Kirkby, Bar-Eli, Blumenstein, Chadha, Liu, and Kerr (1999) developed a 30-item 3-point Likert scale and administered it to 701 gymnasts with an age range of 8 to 15 years. Subsequent factor analysis revealed seven factors, namely team/affiliation, popularity/energy release, challenge/fun, skills, achievement, recognition/excitement, and miscellaneous. A year later, Weinberg, Tenenbaum, McKenzie, Jackson, Anshel, Grove, and Fogarty (2000) developed a 22-item version of the PMQ with responses on 3-point Likert scales and administered it to 1,472 athletes with an age range of 13 to 18 years. Factor analysis of the data yielded four

factors for sport, namely competition, social energy, fitness/fun, and teamwork, and four factors for exercise, namely intrinsic, extrinsic, fitness, and energy release.

In a landmark study, Morris et al. (1995) looked at age, gender, and activity type to examine motives for participation in physical activity in Australia. They used the PMQ approach and developed a 50-item version of the PMQ with responses on 5-point Likert Scales. This instrument was administered to 2,601 participants (1,164 males and 1,437 females), aged between 6 and over 80 years, who were involved in 14 different kinds of physical activity. The activities were chosen to represent five categories of physical activity, namely body movement sports (gymnastics, swimming), racquet sports (tennis, table tennis, squash), team ball games (lacrosse, netball, basketball, volleyball), exercise activities (aerobics, weight training), and martial arts (karate, tae kwon do, tai chi). An EFA on the data yielded nine factors, namely skills, challenge, fun, health, relaxation/aesthetic, affiliation, status, the environment, and to be occupied. Consequently, Morris et al. conducted discriminant function analyses for age and gender. The strongest discriminating factors for gender were found to be challenge, affiliation, health, and status. Affiliation and health were rated higher by females than males, and challenge and status were found to be more important for males than females. The strongest discriminating factors for age were found to be status, skills/movements, challenge, health, fun, and relaxation/aesthetic. The youngest age group (6- to 14-year-olds) rated status and skills as the most important factors for participation in physical activity. For the adolescent age group (15- to 18-year-olds), status and challenge were found to be the strongest discriminating factors. For the 19- to 22-year-olds, the factors of health and fun were found to be rated as being more important than the other factors, whereas affiliation and relaxation/aesthetic were not as important for these

participants as they were for the whole sample. In the 23- to 39-year-olds, health was the highest discriminating factor, whereas status and skills were found to be the lowest. The 40- to 59-year-olds rated relaxation/aesthetic as the highest discriminator, and were less interested in status, skills, and challenge. Finally, the over-60-year-olds group was found to be motivated by relaxation/aesthetic, and less interested in fun and challenge of participation when compared to the whole sample. Overall, the researchers found that young participants were interested in skill learning/improvement and status; adolescents were motivated by challenge; adults focused more on health/fitness; and older adults were concerned primarily with relaxation/aesthetic as a key motive for engaging in physical activity.

Furthermore, Morris et al. (1996) compared each sport type with the rest of the sample to identify the factors that emerged as strong motives for participation in that type of activity. Using discriminant function analyses, they found challenge to be the main discriminator for racquet sports. This seems to fit with the main characteristics of racquet sports, where the person goes head-to-head with another individual in these activities, thus maximizing the personal challenge. Affiliation was found to be the strongest discriminator for the team ball games, which was expected as all these were group activities. Interestingly, affiliation and challenge were not ranked highly by the exercisers, who rated health/fitness as a more important motive that the rest of the sample. These patterns indicate a consistent relationship between the primary characteristics for each activity type and the preference of individuals for those activities. Future research should focus on replicating this study to examine the major motives that characterize different forms of physical activity. This will help practitioners match individuals to a specific type of activity based on their principal motives, thus, maximizing satisfaction.

Though the numerous versions of the PMQ have indeed covered a breadth of motives of participation in physical activity, it is evident that the descriptive research on participant motivation has been largely unsystematic. Whereas some researchers have chosen to study motives in a single sport, others have selected a wide range of activities. Often the activities were chosen based on a specific interest or convenience, rather than a conceptually based rationale. Other factors, such as sample size and level of participation, have also varied greatly from one study to another. Another shortcoming of the PMQ approach is that it is not supported by any specific theory of motivation (Frederick-Recascino & Morris, 2004). Furthermore, a stable version of the PMQ has not yet been established that could be used to measure participant motivation in a variety of physical activities, with versions varying from 22 to 50 items and factors derived, representing motives for participation, being as few as four and as many as 11 factors.

Clearly, the existing measures of participant motivation lack the comprehensiveness needed to cater for the different motives for participation that are found in both the sport and exercise domains. For example, Weinberg et al. (2000) reported different factors for competitive sport participants to those identified for non-competitive exercisers. It is possible that a reason for this was the small number of items and factors in their study. Also, the measures do not possess a strong conceptual underpinning that is a prerequisite for understanding motives for participation in any kind of physical activity.

Development of the Recreational Exercise Motivation Measure (REMM)

To address the limitations of previous measures, Rogers and Morris (2003) created a new instrument by incorporating both the theory-based and atheoretical approaches. First, they conducted a qualitative study that involved in-depth, semi-structured interviews with 11

exercise participants (seven females and four males) aged 21 to 50 years (M = 36.1 years, SD = 11.5 years), to examine the reasons for participation in non-competitive physical activity (Rogers, Morris, & Moore, 2008). They selected regular exercisers who engaged consistently in physical activity for at least 30-60 minutes every week in the preceding year. They used open-ended questions and asked participants to nominate their goals for exercise and what they felt embodied success in their activities. They used terms such as "success" and "goals" throughout the interview and avoided the terms "motives" or "reasons" for participation. Although these terms are often used interchangeably, they are conceptually distinct. This approach reflected the intention of Rogers et al. to examine achievement goal theory applied to non-competitive or recreational exercise.

Following the participant interviews, Rogers et al. (2008) identified 13 first-order themes, namely competition/ego, social comparison, appearance, rewards, others' expectations, affiliation/social, fitness, medical, psychological well-being, self-esteem, relaxation/stress release, mastery, and enjoyment. These were further reduced to seven second-order themes, namely competition/ego, extrinsic rewards, social, physical health, psychological health, mastery, and enjoyment. Although the mastery and competition/ego orientations that emerged from the qualitative study aligned with achievement goal theory, a range of other themes were also generated that lacked theoretical underpinning. These appeared to reflect motives rather than goals. Consequently, Rogers et al. proposed that the motives of mastery and enjoyment could be grouped into an intrinsic motivation general dimension, while all the other motives were grouped as extrinsic motives. This, therefore, fit neatly into the framework of SDT that could account for the range of motives, which emerged from the qualitative study.

This study by Rogers et al. (2008) had some significant advantages over the previous studies. First, the motives that emerged from the qualitative study fitted a theoretical framework, namely intrinsic-extrinsic motivation, as characterized in the SDT. Second, many of the motives that emerged from the interviews were consistent with the items and factors from previous studies (e.g., Morris, Clayton, Power, & Han, 1995; Frederick & Ryan, 1993; Ryan et al., 1997). Furthermore, although the motives were generated within the recreational exercise domain, they reflected considerable overlap with the items in the PMQ, which was developed in a sport context.

Equipped with the findings from the qualitative study, Rogers, Morris, and Moore (2008) generated 90 items to comprehensively cover the different aspects of each construct. They reduced the number of items to 55 based on the recommendations received from a panel of 16 experts in the field of exercise psychology. To create a valid and reliable measure, they borrowed some items from previous measures (e.g., MPAM, MPAM-R, and the 50-item PMQ). The items from the MPAM and MPAM-R were grouped into 13 integrated concepts and identical items were removed. Then, items that were easily readable and comprehendible were retained while others were deleted. The items from the MPAM and MPAM-R that reflected concepts not covered by the new items were added to the item pool under the relevant integrated concept. Two additional items (one related to gaining status and recognition from sport and the other referred to winning) from the 50-item PMQ that were not covered by the existing items were also added. This resulted in a 73-item questionnaire. Each item was independently reviewed to ensure that the 13 constructs were comprehensively covered and that none of them was over-represented by the items. To

reflect the breadth of the constructs, a similar number of items (between four and eight) were used to represent each of the 13 constructs.

The new measure, named the Recreational Exercise Motivation Measure (REMM), asked for the response to each item on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*), to indicate how people's motives for participation in physical activity agreed (or disagreed) with those expressed in each item. The choice of a 5-point scale was based on the recommendations of several authors (e.g., Clark & Watson, 1995; Comrey, 1988; Kline, 2005). The items were randomly sequenced in the final version of the questionnaire. All the items followed the same stem "I exercise …..". Examples of the items are "to keep up current skill level", "because it makes my physical appearance better than others", and "because it is something I have in common with my friends". The REMM was administered to 82 recreational exercise and recreational sport participants (65 females and 15 males, 2 gender not specified, mean age = 38.4 years, *SD* = 11.1) who were recruited from various gymnasiums and clubs.

Recently, the REMM has been validated with 750 recreational exercisers (439 females, 238 males, and 73 gender not specified) aged 14 to 84 years (mean age = 38.5 years, *SD* = 13.2; Rogers, Morris, & Moore, 2008). A follow up study with 245 sports participants (98 females, 119 males, 28 gender not specified), aged 17 to 74 years (mean age = 30.7 years, *SD* = 7.7), was also conducted that revealed similar factor structure in EFA. An EFA was conducted on both the recreational exercise sample and the recreational sport sample, which revealed an eight-factor structure, namely competition/ego, appearance, others' expectations, affiliation, physical condition, psychological condition, mastery, and enjoyment. The factor structure that emerged was found to be very similar to what was

predicted based on the prior qualitative study (Rogers, Morris, & Moore, 2008). A second-order factor analysis was then carried out on the factor scores from the first-order analysis. The second-order factor analysis grouped the eight first-order factors into three broad constructs, namely (with first-order themes in parentheses), intrinsic motivation (mastery, enjoyment), social extrinsic motivation (others' expectations, affiliation, competition), and body/mind extrinsic motivation (physical condition, psychological condition, and appearance). This was in line with the argument that the motives would fit the intrinsic-extrinsic dichotomy, where the motives of mastery and enjoyment would reflect intrinsic motivation while all the others would refer to extrinsic motivation.

The data also revealed that the REMM had reliable internal consistency. The coefficient alpha (α) for the total scale was found to be .94 in the recreational exercise sample, and .92 in the recreational sport sample. The α values for each of the sub-scales were the same for the recreational exercise data and recreational sports data. The α values for each of the sub-scales of REMM were high and varied from .77 and .92, namely (with the corresponding subscale in parentheses) were .92 (competition/ego), .83 (appearance), .77 (others' expectation), .90 (affiliation), .80 (physical condition), .85 (psychological condition), .88 (mastery), and .88 (enjoyment). The concurrent validity of the factors in REMM was supported by the fact that most of the items drawn from MPAM-R and the PMQ emerged from the factor analysis into equivalent factors in the REMM. Also, the factor analysis revealed that the REMM covered concepts that were not covered by the MPAM-R or the PMQ.

The study revealed that the exercise participants placed more emphasis on physical condition and appearance, while their sports counterparts rated enjoyment and affiliation as

more important. This was in line with previous research (e.g., Frederick, 1991; Frederick and Ryan, 1993; Morris, Clayton, Power, and Han, 1995, 1996; and Ryan, Frederick, Lepes, Rubio, and Sheldon, 1997). For instance, Morris et al. (1995) found that team sport participants placed more emphasis on challenge, fun, and affiliation, while exercise participants rated health/fitness motives to be more important. The consistency of these findings lends further support to the construct validity of the REMM. Future research should explore this area further and examine the different reasons people have for engaging in physical activity to build on the initial construct validity.

Research has clearly outlined the advantages REMM has over the other questionnaires. First, REMM was developed by incorporating both theoretical and atheoretical approaches. Also, the motives that emerged from REMM not only fitted the intrinsic-extrinsic motivation within the SDT, but were also consistent with the items and factors from previous studies (e.g., Morris, Clayton, Power, & Han, 1995; Frederick & Ryan, 1993; Ryan et al., 1997). And finally, REMM had been validated with both sport and exercise participants (Rogers, Morris, & Moore, 2008).

Development of the Physical Activity and Leisure Motivation Scale (PALMS)

Though the REMM has proven to be a comprehensive measure of participant motives for participation in sport and physical activity, it has some limitations. The sizeable length of the REMM has the potential to create problems, which may affect the results obtained (Morris & Rogers, 2004). For example, the time needed to complete the questionnaire might lead to boredom and fatigue. Hence, the REMM might not always be convenient for administration in sport or exercise contexts.

Consequently, a shorter measure, called the Physical Activity and Leisure Motivation Scale (PALMS), was developed by selecting the five strongest items on each of the eight factors in the REMM, producing a 40-item measure (Morris & Rogers, 2004). The number of items on the REMM, which loaded on each of the eight factors, ranged between eight and 13. To arrive at a short form version of the REMM, Morris and Rogers (2004) conducted item analysis, including examination of means and standard deviations, skewness and kurtosis, factor loadings, item-subscale correlations, and deleted alpha coefficient values. Items with high factor loadings and correlations were retained. Items with means not located too far toward one or other extreme of the scoring range, moderate to high standard deviations, indicating good spread in the distribution, high factor loadings on the factors they had been assigned to, and high correlation coefficients with the total score for the subscale to which they had been assigned, were retained while others were not included in the shorter version. As a result of this, three items were excluded from the subscales of physical condition, affiliation, others' expectations, and enjoyment, and eight items were left out of the competition/ego subscale. This resulted in the short form of the measure with a total of 40 items (five items on each of the eight subscales).

Given that the PALMS has been derived from the REMM, it is plausible that the PALMS, like the REMM, will have sound psychometric properties. A recent study by Zach, Bar-Eli, Morris, and Rogers (in press) translated the PALMS into Hebrew (PALMS-H) and validated it with 678 recreational exercise participants (350 males, 316 females, and 12 gender not specified) aged 9 to 89 years (M = 28.65 years, SD = 16.48) who exercised regularly from 30 different gymnasiums, recreational parks, clubs, and fitness centers in Israel. An EFA of the data yielded nine factors namely, competition/ego, affiliation,

psychological condition, appearance, enjoyment, physical condition, mastery, family's and friends' expectations, and health professionals' and employers' expectations. Zach et al. also found that the PALMS-H demonstrated good internal consistency, with the α values for each of the sub-scales ranging from .63 to .96. More specifically, the α values for each of the sub-scales of the PALMS-H were (with the corresponding subscale in parentheses) .96 (competition/ego), .91 (affiliation), .90 (psychological condition), .90 (appearance), .89 (enjoyment), .84 (physical condition), .84 (mastery), .83 (family's and friends' expectations), and .63 (health professionals' and employers' expectations). The factor structure of the PALMS was found to be very similar to that of the REMM. There was one difference. The factor labeled others' expectations (from the REMM) was found to be split into two separate factors, one that referred to family's and friends' expectations, and another that related to health professionals' and employers' expectations.

Since EFAs have been used to study the factor structure of both the REMM and the PALMS, future research should focus on conducting confirmatory factor analysis (CFA) on the PALMS to confirm the factor structure. Future research should also examine whether this new measure (PALMS) is as reliable and consistent as the longer "parent" measure (REMM). It is, therefore, worthwhile to conduct research examining the REMM and the PALMS in both sport and exercise contexts to examine the motives people have for participating in various kinds of physical activity.

Motivational Differences between Demographic Variables

Research on participation motivation suggests that there are systematic differences between participation motives and some demographic variables. These may include gender,

level of participation in physical activity, and the preference of individuals for specific forms of physical activity.

Research on gender differences in participation motivation indicates that males and females exhibit different motives for participation in physical activity. Mathes and Battista (1985) found that while males favoured competition as a motive for participation in physical activity, females favoured social experience. Frederick (1991) found that while males placed more emphasis on motives related to mastery, females seemed to be more interested in motives related to physical attractiveness and appearance. A number of other studies have shown that females consistently rated appearance motives more highly than their male counterparts (Frederick & Ryan, 1993; Frederick, Morrison, & Manning, 1996; Frederick & Morrison, 1996; Weinberg et al., 2000).

Though research on participation motivation has often looked at factors effecting participation in physical activity, the level of participation in any form of physical activity has received no attention. It is well evident from the research on participation motivation that individuals have different motives for engaging in physical activity. It can be said that the extent to which people undertake physical activity is reliant to a large degree on the level at which they participate. It is, therefore, important to make distinctions between the different levels of participation. For instance, participants who classify their physical activity participation as club may subscribe to and are members of an organization/centre, e.g., fitness centres. Further, it may be considered that recreational participants are those individuals who engage in physical activity in their own discretionary leisure time. And finally, social participants may be considered as individuals who engage in physical activity due to communal reasons. It is plausible to believe that there will be systematic differences

between the levels of participation, even within the same kinds of physical activity. For example, a professional tennis player is expected to have strong motivation to conscientiously pursue his/her career goals and hence undertake physical activity seriously and diligently. A recreational tennis player, on the other hand, might play tennis at the local club to get together with his/her friends. Conversely, it can be argued that the motives for participation in physical activity will also differ from one person to another. It would, therefore, be interesting to compare the participants' motives for engaging in physical activity and the level at which they are involved in.

From the reviewed literature on motives for participation, it is plausible to believe that there is a relationship between physical activity types and the preference of individuals for those activities. Studies that have reported the correspondence of the participation motives with specific types of physical activity suggest systematic differences (e.g., Rogers et al., 2008; Morris et al., 1995, 1996; Ryan et al., 1997; Frederick and Ryan, 1993). For instance, Morris et al. (1995, 1996) found that team sport participants' rate affiliation higher than any other group, individual sport participants' place more emphasis on interest/enjoyment and competence/mastery, racquet sport competitors' rate challenge or competition/ego more highly than others, exercise participants rate physical condition and appearance, and martial arts competitors are especially interested in enhancing body and mind-related skills. It has also been noted that individual sport participants seem to engage in physical activity for inherent reasons, which reflect an intrinsic motivation orientation, whereas exercise/fitness group participants get involved in physical activity mostly due to instrumental reasons, which is extrinsically motivated (Frederick and Ryan, 1993). It would

be interesting to examine the reasons and motives people nominate for engaging in physical activity.

Aims of the Study

Due to the paucity of research in the area of participation motivation, concrete hypotheses have not been formulated in this study. Instead, multiple aims have been mentioned based on the literature review. First, the present study was conducted to validate the PALMS. Since previous studies have used EFAs to study the factor structure of both the REMM and the PALMS, a CFA was conducted in the present study to test the factor structure of the PALMS. The PALMS was expected to demonstrate sound psychometric properties. This study also examined the reliability and validity of the PALMS. More specifically, the internal consistency and criterion validity of the PALMS were also investigated in the study. It was expected that the subscales of the PALMS would demonstrate good internal consistency. With respect to the criterion validity, it was expected that the subscales of the PALMS would show strong correlations when compared to the corresponding subscales of the REMM.

A second aim of this study was to examine the motives people have for engaging in different kinds of physical activity. From the literature reviewed, it is understood that different people have different reasons for engaging in physical activity. And so, it was expected that the participants in this study would nominate different motives for participation in physical activity, consistent with previous research. For instance, it was hypothesized that males would rate affiliation and females would rate appearance as their primary motive for engaging in physical activity.

A third aim of the present study was to examine the motivational differences between different categories of key demographic variables. It was hypothesized that males would rate competition more highly as a motive for participation than females, who were expected to rate appearance highly. It was anticipated that team sport (e.g., Australian Football League) players would rate affiliation higher than the rest of the sample. Similarly, it was expected that gym-based exercisers would rate physical health and appearance as more important than people involved in other activities, whereas martial arts (tae kwon do) participants and individuals engaging in yoga would rate psychological health and skill development as the principal motives for engaging in physical activity.

Chapter 3

Method

Participants

A community sample of 202 volunteer participants, 120 males and 82 females, aged 18 to 71 years (M = 28.7, SD = 10.28), was recruited from various organizations, clubs, and leisure centres. The participants represented different forms of physical activity namely, Australian Football League (AFL), gym-based exercise, tae kwon do, tennis, and yoga.

Measures

Demographic information form. This form was used to obtain relevant information, such as participant's age, gender, occupation, and the physical activity they were involved in, including the skill level at which people participated, time for which they have participated, and extent of participation per week. (See Appendix B)

Recreational Exercise Motivation Measure (REMM; Rogers & Morris, 2003). The REMM is a 73-item measure of motives for recreational exercise. It measures eight factors, namely competition/ego, appearance, others' expectations, affiliation, physical condition, psychological condition, mastery, and enjoyment, on 5-point Likert scales ranging from 1 (*strongly disagree)* to 5 (*strongly agree)*, so higher scores reflect greater motivation. In responding to the statements, the instructions asked participants to "think of the motives you have for the exercise activity you do. Try not to spend time pondering over your responses. There are no right or wrong answers. Indicate how much your motives correspond with each of the statements by circling one of the numbers on the scale beside each statement. In each case, 1 indicates strongly disagree and 5 indicates strongly agree". Participants were

instructed that all items followed the stem "I participate…..". Examples of the items are "because exercise helps improve my mental health", "because it is something I have in common with my friends", and "to perform well compared to my own past performance". The coefficient alpha (α) for the REMM was found to be .94 in the recreational exercise sample, and .92 in the recreational sport sample (Rogers & Morris, 2003). The α values for each of the sub-scales were the same for the recreational exercise data and recreational sports data. The α values for each of the sub-scales of REMM was high and varied from .77 and .92, namely (with the corresponding subscale in parentheses) were .92 (competition/ego), .83 (appearance), .77 (others' expectation), .90 (affiliation), .80 (physical condition), .85 (psychological condition), .88 (mastery), and .88 (enjoyment). It was validated with a sample of 750 recreational exercisers and then checked with a sample of 250 competitive sport performers. (See Appendix C)

Physical Activity and Leisure Motivation Scale (PALMS; Morris & Rogers, 2004). This is a measure of motives for participating in physical activity and leisure, comprising 40 items. The PALMS was developed from a validated measure, the Recreational Exercise Motivation Measure (REMM; Roger & Morris, 2003). The PALMS retained the eight sub-scale structure of the REMM. The 40 items of the PALMS represent the five strongest items on each of the original eight motivational factors on the REMM. Items were chosen on the basis of analyzing data from factor analyses, descriptive statistics, item-subscale correlations and item-deleted Alpha coefficients for each item in the REMM. Each sub-scale on the PALMS, thus, contains five items, all measured on a 5-point Likert scale, ranging from 1 (*strongly disagree)* to 5 (*strongly agree)*, so higher scores reflect greater motivation. The participants were given instructions similar to those in the REMM. Participants were

instructed that all items followed the stem "I undertake physical activity…..". Examples of the items are "because I enjoy spending time with others", "to do something in common with friends", and "because it acts as a stress release". The PALMS has recently been validated with a sample of 678 recreational exercise participants, aged 9 to 89 years, who engaged in regular exercise (Zach et al., in press). The α values for each of the eight sub-scales of PALMS varied from .63 and .96 and namely (with the corresponding subscale in parentheses) were .96 (competition/ego), .90 (appearance), .83 (family's and friends' expectations), .63 (health professionals' and employers' expectations), .91 (affiliation), .84 (physical condition), .90 (psychological condition), .84 (mastery), and .89 (enjoyment). (see Appendix D)

Shortened Marlowe-Crowne Social Desirability Scale (SM-C-SDS; Reynolds, 1982). This is a 13-item short form of the original 33-item M-C-SDS (Crowne & Marlowe, 1960) wherein participants are required to answer in true or false responses. The purpose of the SM-C-SDS is to assess individuals' need to respond in a socially desirable way (Reynolds, 1982). Although a number of researchers studying motivation in the past have used questionnaires to collect data (e.g., Brodkin & Weiss, 1990; Gill, Gross, & Huddleston, 1983; Gould, Feltz, & Weiss, 1985; Morris, Clayton, Power & Han, 1995; Morris & Han, 1991; Morris, Power, & Pappalardo, 1993; Morris, & Rogers, 2004; Sutherland & Morris, 1997; and Weinberg, Tenenbaum, McKenzie, Jackson, Anshel, Grove, & Fogarty, 2000), researchers also suggest that self-report instruments are fraught with social desirability bias (King & Bruner, 2000; Seol, 2007). Social desirability bias refers to the tendency of individuals to respond to self-evaluative questions in a socially approved manner so as to portray themselves in a favourable fashion. Future researchers are advised to use social

desirability scales, such as the SM-C-SDS, to assess social desirability bias amongst participants, especially in studies that examine the psychometric properties of self-report questionnaires.

In the present study, the SM-C-SDS was correlated with the PALMS to see if participants provided honest responses, or whether they responded to the PALMS in a socially desirable way. In responding to the statements, the participants were informed that "listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you personally". Examples of the items are "on a few occasions, I have given up doing something because I thought too little of my ability", "there have been times when I felt like rebelling against people in authority even though I knew they were right", and "I have never been irked when people expressed ideas very different from my own". (see Appendix E)

Procedure

The participants were recruited from various organizations, clubs, leisure centres, and through chain sampling. Prior permission was negotiated through relevant authorities, wherever needed, to contact potential participants. It was then explained to prospective participants that their participation was voluntary and would be kept classified and that they could withdraw from the study at any point should they feel uncomfortable. Prospective participants who were willing to participate in the study were then told the nature and purpose of the study. They were also informed that there were no right or wrong answers and that their responses would be kept confidential. The participants classified their participation in physical activity as club, recreational, and social.

Participants were provided with an information sheet (Appendix A) that explained the steps involved in the study and contained the contact details of the principal and student researchers. Interested participants were then provided with a demographic information form and a questionnaire pack to complete and return. The questionnaire pack consisted of the REMM, the SM-C-SDS, and the PALMS. Participation in the study took around 20-30 minutes. The questionnaires were packed in such a way that half of the participants completed the measures in the order just listed and the other half completed the measures in the order PALMS, SM-C-SDS, and REMM, to eliminate or reduce potential order effects. Completion of the demographic information form and the questionnaire pack implied consent. While conducting the study, every effort was undertaken to make sure that the participants were made comfortable and that any potential risks were either removed or at least minimized. All the participants were debriefed and thanked for their cooperation after the completion of the questionnaire pack.

Analyses

Testing the factor structure of the PALMS

In the present study, structural equation modeling (SEM) was used to test the factor structure of the PALMS. Structural equation modeling is a statistical methodology that is used for the quantification and testing of theories and models. There are no operational methods for measuring latent variables, especially in behavioural sciences. Manifestation of these variables can be observed, however, by recording certain behavioural patterns or responses using instruments (e.g., questionnaires, self-reports, and tests). SEM uses path diagrams and analyses to explicitly state the dependency relations between the latent and observed variables in multivariate data. CFA is a part of SEM and plays a crucial role in model validation in path or structural analyses. Each variable included in the path diagram in

the CFA is measured by its own set of observed indicators. In the present study, a path diagram was drawn to depict the relationship between the latent variable (8 factors) and the observed variables (items on the PALMS). The assumptions of normality were also checked. A number of fit indices (e.g., CMIN/DF, NFI, CFI, and RMSEA) have been considered to see how well the data fit the model.

Internal consistency and criterion validity of the PALMS

Cronbach's (1951) Coefficient Alpha was calculated in order to determine the internal consistency of the items for the whole scale. In terms of criterion validity, each of the eight subscales of the PALMS was correlated using Spearman's (1904) Rank Correlation Coefficient with the corresponding subscales on the REMM. The Pearson's (1920) Product-Moment correlations between the subscales of the PALMS and the SM-C-SDS were also examined to determine whether participants were responding to the REMM and PALMS in socially desirable ways.

Examining motives for participation in physical activity

Descriptive statistics were calculated to broadly examine the participation motives for the different physical activities. An independent *t*-test was used to examine the gender differences on the participation motives. A one-way between groups ANOVA was also used to examine the differences on the subscales of the PALMS for the different physical activities. Furthermore, a Kruskal-Wallis one-way ANOVA was used to examine the differences in the ranking of motives for participation across the five different physical activities.

Chapter 4

Results

In the first section of this chapter, the results of the CFA are reported. The CFA was conducted to test the factor structure of the PALMS. Then, the internal consistency and criterion validity of the PALMS are reported. The results of analyses using descriptive statistics to examine participation motives for physical activity are then presented. Next the findings are reported from an independent *t*-test, examining gender differences on the participation motives. Then the results are presented of one-way between groups ANOVA, used to examine differences on the subscales of the PALMS for the different physical activities. Finally, the results are reported of a Kruskal-Wallis one-way ANOVA, used to examine the differences in the ranking of motives for participation across the five different physical activities.

Confirmatory Factor Analysis

A confirmatory factor analysis, based on the data collected, was carried out through AMOS 19.0 on the eight subscales of the PALMS. The hypothesized model is presented in Figure 4.1, where ellipses represent latent variables, and rectangles represent measured variables. Single-headed arrows represent a hypothesized direct relationship between two variables whereas double-headed arrows indicate an unanalysed relationship, simply a covariance between the two variables with no implied direction of effect (Tabachnick & Fidell, 2007). Absence of a line connecting variables implies no hypothesized effect. Figure 4.1 shows the path diagram for the latent and observed variables. The hypothesized model consists of eight latent variables, namely Mastery, Physical Condition, Affiliation, Psychological Condition, Appearance, Others' Expectations, Enjoyment, and

Competition/Ego. Consistent with previous EFA research on the PALMS, it is postulated in the hypothesized model in this study that each of the observed variables will load on one and only one factor (i.e., latent variable).

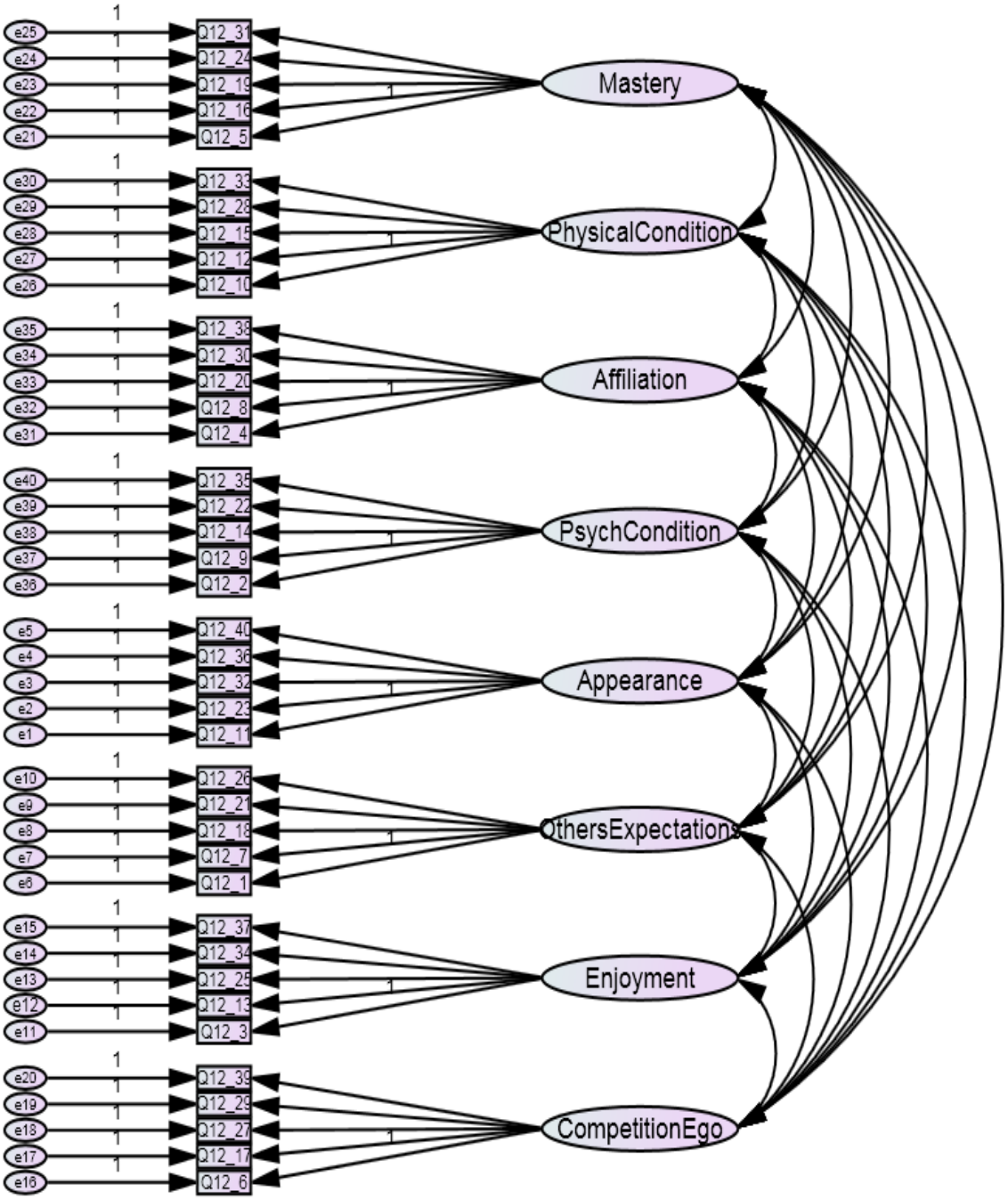

Figure 4.1. Path diagram for the latent and observed variables in the CFA.

The observed variables (items on the PALMS) and their corresponding questions and subscales have been presented in Table 4.1.

Table 4.1
Observed Variables and the Corresponding Questions and Subscales on the PALMS

Observed Variables	PALMS	
	Questions	Subscales
Q12_1	1. to earn a living	Others Expectations
Q12_2	2. because it helps me relax	Psychological Condition
Q12_3	3. because it's interesting	Enjoyment
Q12_4	4. because I enjoy spending time with others	Affiliation
Q12_5	5. to get better at an activity	Mastery
Q12_6	6. because I perform better than others	Competition/Ego
Q12_7	7. because I get paid to do it	Others Expectations
Q12_8	8. to do activity with others	Affiliation
Q12_9	9. to better cope with stress	Psychological Condition
Q12_10	10. because it helps maintain a healthy body	Physical Condition
Q12_11	11. to define muscle, look better	Appearance
Q12_12	12. be physically fit	Physical Condition
Q12_13	13. because it makes me happy	Enjoyment
Q12_14	14. to get away from pressures	Psychological Condition
Q12_15	15. to maintain physical health	Physical Condition
Q12_16	16. to improve existing skills	Mastery
Q12_17	17. to be best in the group	Competition/Ego
Q12_18	18. to manage medical condition	Others Expectations
Q12_19	19. to do my personal best	Mastery
Q12_20	20. to do something in common with friends	Affiliation
Q12_21	21. because people tell me I need to	Others Expectations
Q12_22	22. because it acts as a stress release	Psychological Condition
Q12_23	23. to improve body shape	Appearance
Q12_24	24. to obtain new skills/activities	Mastery
Q12_25	25. because it's fun	Enjoyment
Q12_26	26. because it was prescribed by doctor, physio	Others Expectations
Q12_27	27. to work harder than others	Competition/Ego
Q12_28	28. because it keeps me healthy	Physical Condition
Q12_29	29. to compete with others around me	Competition/Ego
Q12_30	30. to talk with friends exercising	Affiliation
Q12_31	31. to keep current skill level	Mastery
Q12_32	32. to improve appearance	Appearance
Q12_33	33. to improve cardiovascular fitness	Physical Condition

Q12_34	34. because I enjoy exercising	Enjoyment
Q12_35	35. to take mind off other things	Psychological Condition
Q12_36	36. to lose weight, look better	Appearance
Q12_37	37. because I have a good time	Enjoyment
Q12_38	38. to be with friends	Affiliation
Q12_39	39. to be fitter than others	Competition/Ego
Q12_40	40. to maintain trim, toned body	Appearance

To conduct CFA on the PALMS, data from 202 participants, who engaged in a range of physical activities including AFL, gym-based exercise, tae kwon do, tennis, and yoga, was collected. The data was screened for multivariate outliers. There was no missing data. The assumptions of multivariate normality were examined by checking the multivariate skewness and kurtosis coefficients. Table 4.2 shows that there were significant departures from normality for some of the items. Harington (2009) maintained that maximum likelihood (ML), one of the commonly used estimation methods, might not be appropriate in cases of non-normality. Asymptotically distribution-free (ADF) estimation, on the other hand, does not assume multivariate normality and should be preferred (Kline, 2005). ADF, however, requires very large samples to obtain reliable weight matrices (Browne, 1984; McDonald & Ho, 2002). Given the sample of 202 in this study was not sufficiently large, the generalized least squares (GLS) was used as an estimation method.

Table 4.2

Means, Range, Skewness, and Kurtosis Values of the Observed Variables in the CFA

Observed Variables	Mean	Min	Max	Skewness	Kurtosis
Q12_1	1.55	1	4	0.743	1.342
Q12_2	3.84	2	5	-0.988	2.028
Q12_3	3.81	3	5	-0.887	0.632
Q12_4	3.09	2	5	0.61	-1.177
Q12_5	4.01	3	5	-0.019	-1.653

Q12_6	3.58	2	5	-0.253	-1.212
Q12_7	1.57	1	5	1.596	7.03
Q12_8	3.10	2	5	0.608	-1.209
Q12_9	3.62	3	5	0.120	-0.861
Q12_10	3.90	3	5	-0.279	1.087
Q12_11	2.93	1	5	0.875	-0.868
Q12_12	3.90	3	5	-0.444	1.602
Q12_13	3.87	3	5	-1.15	2.122
Q12_14	3.25	2	5	-0.038	-0.414
Q12_15	3.88	3	5	-0.573	1.609
Q12_16	4.02	2	5	-0.232	-1.212
Q12_17	3.56	2	5	-0.16	-1.409
Q12_18	1.21	1	5	3.799	13.599
Q12_19	4.03	3	5	-0.065	-1.562
Q12_20	3.10	2	5	0.596	-1.179
Q12_21	2.05	1	5	2.677	11.477
Q12_22	3.63	2	5	-0.045	-0.62
Q12_23	2.96	2	5	0.834	-0.894
Q12_24	3.72	2	5	0.323	-1.574
Q12_25	3.80	3	5	-1.115	0.373
Q12_26	1.20	1	5	3.929	14.557
Q12_27	3.56	1	5	-0.222	-1.129
Q12_28	3.86	3	5	-1.101	1.778
Q12_29	3.55	1	5	-0.229	-1.261
Q12_30	3.04	1	5	0.548	-1.072
Q12_31	4.12	3	5	-0.22	-1.34
Q12_32	2.95	2	5	0.843	-0.924
Q12_33	3.94	3	5	-0.09	0.719
Q12_34	3.86	3	5	-1.314	2.123
Q12_35	3.33	2	5	0.089	-0.17
Q12_36	2.94	2	5	0.852	-0.886
Q12_37	3.85	3	5	-1.467	1.9
Q12_38	3.09	2	5	0.615	-1.179
Q12_39	3.68	2	5	-0.292	-1.217
Q12_40	2.98	2	5	0.825	-0.964

The fit statistics, namely minimum discrepancy (CMIN or χ^2), degrees of freedom (DF), minimum discrepancy divided by the degrees of freedom (CMIN/DF ratio), normed fit index (NFI), comparative fit index (CFI), and the root mean square error of approximation (RMSEA) are presented in Table 4.3. Table 4.3 indicates that, in the present study, the hypothesized model produced a significant chi-square, χ^2 (712, 202) = 1580.334, $p < .001$. The CMIN/DF or χ^2/df ratio was found to be 2.22. The NFI and CFI were found to be 0.95 and 0.97 respectively. The RMSEA was also considered to assess the degree of fit of the model. The RMSEA value for the hypothesized model was found to be 0.078, with 90% confidence intervals ranging from 0.073 to 0.083.

Table 4.3
Model Fit Indices for the Data Collected using PALMS

	N	CMIN	DF	CMIN/DF	NFI	CFI	RMSEA	
$Model_H$	202	1580.334	712	2.22	0.951	0.969	0.078	
							0.073*	0.083**

Note. Model $_H$ = the hypothesized model. N = sample size. CMIN = minimum discrepancy. DF = degrees of freedom. NFI = normed fit index. CFI = comparative fit index. RMSEA = root mean square error of approximation. * = lower boundary of a two-sided 90% confidence interval for the population. ** = upper boundary of a two-sided 90% confidence interval for the population.

The standardized direct (unmediated) effects of the latent variables on the observed variables are presented in Table 4.4. Table 4.4 indicates that, except for item Q12_4 (because I enjoy spending time with others) and Q12_2 (because it helps me relax), all the other items have high loadings.

Table 4.4
Standardized Direct (unmediated) Effects of the Latent Variables on the Observed Variables

Questions on the PALMS	L1	L2	L3	L4	L5	L6	L7	L8
Q12_35	-.706	--	--	--	--	--	--	--
Q12_22	.672	--	--	--	--	--	--	--

Questions on the PALMS	L1	L2	L3	L4	L5	L6	L7	L8
Q12_14	-.800	--	--	--	--	--	--	--
Q12_9	.926	--	--	--	--	--	--	--
Q12_2	.326	--	--	--	--	--	--	--
Q12_38	--	-1.013	--	--	--	--	--	--
Q12_30	--	-.627	--	--	--	--	--	--
Q12_20	--	-.642	--	--	--	--	--	--
Q12_8	--	-.640	--	--	--	--	--	--
Q12_4	--	.071	--	--	--	--	--	--
Q12_33	--	--	.799	--	--	--	--	--
Q12_28	--	--	.960	--	--	--	--	--
Q12_15	--	--	.992	--	--	--	--	--
Q12_12	--	--	.947	--	--	--	--	--
Q12_10	--	--	.927	--	--	--	--	--
Q12_31	--	--	--	.762	--	--	--	--
Q12_24	--	--	--	.991	--	--	--	--
Q12_19	--	--	--	.573	--	--	--	--
Q12_16	--	--	--	.809	--	--	--	--
Q12_5	--	--	--	.798	--	--	--	--
Q12_39	--	--	--	--	.918	--	--	--
Q12_29	--	--	--	--	.919	--	--	--
Q12_27	--	--	--	--	.984	--	--	--
Q12_17	--	--	--	--	.981	--	--	--
Q12_6	--	--	--	--	.982	--	--	--
Q12_37	--	--	--	--	--	.966	--	--
Q12_34	--	--	--	--	--	.979	--	--
Q12_25	--	--	--	--	--	.965	--	--
Q12_13	--	--	--	--	--	.890	--	--
Q12_3	--	--	--	--	--	.992	--	--
Q12_26	--	--	--	--	--	--	.976	--
Q12_21	--	--	--	--	--	--	.601	--
Q12_18	--	--	--	--	--	--	.801	--
Q12_7	--	--	--	--	--	--	1.050	--
Q12_1	--	--	--	--	--	--	.910	--
Q12_40	--	--	--	--	--	--	--	.963
Q12_36	--	--	--	--	--	--	--	.951
Q12_32	--	--	--	--	--	--	--	.987
Q12_23	--	--	--	--	--	--	--	.985
Q12_11	--	--	--	--	--	--	--	.952

Note. L1 = Psychological Condition. L2 = Affiliation. L3 = Physical condition. L4 = Mastery. L5 = Competition/Ego. L6 = Enjoyment. L7 = Others' expectations. L8 = Appearance.
-- = .000

Internal Consistency and Criterion Validity of the PALMS

The internal consistency and the criterion validity of the PALMS are represented in Table 4.5. Overall, the PALMS demonstrated good internal consistency with a Cronbach's alpha (α) of 0.79. The internal consistency values of the eight PALMS subscales were generally high, the lowest being 0.80 for others' expectations. Spearman's rho (r_s) indicated a strong positive correlation between the REMM and the PALMS ($r_s = .9$, $p<.001$, two tailed, $N = 202$). The Spearman's rho correlations between each PALMS sub-scale and the corresponding sub-scale on the validated REMM, which are also displayed in Table 4.5, were also high, ranging from $r_s = .76$ to .95, which lends support to the criterion validity of the eight PALMS subscales.

Table 4.5

Internal Consistency and Criterion Validity of the PALMS

Sub-scales	PALMS	PALMS & REMM
	Internal consistency (α)	Correlations (r_s)
Mastery	0.97*	0.93*
Physical condition	0.96*	0.76*
Affiliation	0.99*	0.95*
Psychological condition	0.90*	0.91*
Appearance	0.99*	0.89*
Others' expectations	0.80*	0.84*
Enjoyment	0.95*	0.83*
Competition/ego	0.98*	0.83*

Note. α = Cronbach's alpha. r_s = Spearman's rho.

* p = significant at .01 (two-tailed)

The Pearson's product moment correlation coefficients between each of the subscales of the PALMS and the SM-C-SDS are presented in Table 4.6. These indicated low correlations between each subscale of the PALMS and the SM-C-SDS. The highest correlations were observed for the competition/ego and physical condition subscales respectively.

Table 4.6

Correlation between each of the Subscales of the PALMS and the SM-C-SDS

	PALMS & SM-C-SDS
Sub-scales	Pearson's Product-Moment correlations (r)
Mastery	-0.04
Physical condition	-0.30**
Affiliation	0.03
Psychological condition	0.03
Appearance	0.05
Others' expectations	-0.14*
Enjoyment	-0.21**
Competition/ego	-0.34**

* p < .05, ** p < .01.

Examining Motives for Participation in Physical Activity

Descriptive statistics were calculated for the whole sample. Table 4.7 presents the means and SDs for the whole sample for all sub-scales of all measures. The results in Table 4.7 indicate that the age range for the 202 participants was 18 to 71 years ($M = 28.71$, $SD = 10.28$).

Table 4.7

Descriptive Statistics for the Whole Sample

	N	Minimum	Maximum	M	SD
Age (in years)	202	18	71	28.71	10.28

Gender	202	1	2	1.41	0.49

Note. N = sample size. M = Mean. SD = Standard deviation.

The global means and standard deviations for motivation on the REMM and PALMS in each activity are presented in Table 4.8. As the results indicate, the means and standard deviations for these physical activities were very similar on the REMM and the PALMS.

Table 4.8

Means and Standard Deviations for REMM and PALMS for Different Activities

Physical Activity	*N*	REMM		PALMS	
		M	*SD*	*M*	*SD*
AFL	42	3.32	0.11	3.45	0.15
Gym	44	3.38	0.19	3.37	0.20
Taekwondo	36	3.29	0.06	3.31	0.06
Tennis	30	3.08	0.07	3.16	0.10
Yoga	36	2.92	0.08	2.96	0.08

Note. *N* = sample size. *M* = Mean. *SD* = Standard deviation.

The means and standard deviations for subscales of the PALMS for males and females are presented in Table 4.9. An independent samples *t*-test revealed that there were significant differences in the mean scores for males and females in the subscales of affiliation, appearance, and mastery.

Table 4.9

Means for Subscales of the PALMS for Males and Females

Subscales	Males	Females
Mastery	19.82* (3.97)	20.06* (4.48)
Enjoyment	19.23	19.18

	(1.78)	(1.89)
Affiliation	17.08**	13.04**
	(6.41)	(3.96)
Competition/ego	18.52	17.13
	(5.30)	(5.54)
Others' expectations	7.83	7.28
	(2.77)	(1.93)
Physical condition	19.62	19.30
	(2.04)	(2.19)
Psychological condition	17.54	17.93
	(2.48)	(2.40)
Appearance	13.83*	16.16*
	(5.42)	(6.40)

Note. Numbers in brackets are standard deviations.
*$p < .005$, **$p < .001$.

The means and standard deviations for the level of participation in different physical activities are presented in Table 4.10. One-way between groups ANOVA revealed significant differences on the subscales of the PALMS for the level of participation in physical activity. The social level participants reported a significantly lower mean on the subscale of mastery than the club and the recreational level participants. The social level participants reported a significantly higher mean on the subscale of affiliation compared to the club and the recreational level participants. On the subscale of competition/ego, the club level participants reported a

significantly higher mean than the recreational and social level participants. The social level participants reported a significantly higher mean on the subscale of others' expectations than the club and recreational level participants. On the subscale of appearance, the social level participants reported a significantly higher mean than the club and recreational level participants.

Table 4.10

Mean and Standard Deviation for Motives for Participation Subscales for Different Levels of Participation

Subscales	Club	Recreational	Social
Mastery	20.39* (3.70)	19.69* (4.61)	15.00* (0.89)
Enjoyment	19.81** (0.93)	18.46** (2.33)	20.00** (0.00)
Affiliation	17.60** (6.21)	12.46** (3.88)	22.00** (1.78)
Competition/ego	20.58** (3.67)	15.16** (5.77)	13.67** (1.36)
Others' expectations	7.18** (1.24)	7.74** (3.06)	13.00** (2.68)
Physical condition	20.16** (0.80)	18.62** (2.79)	20.67** (1.03)
Psychological condition	16.67** (1.87)	18.87** (2.59)	18.33** (0.51)

Appearance	12.07**	17.68**	19.00**
	(4.92)	(5.58)	(4.98)

Note. Numbers in brackets are standard deviations.
*$p < .01$, **$p < .001$.

The means and standard deviations for participation motives for different physical activities are presented in Table 4.11. A One-way between groups ANOVA revealed significant differences on the subscales of the PALMS for the different physical activities. Tae kwon do participants reported a significantly higher mean on the subscale of mastery than the AFL, gym, tennis, and yoga participants. The AFL participants reported a significantly higher mean on the subscale of affiliation compared to the gym, tae kwon do, tennis, and yoga participants. For the subscale of competition/ego, the tennis participants reported a significantly higher mean compared to the AFL, gym, tae kwon do, and yoga participants. The yoga participants reported a significantly lower mean on the subscale of physical condition and a significantly higher mean on the subscale of psychological condition compared to AFL, tae kwon do, gym, and tennis participants. The gym-based participants reported a significantly higher mean for the subscale of appearance compared to the AFL, tae kwon do, tennis, and yoga participants.

Table 4.11
Means and Standard Deviations for Participation Motives for Different Physical Activities

Subscales	AFL	Gym	Taekwondo	Tennis	Yoga
Mastery	18.60*	15.27*	25.00*	17.30*	24.94*
Enjoyment	19.64*	19.18*	20.00*	19.60*	17.03*
Affiliation	24.57*	13.50*	13.89*	11.63*	10.00*
Competition/ego	21.07*	16.18*	19.78*	24.97*	10.06*
Others' expectations	8.07*	7.77*	6.00*	7.40*	6.00*

Physical condition	20.19*	20.18*	20.00*	20.00*	15.75*
Psychological condition	15.40*	18.36*	18.00*	15.17*	19.97*
Appearance	10.48*	24.50*	10.00*	10.47*	14.83*

Note. Total participants = 188.
*p <.001.

The ranking of participation motives for each physical activity is reported in Table 4.12. Consistent with the one-way between groups ANOVA, a Kruskal-Wallis one-way ANOVA revealed a statistically significant difference in the ranking of motives for participation across the five different physical activities. As presented in Table 4.12, tae kwon do participants reported a significantly higher mean rank than the other activities for the mastery and enjoyment subscales; AFL athletes reported a significantly higher mean rank than the other activities for affiliation, physical condition, and others' expectations subscales; gym-based exercisers reported a significantly higher mean rank than the other activities for the appearance subscale; tennis players reported a significantly higher rank than the other activities for the competition/ego subscale; and yoga participants reported a significantly higher mean rank than the other activities for the psychological condition subscale.

Table 4.12

Ranking of Participation Motives for each Physical Activity

Subscales	Rank order	Physical activity	Mean Rank
Mastery			
	1st	Taekwondo	153.50*
	2nd	Yoga	151.50*
	3rd	AFL	86.83*
	4th	Tennis	63.57*
	5th	Gym	28.00*
Physical condition			
	1st	AFL	122.89*
	2nd	Gym	112.55*

	3rd	Taekwondo	101.50*
	4th	Tennis	101.50*
	5th	Yoga	26.49*
Affiliation			
	1st	AFL	167.21*
	2nd	Taekwondo	97.56*
	3rd	Gym	81.98*
	4th	Tennis	68.60*
	5th	Yoga	43.50*
Psychological condition			
	1st	Yoga	157.07*
	2nd	Gym	118.36*
	3rd	Taekwondo	102.50*
	4th	AFL	47.99*
	5th	Tennis	39.93*
Appearance			
	1st	Gym	166.50*
	2nd	Yoga	124.60*
	3rd	AFL	60.31*
	4th	Tennis	55.25*
	5th	Taekwondo	49.00*
Others' expectations			
	1st	AFL	140.21*
	2nd	Gym	123.07*
	3rd	Tennis	109.80*
	4th	Taekwondo	44.00*
	5th	Yoga	44.00*
Enjoyment			
	1st	Taekwondo	116.50*
	2nd	Tennis	105.23*
	3rd	AFL	102.85*
	4th	Gym	95.36*
	5th	Yoga	52.76*
Competition/ego			
	1st	Tennis	167.15*
	2nd	AFL	120.68*
	3rd	Taekwondo	105.22*
	4th	Gym	71.66*
	5th	Yoga	20.61*

Note. Total participants = 188.
*$p < .001$.

Chapter 5

Discussion

Based on the literature reviewed, the primary aim of the present study was to validate the Physical Activity and Leisure Motivation Scale (PALMS). Since previous research has used EFAs to study the factor structure of both the REMM and the PALMS, a CFA was conducted in the present investigation to test the factor structure of the PALMS. Subsequently, the reliability and criterion validity of the PALMS were also examined. Another purpose of the present study was to examine people's reasons for engaging in sport and exercise activities using the PALMS. The present study also investigated the motivational differences between demographic variables.

Testing the Factor Structure of the PALMS

The PALMS was developed from its parent measure, the REMM, to examine motives for participation in physical activity. As compared to the REMM, which was shown to be a reliable measure of participation motivation, the PALMS has been validated in only one study so far (Zach et al., in press). No research has employed a CFA to test the factor structure of the PALMS.

In the present study, CFA was conducted to examine the 8-factor model of the PALMS that is based on its derivation from the 8-factor REMM. The eight factors of the PALMS are Mastery, Physical Condition, Affiliation, Psychological Condition, Appearance, Others' Expectations, Enjoyment, and Competition/Ego. The CFA was employed to evaluate the extent to which the PALMS measures the latent variables it is proposed to measure. Fit indices were used to examine the model fit and see how well the population data fitted the hypothesized model. In the CFA, the data collected in the present study

provided a good approximation to the hypothesized model. The χ^2 represents the discrepancy between the unrestricted sample covariance matrix and the restricted covariance matrix. This statistic is equal to $(N-1)F_{min}$ (sample size minus 1, multiplied by the minimum fit function). The null hypothesis of no difference is tested using the χ^2 to examine if the residual (i.e., the discrepancy between the unrestricted sample covariance matrix and the restricted covariance matrix) is low. It should be noted that the χ^2 is used to compare the sample data fit of a model's covariance structure to the observed covariance structure. The χ^2 statistic as a measure of fit, however, is known to be sensitive to the sample size and multivariate non-normality (Cheung & Rensvold, 2002). For instance, small samples (e.g., less than 200) may have χ^2 values that are not statistically significant, which can lead to type II errors, i.e., rejecting the null hypothesis when it is true, whereas large samples (e.g., more than 200) may produce statistically significant χ^2 values that can yield type I errors, i.e., retaining the null hypothesis when it is false. The present study had a sample of 202 which is just enough according to the convention (Cheung & Rensvold, 2002). Moreover, some of the observed variables in the present model had significant skewness and kurtosis, which violate the assumption of multivariate normality. Therefore, other fit indices were considered to evaluate the fit of the model.

A number of researchers have addressed the limitations of the χ^2 statistic by developing goodness-of-fit indexes to evaluate the process of model fit (Hu & Bentler, 1999). The ratio of χ^2 to degrees of freedom has been used more often to judge the fit of data to the hypothesized model. It has been suggested that a χ^2/df ratio of 2:1 indicates a good fit (Kline, 2005) although others have proposed values as high as 5 (Marsh & Hocevar, 1985). The χ^2/df value obtained in this study was 2.22, indicating a good fit.

The next set of goodness-of-fit indices, which are classified as incremental or comparative indexes of fit (Hu & Bentler, 1999), that have been used in a number of studies are the NFI (normed fit index) and the CFI (comparative fit index). NFI and CFI provide a measure of complete co-variation in the data and are derived from the comparison of an hypothesized model with the independence model (Byrne, 2001). Although a value of 0.90 or more was originally considered representative of a good fit, a revised cut-off of value close to 0.95 has been advised (Hu & Bentler, 1999). The NFI and CFI in the present study were found to be 0.95 and 0.97 respectively, suggesting that the hypothesized model represented a good fit to the data.

Another fit statistic, the root mean square error of approximation (RMSEA), was also used to adjudge the model fit. The RMSEA indicates the fit between the hypothesized model and population covariance matrix by taking into account the error of approximation. The point estimate of the model fit often is imprecise when considered as an actual estimation of the model fit in the population. Some researchers believe that the degree of imprecision can be indicated by the confidence interval (CI) in the RMSEA, which will provide greater insight into the evaluation of the model fit (MacCallum, Browne, & Sugawara, 1996; Steiger, 1990). More specifically, it has been mentioned that a narrow CI would argue for good precision of the RMSEA value in reflecting the model fit in the population. Also, it is an accepted convention that a RMSEA value less than .05 is indicative of close fit; values between .05 and .08 indicate fair fit; and values above .10 indicate poor fit (Browne & Cudeck, 1993; Hu & Bentler, 1999). The RMSEA value for the hypothesized model in the present study is 0.078, with the 90% confidence interval ranging from .073 to .083. These values indicate a fair model fit and the narrow CI shows a good degree of

precision. These results, therefore, suggest that the hypothesized model in the present study fits the data well. No post-hoc modifications were necessary because of the good fit of the data to the hypothesized model.

The high, unmediated effects of the latent variables (the eight factors) on the observed variables (the items on the PALMS) indicate that the items are, in fact, measuring what they have been assigned to measure. Though most of the items had high regression coefficients, two items, item 4 (because I enjoy spending time with others) and item 2 (because it helps me relax), had low values. It should be noted that the sample consisted of only one team sport (i.e., AFL). Given the majority of the sample were individual physical activity participants, it is not surprising that item 4, which refers to spending time with others, had a low regression coefficient. Furthermore, it is plausible that participants might not have understood the term 'relax' when responding to item 2. Relax can be attributed to both the physical and psychological states. It is, therefore, likely that the participants were unsure when responding to this particular item.

Overall, the results from the present study lend support to the validation of the PALMS. The fit indices and factor loadings indicate that the PALMS has sound psychometric properties. It can be concluded that future research on participation motivation can use the PALMS to examine and study people's motives for engaging in any form of physical activity, interpreting their responses within the 8-factor framework of subscales.

Internal Consistency and Criterion Validity of the PALMS

The internal consistency of a questionnaire refers to an estimate of how consistently the items of the questionnaire measure a construct obtained from a single administration of a single form of the questionnaire and the measurement of the degree of correlations among

all of the questionnaire items (Cohen & Swerdlik, 2005). It is based on the correlations between different items on the same questionnaire and depends on whether the items that propose to measure the same general construct produce similar results. The internal consistency reliability indicates that the items within a subscale would correlate highly with each other. Therefore, when a person scores highly on one of the items in a given subscale, he/she is also likely to score highly on the others items in the same subscale, and vice-versa. The results from the present study indicate that the PALMS demonstrated good internal consistency with a Cronbach's alpha (α) of 0.79. Also, the α-values for each of the subscales of the PALMS were high and ranged from .80 to .99. The overall high internal consistency of the PALMS exemplifies that the test items are homogenous in nature. This means that the items will consistently measure the factors they are expected to measure. It is also known that the reliability of an instrument increases with its length, as does that of its subscales. The PALMS subscales maintained high reliability values despite being shorter than the corresponding subscales in the REMM. Consistent with previous research (Rogers, Morris, & Moore, 2008; Zach et al., in press), this finding indicated high reliability of the PALMS.

Criterion validity refers to how adequately a test score can be used to infer an individual's most probable standing based on a given criterion (Cohen & Swerdlik, 2005). It is based on the correlations between the test scores and the scores on the criterion measure. The validity coefficient is used to examine the accuracy of a measure by comparing it with another established measure. The criterion validity of the PALMS was supported by the finding that Spearman's rho (r_s) indicated a strong positive correlation between the REMM and the PALMS ($r_s = 0.90$). More importantly, each of the subscales of the PALMS yielded a high correlation coefficient with the corresponding REMM subscale. It should be noted

that the PALMS was developed by selecting the five strongest items on each of the eight factors in the REMM. The number of items on the REMM ranged between eight and 13. Given the PALMS was developed from the REMM, it is not surprising to see that each of the PALMS subscales (with five items on each subscale) in the present study yielded a high correlation coefficient when correlated with the corresponding REMM subscales (with items ranging from eight to 13). The high correlation coefficients indicate that the 5 items in each of the eight subscales of the PALMS are just as good predictors of the participation motives as the eight to 13 items of the eight subscales of the REMM. This argues for the strong criterion validity of the PALMS despite having fewer items on each of the eight subscales. It can, therefore, be said that the PALMS is also a valid measure of participation motivation and can be used to examine participation motives people nominate for engaging in any kind of physical activity.

The low correlations between each of the eight subscales of the PALMS with the SM-C-SDS indicate that the PALMS did not encourage socially desirable responding in this study. This finding suggests that the participants responded to the PALMS in an honest and truthful manner, so the participants' responses can be considered to be an accurate representation of their views (Reynolds, 1982; Seol, 2007). This further lends support to the credibility of the PALMS.

Examining Motives for Participation in Physical Activity

Research on participation motivation suggests that there are systematic differences between participation motives and some demographic variables. The results, in the present study, indicated significant gender difference on specific subscales of the PALMS. As anticipated, females rated appearance as the primary motive for engaging in physical

activity. This is consistent with previous research (Frederick, 1991; Frederick & Ryan, 1993; Frederick & Morrison, 1996; Frederick, Morrison, & Manning, 1996; Weinberg et al., 2000) and reflects an extrinsic motivation orientation that might be attributed to gender role socialization processes and pressures to be slim and fit. In the present sample, males rated affiliation higher than competition. It should be noted that all the team sport (i.e., AFL) participants in this study were males, hence, it is not surprising that they rated affiliation as the primary motive for engaging in physical activity. This is in line with previous research (e.g., Morris et al., 1995), which suggests that team sport participants rate affiliation as the primary motive for participation in physical activity. Future research should use broader samples to show the difference between males and females in terms of motivation in competitive and non-competitive sport and exercise activities.

Results also indicate that participants who classified their participation as social scored the lowest on the subscale of mastery and highest on the subscales of affiliation, others' expectations, and appearance compared to the self-categorised club and recreational participants. This suggests that the social level participants engage in physical activity to look good (i.e., appearance) in front of others (i.e., others' expectations) in order to gain social approval (i.e., affiliation). The social level participants engage in physical activity due to communal reasons and are less interested in improving their skills (i.e., mastery) in an activity. Club level participants, on the other hand, scored the highest on the subscale of competition/ego compared to recreational and social level participants. This suggests that club level participants are more interested in the competition or challenge inherent in the physical activity and are least interested in other factors such as others' expectations and appearance. Results also show that the participants from all the three levels reported in a

comparable manner on the subscales of enjoyment and physical condition, which, together with the relatively high means for all levels of participation, suggests that all the participants enjoy engaging in their chosen physical activity, at least to some extent, and want to reap the direct and/or indirect health benefits of engaging in certain types of physical activity.

As predicted, team sport (i.e., AFL) players rated affiliation higher than the rest of the sample. Also, gym-based exercisers rated physical health and appearance as more important, while martial arts (tae kwon do) players and individuals engaging in yoga rated psychological health and mastery as principal motives for engaging in physical activity. These results are in line with previous research (e.g., Frederick and Ryan, 1993; Morris et al., 1995, 1996; Rogers et al., 2008; Ryan et al., 1997). These findings suggest that team sport participants place more emphasis on the communal reasons for engaging in physical activity than the rest of the sample. These participants are more interested in enjoying the social benefits of sports participation; hence they choose to participate in team sports. The gym-based exercisers in the present study, on the other hand, seem to be more interested in enhancing their looks and maintaining a good physique, so it is not surprising that they rated physical health and appearance as their primary motives for engaging in physical activity. Finally, martial arts (tae kwon do) players and individuals engaging in yoga were found to be more interested in improving their overall mental state and skill level. These participants seem to be predominantly intrinsically motivated as compared to the rest of the group. Yoga participants placed more emphasis on enhancing psychological condition than physical condition. This might be due to the fact that yoga is practiced in order to gain spiritual insight and tranquility, while assuming certain physical postures. Also consistent with previous research, it was found that tennis (racquet sports) participants rated

competition/ego higher than the rest of the sample. This is understandable as individuals go head-to-head or one-on-one in these activities, thereby optimizing personal challenge. It is evident that participants from different sport and exercise activities nominated different reasons for their participation. These findings suggest that the participation motives clearly distinguish between the different physical activities. It is understandable that people participate in different physical activities due to different reasons. Future research should, therefore, focus on conducting analyses, such as discriminant function analysis (DFA) and logistic regression analysis, that are designed to shed more light on the participation motives or profiles of motives that characterize different physical activities and, more broadly, types of physical activity.

In terms of ranking of the motives for participation across the five different physical activities, results indicate that tae kwon do participants placed more emphasis on mastery and enjoyment, both of which reflect intrinsic motivation. Similarly, individuals engaging in yoga seem to be more interested in mastery and psychological condition. This is in line with previous research that suggests that individuals who participate in martial arts and similar activities tend to do so to master their skill(s) and garner the fun and satisfaction inherent in those activities. This suggests that apart from the usual bodily movements, martial arts and other similar activities also encourage individuals to be in an intrinsically meditative state of being. Results also show that although AFL athletes ranked affiliation as their primary motive, they were also interested in physical condition and competition/ego. This might be because AFL is a contact sport and athletes need to pay considerable attention to their physical condition as well as developing game-related skills. Additionally, all the AFL athletes in this study were competing at competitive club levels, which might be one reason

why they were also interested in competition/ego. Further, in line with previous research, it was found that appearance was the top ranked motive for gym-based exercisers followed by physical condition. This makes sense, because individuals who subscribe to a gym are likely to pay particular attention to their physical condition and fitness in order to look good and enhance their appearance. Finally, tennis players ranked competition/ego as their primary motive, followed by enjoyment and physical condition. In sports like tennis, players compete head-to-head, so it is plausible to surmise that the players have to be in good physical condition to match their opponents.

Although the present study examined five physical activities, whereas Morris et al. (1995, 1996) examined several activities in each category they identified, the findings in the present study are consistent with the predictions made by Morris et al. In the only study conducted specifically to examine participation motives for different types of physical activity, Morris et al. conducted discriminant function analyses and found challenge to be the main discriminator for racquet sports; affiliation for team ball games; relaxation/aesthetic for martial arts; and health/fitness for recreational exercise activities. Consistent with the predictions made by Morris et al., it was found in the present study that affiliation was rated highly by the AFL (team sport) participants; competition/ego was rated highly by tennis (racquet sport) participants; mastery was rated highly by tae kwon do and yoga (martial arts) participants; and appearance was rated highly by gym-based exercisers. It is evident that motives for participation are entwined with specific types of physical activity. It is also clear that different motives for participation will carry different functional significance depending on the type of physical activity. Although the participants in this study had a number of reasons for engaging in physical activity, their participation has been

characterized primarily by specific participation motives. This suggests that there is a relationship between the primary characteristics for each activity type and the preference of individuals for participation in those activities. The patterns identified in this study need to be replicated in studies involving multi-sport and exercise activities across the lifespan to arrive at a comprehensive understanding of participation motives. Future research should focus on examining participation motives in a range of sport and exercise activities to allow comparative analyses to be conducted and enhance understanding of participation motivation.

Given that different types of physical activity can be characterized by the major motives for participation, people could be matched to a particular form of physical activity based on their principal motives for participation. For instance, individuals who are intrinsically driven to engage in physical activity might be advised to participate in activities such as martial arts. Similarly, individuals who are interested to reap the social benefits of engaging in physical activity might be advised to get involved in a team sport. The PALMS could be of great value in this domain. The PALMS can be used to prescribe a specific form of physical activity based on the primary preferences of the individuals. This should provide individuals with accurate advice to engage in appropriate activities thereby maximizing their satisfaction.

Limitations of the Present Study

One potential limitation of the present study might have been the selection of the sample. The participants in the present study comprised a convenience sample, who were selected based on the different kinds of physical activities they participated in. This was achieved by choosing the participants who engaged in different physical activities. The

sampling, however, was not systematic in controlling for a range of demographic factors that had the potential to confound findings. Prominent variables that have this potential include level of activity, gender, and age. For example, the AFL participants were all male and mostly between 18 and 30 years of age. Also, the majority of the participants were individual physical activity participants. Further, many of the yoga participants were female and more mature. It is possible that some of the motivational differences attributed to the physical activity in which these people participated could reflect gender and age differences in motivation. The uncontrolled variation of these demographic variables within the sample could produce artefacts. Selecting participants with similar demographic characteristics from a range of sport and exercise activities would reduce the potential confounding effects.

The present study involved the administration of a questionnaire pack that included the REMM, the PALMS, and the SM-C-SDS. The sizeable length of the questionnaires might have induced boredom and fatigue and hence it is likely that participants did not respond in an appropriate manner. Also, the completion of the questionnaire pack was based on self-administration. Although the questionnaire pack contained an information sheet and reporting instructions, it is possible that some participants did not precisely understand the questions or what they were supposed to do, and also had no opportunity to ask for clarifications. This might have compromised their ability to provide accurate responses, thereby adding variability to the data and affecting the results obtained. Conducting this study in a controlled environment with trained staff on site might have reduced the variability in the data. This, however, was realistically not feasible given the nature of participation across the different physical activities and the kind of access that was possible in those contexts. It should be noted that the data in the present study was checked for

missing values and only responses from completed questionnaires were selected for analyses.

Scope for Future Research

The present study demonstrated the PALMS to be a valid and reliable measure of participation motivation. It is, however, important to continually develop and update the PALMS to arrive at a better and comprehensive understanding of participation motivation. It is, therefore, important for future research to examine the long-term stability of the PALMS. Test-retest reliability must be demonstrated over long periods of time to test the efficacy of the PALMS. Stable measures of participation motivation will be needed to effectively examine pre-test, intervention, and post-test designs. As an established measure of participation motives, the PALMS could be of great value in this domain once its test-retest reliability is well established.

The present study also showed clear differences between motives people nominated for engaging in a range of physical activities. It is possible that the PALMS could be used to identify participation motives in a range of sport and exercise activities. It could then be used to recommend specific types of physical activity based on the match of the participation motivation profiles of individuals with the profiles typical of different types of sport and physical activity. This should provide individuals with accurate advice to engage in appropriate activities thereby maximizing their satisfaction. Using measures of satisfaction, a longitudinal study involving the same individuals could then be conducted to compare the satisfaction with their physical activity of individuals who engaged in physical activity based on their profiles to those who engaged in physical activity that did not match their profiles. This would not only help further the development of PALMS, but also deepen

understanding of participation motivation and test the feasibility of using such motivational profiling through PALMS to help people initiate and sustain involvement in physical activity in the long term.

Apart from optimizing personal satisfaction, matching individuals to particular forms of physical activity based on their principal motives for participation should also promote adherence, as it should reduce the risk of mismatch between motives for participation and characteristics of particular activities that often leads to rapid drop-outs. This has important implications given there is a steady decline in physical activity participation in Australia and that up to 60% of exercise activity participants have been found to drop out within the first six months after commencing an activity (Australian Bureau of Statistics, 2011). The PALMS could be used over a longer period of time to examine the adherence of participants engaged in a range of sport and exercise activities. Health professionals can use this information to develop effective interventions and promote participation in physical activity. The studies to date have been cross-sectional, which means there is no evidence on the question of whether prescription of type of activity based on participation motives would lead to enhanced adherence. Because retrospective research is affected by self-selection or drop-out, prospective longitudinal research would be valuable to address this issue. In such research, the PALMS would be administered prior to individuals commencing participation in physical activity and adherence would then be monitored and compared for individuals who entered sports that matched their motivational profiles compared to individuals who initiated participation in sports that did not match their motivational profile.

The PALMS has been developed and standardized on participants who predominantly represent the Western culture. Future research could also use the PALMS in

a number of different cultural contexts to arrive at global understanding of participation motivation. Future research could translate the PALMS into a number of different languages (e.g., Zach et al., in press), which might help overcome cultural barriers and understand participation motivation in different contexts around the world.

Implications for Practice

The present study has a number of important implications for practice. First, the present study establishes the PALMS to be a comprehensive and reliable measure of participant motivation. The PALMS has a number of advantages when compared to other existing measures of participant motivation. It has been developed using both theoretical and atheoretical approaches and measures a breadth of participation motives. Also, it can be used in both sport and exercise contexts. Further, it is a relatively concise measure, which might help to minimise the effects of boredom and fatigue. The PALMS offers a relatively short, yet wide-ranging instrument to examine participation motives in future research on the reasons why people do physical activity.

Second, it is imperative to understand that individuals often have different reasons for engaging in physical activity that might reflect underlying needs and wishes. Though motivation is often considered a global and unified construct, gaining an insight into the different components of individuals' motivation might help health professionals develop and tailor effective interventions. These interventions may not only be effective in recognizing, encouraging, and promoting physical activity, but should also increase adherence and help to reduce a number of lifestyle-related illnesses that are prevalent in the world. Future research should, therefore, place more emphasis on the empirical exploration of the underlying motives of individuals engaging in any form of physical activity in order to

understand how and why individual are motivated to undertake physical activity as the basis for implementing interventions.

The findings in this study provide support for the proposition that there is a relationship between each physical activity type and the motives that individuals report for participating in those activities. This area of research warrants further investigation. These systematic differences should be shown by questionnaires that purport to measure motives for participation in any form of physical activity. Future research should expand on the comparisons of motives for participation explored in the present study in order to examine the primary participation motives that characterize different forms of physical activities. Equipped with this knowledge, individuals could be matched to a specific form of physical activity based on their primary motives for participation, thereby optimizing satisfaction and increasing the likelihood of adherence. For instance, individuals with low scores on specific participation motives as measured by a questionnaire can be encouraged to participate in appropriate programs that might help enhance their motivational levels.

Conclusion

The present study was conducted to validate the Physical Activity and Leisure motivation Scale (PALMS). A CFA was conducted to examine whether the PALMS has a sound factor structure. Internal consistency and criterion validity were also investigated to test the psychometric properties of the PALMS. The present study also examined the motives people have for engaging in different forms of physical activities. The results of this study provided further support for the reliability and validity of the PALMS. The PALMS was shown to be a comprehensive and reliable measure of participation motivation, with sound internal consistency and criterion validity. In addition, the present results showed

participation motives for different activities that are consistent with those found in previous research, supporting the construct validity of the instrument. The PALMS can be used to extract valuable information that will inform health professionals about the wide range of motives people have for participating in different forms of physical activity. This information can be used to meet the myriad needs and motives people have for engaging in physical activity by diversifying the ways in which participation in physical activity has been promoted, and not just focus on the traditional approach to fulfil health-based motives. Covering a broad range of participation motives, health and exercise professionals will be able to match individuals to specific types of physical activity based on their primary participation motives. This will hopefully encourage people to undertake physical activity, lead to greater adherence to physical activity in the long term, reduce drop-out rates and lifestyle-related illnesses, and enhance overall quality of life.

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Appendix A: Information to Participants Involved in Research

You are invited to participate

You are invited to participate in a research project entitled "Examining reasons for participation in sport and exercise using the Physical Activity and Leisure Motivation Scale (PALMS)".

This project is being conducted by a student researcher, Debadeep Roy Chowdhury, as part of his Doctoral study at Victoria University under the supervision of Professor Tony Morris from the School of Human Movement, Recreation and Performance, Victoria University.

Project explanation

The purpose of this study is to determine people's reasons for engaging in sport and exercise activities. Your participation in this study will help us to have a better understanding of the various reasons' people participate in sport and exercise activities.

What will I be asked to do?

Participation in this study will involve completing a personal information form and a questionnaire pack, and will take around 20-30 minutes. The researcher will answer any questions that you may have.

What are the potential risks of participating in this project?

The present study poses minimal risk to the participants. The questions in the questionnaire are based on personal experiences and hence there are no right or wrong answers. However, some participants may develop feelings of anxiousness, or become distressed when answering some of the questions, because of previous unpleasant experiences or because participants do not understand what certain questions mean. Under these circumstances, the participants can stop temporarily or withdraw from the study permanently. If needed, they will be provided with a free counselling service by a qualified psychologist who is not involved in this research.

How will this project be conducted?

Participants will first read an information sheet about the study. Participants who are willing to participate will then complete the personal information form and the questionnaire pack. After completing the questionnaire pack, the participants will be debriefed and thanked for their cooperation. Completion of the personal information form and questionnaire pack implies consent to participate in this research. The data collected will then be analysed by the student researcher.

Who is conducting the study?

Principal Researcher: Professor Tony Morris
9919 5353
tony.morris@vu.edu.au

Student Researcher: Mr. Debadeep Roy Chowdhury
0430 032 587
debadeep.roychowdhury@live.vu.edu.au

Any queries about your participation in this project may be directed to the Principal Researcher listed above. If you have any queries or complaints about the way you have been treated, you may contact the Ethics and Biosafety Coordinator, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, VIC, 8001 phone (03) 9919 4148.

Appendix B: Demographic Information Form

Age (years): _____ **Sex:** M / F

Occupation: _____ **Country of Origin:** _____

In the table below, the top row is an **example**, where the details have been filled in using ***bold italics***, to show you the way to respond. In the bottom row, please write the activity you do most, which you will think about when you give your reasons for participating, in the other questionnaires. Then, tick what type of activity it is and what level you play, if it is a sport.

EXAMPLE:

ACTIVITY	TYPE OF ACTIVITY	LEVEL OF SPORT
Running	1) Sport ☑ 2) Planned exercise activity ☐ 3) Non-physical activity ☐ 4) Other (please specify): _____ ☐	1) International ☐ 2) National ☐ 3) State ☐ 4) Club ☐ 5) Recreational ☑

Now fill in your details in the boxes below:

ACTIVITY	TYPE OF ACTIVITY	LEVEL OF SPORT
	1) Sport ☐ 2) Planned exercise activity ☐ 3) Non-physical activity ☐ 4) Other (please specify): ☐ _____	1) International ☐ 2) National ☐ 3) State ☐ 4) Club ☐ 5) Recreational ☐

In the space provided below, could you please indicate the duration, frequency, and intensity of each exercise and/or sport activity you regularly participate in. For sport could you also indicate the level at which you participate. In the example provided, the participant plays tennis for two hours twice a week at club level at a medium intensity level. The person also runs for 3 minutes at a fast pace once a week, does a beginners/light circuit class once a week, and 3, 20 minute weight sessions.

Activity	**Frequency** *(number of times per week)*	**Duration** *(average length of each session of that activity)*	**Intensity** *(Heavy/ medium/ light)*	**Level of play** *(social/ club/ state/ national)*
Example: tennis running circuit class weight training	 2 3 1 3	 2 hours 30 minutes 1 hour 20 minutes	 medium fast light medium	 club
Insert your activities below				

Appendix C: The Recreational Exercise Motivation Measure (REMM)

In responding to the following statements, think of the reasons you have for the sport or exercise activity you do most. Try not to spend time pondering over your responses. There are no right or wrong answers. Indicate how much your reasons correspond with each of the statements by **circling** one of the numbers 1 to 5 on the scale beside **each statement**. In each case **1** indicates **strongly disagree** and **5** indicates **strongly agree.**

I participate.....	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. to keep up current skill level	1	2	3	4	5
2. because I like activities that are challenging	1	2	3	4	5
3. to do my personal best	1	2	3	4	5
4. because I get rewarded for doing it	1	2	3	4	5
5. because it is something I have in common with my friends	1	2	3	4	5
6. because exercise helps keep my mind healthy	1	2	3	4	5
7. to meet new people	1	2	3	4	5
8. to do more for my fitness than other people	1	2	3	4	5
9. because friends want me to	1	2	3	4	5
10. because the activities I do are exciting	1	2	3	4	5
11. because I want to cope better with stress	1	2	3	4	5
12. because doing exercise helps me maintain a healthy body	1	2	3	4	5
13. to improve my appearance	1	2	3	4	5
14. to improve my strength	1	2	3	4	5
15. to define muscle to look better	1	2	3	4	5
16. because I like the physical challenges	1	2	3	4	5
17. to perform well compared to my own past performance	1	2	3	4	5
18. to obtain new skills or try new activities	1	2	3	4	5
19. because it keeps me healthy	1	2	3	4	5
20. because exercise is stimulating	1	2	3	4	5
21. because after exercise I feel good about myself	1	2	3	4	5
22. because doing exercise helps me achieve other things in life	1	2	3	4	5

23. because it acts as a stress release	1	2	3	4	5
24. because exercise helps improve my mental health	1	2	3	4	5
25. to make new friends	1	2	3	4	5
26. to achieve an exercise goal I have set myself	1	2	3	4	5
27. because someone close to me approves my exercise activities	1	2	3	4	5
28. to improve my body shape	1	2	3	4	5
29. because it helps me gain status or recognition	1	2	3	4	5
30. because exercise helps me take my mind off other things	1	2	3	4	5
31. to be physically fit	1	2	3	4	5
32. because it helps me relax	1	2	3	4	5
33. because doing exercise stops me from feeling depressed	1	2	3	4	5
34. to improve cardiovascular fitness	1	2	3	4	5
35. because I like to win	1	2	3	4	5
36. because it makes my physical appearance better than others	1	2	3	4	5
37. to talk with friends while I exercise	1	2	3	4	5
38. because I am required to stay fit for my job	1	2	3	4	5
39. because it helps me manage a medical condition	1	2	3	4	5
40. to do an activity with others	1	2	3	4	5
41. to improve existing skills	1	2	3	4	5
42. to have more energy	1	2	3	4	5
43. to be attractive to others	1	2	3	4	5
44. to compete with others around me	1	2	3	4	5
45. because it is fun	1	2	3	4	5
46. to earn a living	1	2	3	4	5
47. to beat my friends	1	2	3	4	5
48. because I enjoy exercising	1	2	3	4	5
49. to be the best in the group	1	2	3	4	5
50. to work harder than others when I exercise	1	2	3	4	5
51. because it helps me maintain a trim, toned body	1	2	3	4	5
52. because it is interesting	1	2	3	4	5

53. to improve my skill or technique	1	2	3	4	5
54. to achieve the looks/figure others expect of me	1	2	3	4	5
55. because I have a good time	1	2	3	4	5
56. because it helps me stay in shape	1	2	3	4	5
57. to be with friends	1	2	3	4	5
58. to lose weight to look better	1	2	3	4	5
59. because it makes me happy	1	2	3	4	5
60. because I get paid to do it	1	2	3	4	5
61. to be fitter than others	1	2	3	4	5
62. because exercise lessens the physical effects of ageing	1	2	3	4	5
63. to make my muscles look more toned than other people's	1	2	3	4	5
64. to make my body look better than other people's	1	2	3	4	5
65. to get away from pressures at work/home	1	2	3	4	5
66. because people tell me I need to exercise	1	2	3	4	5
67. because I enjoy spending time with others doing exercise	1	2	3	4	5
68. because I like the excitement of participation	1	2	3	4	5
69. to maintain strength	1	2	3	4	5
70. to maintain physical health	1	2	3	4	5
71. to get better at activity	1	2	3	4	5
72. because it is prescribed by my doctor, physiotherapist	1	2	3	4	5
73. to perform better than others	1	2	3	4	5

Do you have any reasons for participating that are not included in the above statements? Please write them here.

_____
_____
_____
_____
_____

Appendix D: The Physical Activity and Leisure Motivation Scale (PALMS)

In responding to the following statements, think of the motives you have for the physical activity you do. Try not to spend time pondering over your responses. There are no right or wrong answers. Indicate how much your motives correspond with each of the statements. In each case **1** indicates **strongly disagree** and **5** indicates **strongly agree**.

I undertake physical activity…..	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. to earn a living	1	2	3	4	5
2. because it helps me relax	1	2	3	4	5
3. because it's interesting	1	2	3	4	5
4. because I enjoy spending time with others	1	2	3	4	5
5. to get better at an activity	1	2	3	4	5
6. because I perform better than others	1	2	3	4	5
7. because I get paid to do it	1	2	3	4	5
8. to do activity with others	1	2	3	4	5
9. to better cope with stress	1	2	3	4	5
10. because it helps maintain a healthy body	1	2	3	4	5
11. to define muscle, look better	1	2	3	4	5
12. be physically fit	1	2	3	4	5
13. because it makes me happy	1	2	3	4	5
14. to get away from pressures	1	2	3	4	5
15. to maintain physical health	1	2	3	4	5
16. to improve existing skills	1	2	3	4	5
17. to be best in the group	1	2	3	4	5
18. to manage medical condition	1	2	3	4	5
19. to do my personal best	1	2	3	4	5
20. to do something in common with friends	1	2	3	4	5
21. because people tell me I need to	1	2	3	4	5
22. because it acts as a stress release	1	2	3	4	5
23. to improve body shape	1	2	3	4	5
24. to obtain new skills/activities	1	2	3	4	5
25. because it's fun	1	2	3	4	5
26. because it was prescribed by doctor, physio	1	2	3	4	5
27. to work harder than others	1	2	3	4	5
28. because it keeps me healthy	1	2	3	4	5

29. to compete with others around me	1	2	3	4	5
30. to talk with friends exercising	1	2	3	4	5
31. to keep current skill level	1	2	3	4	5
32. to improve appearance	1	2	3	4	5
33. to improve cardiovascular fitness	1	2	3	4	5
34. because I enjoy exercising	1	2	3	4	5
35. to take mind off other things	1	2	3	4	5
36. to lose weight, look better	1	2	3	4	5
37. because I have a good time	1	2	3	4	5
38. to be with friends	1	2	3	4	5
39. to be fitter than others	1	2	3	4	5
40. to maintain trim, toned body	1	2	3	4	5

Appendix E: The Shortened Marlowe-Crowne Social Desirability Scale (SM-C-SDS)

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you personally.

Circle either the true (T) or false (F) response beside each question.

1. It is sometimes hard for me to go on with my work if I am not encouraged.	T F
2. I sometimes feel resentful when I don't get my own way.	T F
3. On a few occasions, I have given up doing something because I thought too little of my ability.	T F
4. There have been times when I felt like rebelling against people in authority even though I knew they were right.	T F
5. No matter who I'm talking to, I'm always a good listener.	T F
6. There have been occasions when I took advantage of someone.	T F
7. I'm always willing to admit it when I make a mistake.	T F
8. I sometimes try to get even, rather than forgive and forget.	T F
9. I am always courteous, even to people who are disagreeable.	T F
10. I have never been irked when people expressed ideas very different from my own.	T F
11. There have been times when I was quite jealous of the good fortune of others.	T F
12. I am sometimes irritated by people who ask favours of me.	T F
13. I have never deliberately said something that hurt someone's feelings.	T F