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**The Relationship Between Perceived Sports
Competence and Motivational Orientations in
Hong Kong Secondary School Context**

Eric Cheuk Kuen Tsang

**A thesis submitted in partial fulfillment of the
requirements of Nottingham Trent University
for the degree of Doctor of Philosophy**

July 2006

Abstract

The Relationship between Perceived Sports Competence and Motivational Orientations in Hong Kong Secondary School Context

By

Eric Cheuk Kuen Tsang

For the degree of

Doctor of Philosophy

The role of competence in physical education (PE) is an important cue in the decision of participation (Caroll & Loumidis, 2001; Duda et al., 1981; Klint & Weiss, 1987; Weiss et al., 1986). In Hong Kong, the government also proposed that physical competence was one of the learning targets in PE (Curriculum Development Council, 2002). The purpose of this research project was to study children's sport and PE participation by focusing on perceived sports competence as suggested in Harter's competence motivation theory (1978, 1981). The study also included the assessment of other related factors such as intrinsic/extrinsic motivational orientation, task/ego goal orientation and level of competitive trait anxiety. Initial phases of the research involved the translation and validation of several relevant instruments utilised for this research project, including , the Self-Perception Profile for Children (SPPC; Harter, 1985), Sport Motivation Scale (SMS; Pelletier et al., 1995), Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1989) and Sport Competition Anxiety Test (SCAT; Martens, Vealey & Burton, 1990). Two validation studies and a pilot study were conducted to determine validity and reliability of the instruments and to ensure the opportunity to observe the possible relationships and interaction among

different motivational variables. The main study was conducted with 2,202 participants from eleven schools of Secondary One (Grade 7), Two (Grade 8) and Three (Grade 9), with a mean age of 13.55 years ($SD = 2.15$). There was a proportional distribution of males ($n = 1,056$) and females ($n = 1,130$). Descriptive statistics were used to generalise the characteristics of the sample. Multivariate analysis of variance (MANOVA) was used to assess differences between subgroups. Coefficients of correlation were calculated to examine the relationships between different motivational attributes. Finally, path analysis using EQS was performed to identify the structure of relationships between different attributes. The results revealed that males perceived themselves more competent and had greater enjoyment than females, indicating that they may be more likely to participate in sport and physical activities. Also, it was found that motivation to participate in sport and physical activities decreases with age, and having some regular form of participation was most beneficial in terms of motivation towards sport participation. The relationships between perceived sport competence and other motivational attributes were mostly in accordance with Harter's competence motivation theory such that analyses demonstrated significant, modest, positive relationships with intrinsic motivation ($r = .24, p < .01$) and extrinsic motivation ($r = .24, p < .01$), and negative relationships with anxiety ($r = -.26, p < .01$) and amotivation ($r = -.16, p < .01$). The relationship with task goal orientation was significant but weak ($r = .12, p < .01$). Further examination with path analysis showed that task goal orientation was related to perceived competence through the mediating effect of intrinsic and extrinsic motivation. By understanding how these factors affect children's decisions to continue or discontinue participation in PE and sport activities, and how these factors interact with each other, recommendations were made concerning the school PE curriculum and implementation of sport programmes in Hong Kong.

Acknowledgements

I am most fortunate to have both Dr. Antoinette Minniti and Dr. Attila Szabo as my Directors of Studies. In the first five years, Dr. Szabo guided me all the way through the registration as MPhil/PhD student, successfully transferred to PhD studies and to the final stage of thesis submission. When I had a difficult time for the completion of this thesis, I was most fortunate to have Dr. Minniti stepped in and offered her assistance. Without both of their unconditional support, it would be impossible for me to complete this work. May I take this opportunity to express my deepest appreciation to both of you.

I would also like to thank my supervisors Dr. Clive Williams and Dr. Ellen Billet for their continuing support, help, guidance and patience. Appreciation also goes to Dr. Chris Slade from the Faculty of Education at the Nottingham Trent University, for her valuable comments in response to my first year report in May, 2002. Thank you very much.

I had wonderful support from my friends and colleagues at the Hong Kong Institute of Education with whom I have shared experience and have had the chance to discuss and share ideas. A special thank goes to Dr. Edward Chow for assisting me in the data analysis.

I would also like to acknowledge those schools, principals and P.E. teachers for allowing me to collect data, their assistance were paramount in the completion of this study.

Last, but not the least, I am highly indebted to my wife, Michelle, and my daughters, Natalie and Karen for their love, patience, and unending support throughout my programme of study.

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Chapter 1

INTRODUCTION

The study of motivated behaviour is paramount to sport educators in their quest for developing successful sport and physical education programmes (e.g., Brustad, 1993; Curriculum Development Council, 2002; Gill, Gross, & Haubenstricker, 1978). Taking different approaches, several conceptual perspectives have been proposed to better understand athletes' and leisure-exercisers' motivation. In particular, Harter (1978, 1981) in her competence motivation theory, described and attempted to understand why people are motivated to continue or discontinue participation in various achievement areas, including sport and physical activity (PA). Central to Harter's theory is perceived competence which is defined as a multi-dimensional motive that directs individuals in cognitive, social, and physical domains. Perceived competence gained from success in these domains can increase an individual's willingness to strive for achievement, while perceived incompetence incurred from failure is assumed to lead to a decrease in achievement striving. While success and failure can affect an individual's perceived competence, there also exists a close relationship between one's motivational orientation and perceived competence.

Motivational orientation has several interacting components that comprise the individual's intention for participation (e.g., intrinsic/extrinsic motivation), selection of goals (e.g., task and ego), and perception of competitive situation (e.g., high/low anxiety). Harter (1978) showed that intrinsic motivation is positively related to self-perceived competence. Other research revealed that adoption of task goal orientation results in greater mastery and achievement (Duda, 1989, 1992; Ferrer-Caja & Weiss, 2000; Marsh, 1994; Williams & Gill, 1995). Furthermore, studies by Passer (1983) and Brustad and Weiss (1987) supported Harter's (1978, 1981) hypothesis that affective experiences in sport, such as anxiety, self-esteem and worries were directly related to perceived competence. This program of study will examine the participation

motive in sport activities from a competency perspective and further examine the relationship of perceived competence of participants with their adopted motivational orientations in the Hong Kong context.

Significance of research programme

Since the return of Hong Kong to China in 1997, the new Government of the Hong Kong Special Administrative Region (HKSAR) has started reviewing the inherited systems. The review of the education system started in 1999. By 2002, a new curriculum guide was produced by the Education and Manpower Bureau (EMB) that aimed at developing eight key learning areas (KLA)¹ and five essential learning experiences² (Curriculum Development Council, 2002). Physical education (PE) was one of these eight key learning areas (KLA) and the new curriculum guide stated that all students were entitled to have the learning experience in PE throughout their primary and secondary schooling. Among the various learning targets, lifelong participation, confidence in generic skills and physical competence were amongst the main benchmarks proposed in this area of learning. Another significant educational reform will be implemented in the coming academic year (September, 2006). The original 5-year secondary education (ages 12 to 16) plus 2-year matriculation (ages 17 to 18) and 3-year undergraduate academic system will be replaced by a 3-year junior secondary (ages 12 to 14), 3-year senior secondary (ages 15 to 17) and 4-year undergraduate academic system (3-3-4) (Curriculum Development Council, 2005). Physical education is one of the elective subjects in the New Senior Secondary (NSS)

¹ The eight key learning areas are: a) Chinese language education, b) English language education, c) mathematics education, d) personal, social and humanities education, e) science education, f) technology education, g) arts education, h) physical education

² The five essential learning experiences are: a) moral and civic education, b) intellectual development, c) community service, d) physical and aesthetic development, e) career-related experiences

academic structure. Besides structuring the new curriculum for the senior secondary, there are concerns from the public, especially professionals in physical education, to determine the most appropriate way to match the junior secondary curriculum with the direction of the senior secondary curriculum. There has been a plea for the reform of the junior secondary physical education curriculum to attract more students to choose PE as one of the elective subjects in their senior secondary. Both informal discussion and formal meetings have been conducted to determine what can best motivate students to engage in sport and physical activities. The EMB has formed working groups in the higher education sector, especially from the three Institutes³ offering physical education teacher training, to generate recommendations for the reform of junior secondary and preparation of the senior secondary curriculum. Before formulating recommendations, it is essential to examine the underlining motivational forces of students that affect their participation in sport and physical activities. The findings from this investigation can be used to provide appropriate recommendations and guide future reform.

The aim of this research programme was to examine the role that perceived competence, as suggested in Harter's (1978, 1981) competence motivation theory, played in influencing the secondary school children in Hong Kong towards sport participation. Motivational orientations of intrinsic/extrinsic motivation (Deci & Ryan, 1985), ego/task goal orientation (Maehr & Nicholls, 1980) and level of competitive trait anxiety (Martens, 1977) were examined to verify their ability to differentiate an individual's perceived competence which would be reflected in his/her pattern of participation in sport activities. By understanding the motivational state of children during sport participation, practical approaches could be developed to enhance the

³ The three Institutes offering physical education teacher training in Hong Kong: a) Chinese University of Hong Kong, b) Hong Kong Baptist University, c) Hong Kong Institute of Education

enjoyment and persistence of children in sport and physical activities. The findings could also be used to determine the trend of school physical education curriculum and, in turn, provide suitable recommendations for curriculum reform.

REVIEW OF THE LITERATURE

Theoretical frameworks explaining self-confidence in sport participation

The virtue of being confident has been a highly-regarded characteristic to possess in the area of sport and exercise (Feltz, 1988, 1994; Vealey, 1986, 1999). It was often thought that the general feeling of self-confidence can be an attribute which distinguishes successful from unsuccessful participation in sport activities. Cox (2002) identified three cognitive models in his research on self-confidence, which included Bandura's (1977) self-efficacy, Vealey's (1986) sport confidence, and Harter's (1978) competence motivation theories.

Self-efficacy theory

Bandura (1977, 1986, 1997) defined self-efficacy as the belief that individuals have in their own capability to perform certain tasks. According to the self-efficacy theory, all behavioural and psychological change occurred through the alteration of an individual's sense of personal mastery or efficacy (Bandura, 1977). Central to Bandura's (1977) theory is the importance of expectation. Bandura described two related self-efficacy expectancies necessary to the development of this particular form of self-belief. The first was efficacy expectation which was defined as the belief that one has the capabilities necessary to successfully execute behaviour (Bandura, 1977). The second, outcome expectancy, was defined as a person's belief that a given behaviour would lead to a certain outcome. If an individual lacked the confidence (efficacy expectations) to perform a behaviour, then the actual outcome (efficacy outcome) would be of trivial consequence. Therefore, according to the self-efficacy theory, efficacy expectations were thought to be more important to behavioural change

than outcome expectations. According to Bandura's theory (1977, 1986, 1997), efficacy expectations could increase an individual's performance. Efficacy expectations also determined how much effort an individual would spend and how long this effort would be present in the face of obstacles and aversive situations. As long as the individual has the appropriate skills and incentives, enhanced self-efficacy expectations would produce greater and continued efforts. Self-efficacy expectations were therefore considered to be predictors of both the initiation and persistence of behaviour (Bandura, 1977, 1986, 1997).

Since the publishing of Bandura's self-efficacy theory (1977), many researchers have attempted to apply the hypothesis made by Bandura to high-avoidance tasks (Feltz, 1982; Feltz, Landers, & Raeder, 1979; McAuley, 1985) as well as to competitive situations (Weinberg, Gould, & Jackson, 1979; Weinberg, Gould, Yukelson, & Jackson, 1981; Weinberg, Yukelson, & Jackson, 1980). Self-efficacy theory (1977) was frequently applied to skill acquisition in sport performance (Feltz, 1988); to the adoption of exercise behaviour (Desharnais, Bouillon, & Godin, 1986; McAuley, 1990; McAuley & Jacobson, 1991) and its effect on exercise prescription for rehabilitation purposes (Atkins, Kaplan, Timms, Reinsch, & Lofback, 1984; Ewart et al., 1986) for symptomatic populations. However, not all researchers cite support for the application of Bandura's (1977) theory in the study of sport participation.

Biddle (1997) identified self-efficacy theory as a "domain-specific self-perception" (p.70) and termed it as a skill development hypothesis which suggested that positive experiences in specific domains would lead to the enhancement of higher-order self-construct. Hill (2001) pointed out that the sense of personal competence an individual incurs from self-efficacy is limited to a certain realm and varies from one situation to another. Feltz and Lirgg (2001) also did not strongly support the development of a global self-efficacy in sport or physical activity domain. Finally, as

noted by Morris and Koehn (2004), a key weakness of self-efficacy in practice was its specificity, as the researchers noted that self-efficacy was mainly applied in conjunction with performance and, to be effective, each specific component of the task need to be considered.

Theory of sport confidence

Based on Bandura's (1977) work, Vealey (1986) developed a sport-specific self-confidence construct and referred to it as 'sport confidence'. The concept of sport-specific self-confidence was related to an individual's degree of certainty about one's ability to be successful in sport. This self-confidence was an eclectic concept largely based on self-efficacy (Bandura, 1977), as well as perceived competence (Harter, 1978), movement confidence (Griffin & Keogh, 1982) and expectancy theory (Nelson & Furst, 1972). Vealey's sport confidence model (1986) was conceptualized into trait and state components and also included a dispositional construct of competitive orientation. Vealey proposed that trait sport confidence in conjunction with competitive orientation will influence the state sport confidence for any given sport situation. The subjective outcomes manifested as causal attributions, perceived success and emotions were the behavioural responses which resulted from the interaction of trait sport confidence and competitive orientation goals under the mediating effect of state sport confidence.

More recently, Vealey (2001) specified that the model mainly explained the relationship between self-confidence and sport performance. Hill (2001) summarised that sport self-confidence is a global reflection of an individual's expectation of success across different sport realms. Cox (2002) generalised Vealey's model for the explanation of the relationship between general sport confidence and situation-specific sport confidence. He further extended the application of Vealey's model to sport

participation by emphasising the importance of feelings of success and competence of individuals in a specific sport that could transfer and enhance their general perception of sport confidence. Consequently, this enhanced general perception of sport confidence would encourage individuals to continue participation in sport activities.

Competence motivation theory

Harter (1978, 1981; Harter & Connell, 1984) developed competence motivation theory by extending Robert White's (1959) model of effectance motivation. According to White (1959), people are born with an innate urge to deal competently with their environment or to 'have an effect'. Harter (1978) moved effectance motivation into a developmental framework that could be tested empirically. She developed the competence motivation theory as a multidimensional framework to explain both the initiation of mastery attempts in particular achievement domains, and the development of achievement behaviours such as persistence, approach avoidance and striving for higher levels of competence or challenge. Competence motivation begins with individuals engaging in mastery attempts as an inherent desire to experience feelings of competence through demonstrating their abilities. If those mastery attempts are optimally challenging and success is attained, then increases in intrinsic pleasure, perceived competence, and internal perceptions of control are likely to occur. Furthermore, success from these mastery experiences often results in continued motivation to participate. On the other hand, repeated failures that involve increased anxiety, lower perceived competence, and an external locus of control result in sport withdrawal. In addition, the model depicts the influence of significant others and the use of rewards as having either positive or negative effects on the development of competence motivation.

Biddle (1997) identified competence motivation theory as a "domain-general

self-perception" (p. 63) which was based on the assumption that individuals develop a global view of themselves and their abilities or adequacies in specific domains. Harter's (1978) competence motivation theory has been popular with sport psychology researchers and has been used frequently to examine youth sport participation. Gould and Petlichkoff (1988) incorporated Harter's theory into their model to explain the reasons for youth sport withdrawal. Roberts, Kleiber, and Duda (1981) and Feltz and Petlichkoff (1983) also used Harter's theory to examine the differences in motivational behaviours between sport participants and nonparticipants. Klint (1985) and Klint and Weiss (1986) studied the perceptions of competence in relation to children's motives for sport participation. Horn (1985) and Black and Weiss (1991) examined the relationship between perceived competence and social support. To conclude, there has been considerable support that perceived competence, the main construct in Harter's (1978, 1981) competence motivation theory, can effectively explain the motivation towards participating in or withdrawing from sport and physical activities especially among young people.

Conclusion

Self-efficacy, sport confidence and perceived competence, are interdependent forces that contribute to an individual's motivation to initiate and persist in sport (Cox, 2002). According to different situations and preferences to adopt different approaches, these forces should be defined and investigated separately. Self-efficacy as suggested by Bandura (1977, 1986, 1997) is a domain-specific approach and applicable to particular situations concerning performance, such as acquisition of specific skills. Vealey's sport confidence model (1986, 2001) is primarily concerned with the transfer of confidence inherited from the success of a specific sport to successes in other sport situations. Perceived competence (Harter, 1978, 1981) is seen as a feeling of mastery

or proficiency based on prior accomplishments. As featured in Harter's (1978, 1981) theory, enjoyment or positive affect serves as central to motivational processes. This approach towards the investigation of participation and adherence in sport and physical activities is quite appropriate in Hong Kong schools where the feeling of competence is one of the key benchmarks proposed in the physical education curriculum (Curriculum Development Council, 2002). The developmental framework embedded in the theory also has special appeal to studies with children and youth. In consideration of the above factors and the nature of this study, perceived competence, which is a salient factor affecting young peoples' decisions to continue participating or drop-out from sport and physical activities, was examined in this research programme.

Perceived Sport Competence

Theoretical concepts of perceived sport competence

'Competence' was first discussed by White (1959) to describe how an individual learns to interact effectively with the environment. He proposed that an individual has an intrinsic need to explore, master the environment, and display ability. White also stressed that competence derives from playful and exploratory activities that show direction, selectivity, and persistence when interacting with the environment. In developing the competence motivation theory, Harter (1978, 1981), and colleagues (Harter & Connell, 1984) also stressed that the perceptions of competence associated with the achievement activity are critical determinants of subsequent competence motivation. Individuals with high perceived competence that result from successful performance will be motivated to participate in subsequent achievement situations. According to Harter, the constructs of perceived competence and perceived performance control are contributors to affect and motivation. People scoring high in

perceptions of competence and internal control (over the activity) exert more effort, persist at achievement tasks longer, and experience more positive affect than individuals lower in these characteristics who will likely discontinue participation in the particular sport (Figure 1).

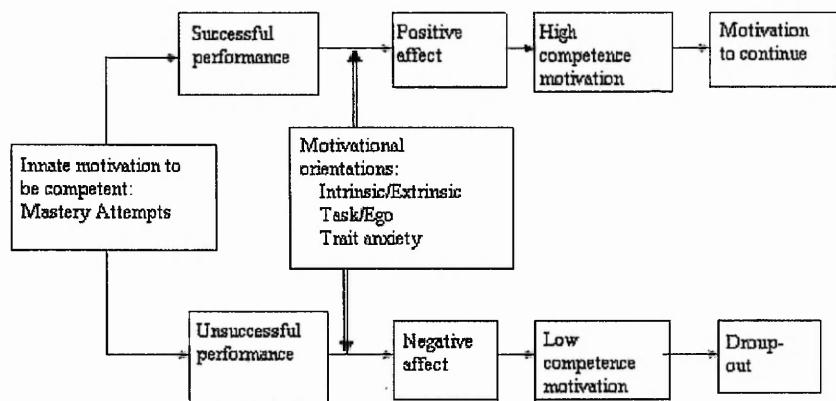


Figure 1. Role of Perceived Competence in Harter's (1978) Competence Motivation Theory

Harter (1978, 1981) views competence motivation as a multidimensional construct that influences both the initiation of mastery attempts and the development of characteristic achievement behaviours such as perceived competence, perceptions of performance control and affect. These constructs, in turn, serve to influence the level of competence motivation and influence the development of a person who is primarily intrinsically- or extrinsically- orientated.

Perceived competence research in sport and physical activities

The primary role of perceived competence in achievement behaviour has been well documented in the area of physical activity and sport (Caroll & Loumidis, 2001; Klint & Weiss, 1987; Roberts, Kleiber & Duda, 1981; Weiss, Bredemeier & Shewchuk, 1986).

In their study, Roberts et al. (1981) examined the relationship between sport participation and perceived competence among 143 fourth- and fifth-grade students between the ages of 9 and 11 years. It was found that students who participated in organised sports had higher mean scores on perceived physical competence than non-participants. In addition, organised sport participants indicated greater persistence in the face of failure, higher expectations for future success, and attributed ability to successful outcomes in sport more than non-participants. However, years of sport participation was not significant in this relationship which could indicate that early participants who do not feel competent have already discontinued participating, and only individuals who feel competent continue to participate. The findings of Roberts et al. (1981) support the notion that perceived competence has an important relationship with participation in organised children's sport which is consistent with results of other researchers who looked at persistence as it related to perceived physical competence (Klint & Weiss, 1987).

Based on Harter's Competence Motivation Theory (1978, 1981), Klint and Weiss (1987) examined the relationship between perceptions of competence and particular motives children have for sport participation. Sixty-seven children between the ages of 8 and 16 years who were involved in youth gymnastic programs were administered Harter's (1982) Perceived Competence Scale and the Motives for Gymnastic Participation (Gill, Gross & Huddleston, 1983) questionnaires. The findings supported the tenets of Harter's competence motivation theory that individuals high in perceived

physical competence identified skill development or competence-related participation motives as more important, whilst those high in perceived social competence indicated that affiliation-related participation motives were most salient. Klint and Weiss (1987) concluded that support was found for the relationship between participant motives and self-perceptions of competencies as suggested in Harter's competence motivation theory (1978, 1981).

When examining the influence of perceived competence on the level of sport participation, Caroll and Loumidis (2001) conducted a study with 922 Year Six (aged 10 to 11 years) primary school children on their participation of physical activity outside school. Caroll and Loumidis concluded that children high in perceived competence tended to participate in more physical activity, in terms of both quantity and intensity, outside school than those of low perceived competence. Also, they found moderate positive but significant relationships ($r = .39, p < .001$) between enjoyment in physical education and perceived competence in physical education for the whole sample.

The findings from a study by Weiss et al. (1986) with 155 children ranging in age from 8 to 12 from a summer sports camp further support the developmental perspectives of Harter's competence motivation theory (1978, 1981). While confirming that perceptions of competence and control are the primary antecedents to achievement and motivational orientation, the study also found that children tended to shift from an intrinsic orientation of independent mastery to an extrinsic orientation of dependence on the teacher for help as they grew older.

To conclude, the findings from the above studies (Caroll & Loumidis, 2001; Duda et al., 1981; Klint & Weiss, 1987; Weiss et al., 1986) supported Harter's (1978, 1981) competence motivation theory which states that those high in perceived physical competence will be more likely than others to participate in sport and

physical activities. In addition, the developmental perspective suggested by Harter (1978, 1981) which stated that children moved from an intrinsic to extrinsic motivational locus of control with age was also supported (Weiss et al., 1986). However, some studies (Gill et al, 1993; Gould, Feltz & Weiss, 1985; Passer, 1981) did not fully support the relationship between perceived competence and participation motivation suggested in Harter's competence motivation theory. They pointed out that apart from demonstrating physical competence, there were multiple motives; for example, affiliative or social-related reasons, for children to engage in physical activities. Therefore, the link between participation in physical activities and competence perception was further examined in this study.

Intrinsic/Extrinsic Motivation

Theoretical concepts of intrinsic/extrinsic motivation

Another important area of focus in studying motivation is on its main source that is hypothesised by the cognitive evaluation theory (Deci, 1975; Deci & Ryan, 1985). The fundamental idea underlying cognitive evaluation theory is that there are three distinct motivational forces influencing behaviour: intrinsic motivation, extrinsic motivation and amotivation. This operational definition of the source of motivation will be adopted in this study.

In general, intrinsic motivation refers to engaging in an activity purely for the sake of pleasure and satisfaction derived from doing the activity (Deci, 1975). When a person is intrinsically motivated, he or she will perform the behaviour voluntarily, in the absence of material rewards or external constraints (Deci & Ryan, 1985). Athletes who go to practice because they find it interesting and satisfying to learn more about their sport, or athletes who practice their sport for the pleasure of constantly trying to

surpass themselves are considered intrinsically motivated towards their sport. Deci and Ryan (1985) suggested that intrinsic motivation stems from innate psychological needs of competence and self-determination. Thus, activities that allow individuals to experience feelings of competence and self-determination will be engaged in because of intrinsic motivation.

Intrinsic motivation has traditionally been operationalised as a unidimensional construct. However, a tripartite taxonomy of intrinsic motivation was also advanced (Vallerand et al., 1992, 1993). This taxonomy reveals the presence of three types of intrinsic motivation, which are identified as intrinsic motivation to know, intrinsic motivation towards accomplishments, and intrinsic motivation to experience stimulation (Figure 2). According to Vallerand (1997), intrinsic motivation to know is defined as performing an activity for the pleasure and the satisfaction that one experiences while learning, exploring, or trying to understand something new. Intrinsic motivation towards accomplishment can be defined as engaging in an activity for the pleasure and the satisfaction experienced when one attempts to accomplish or create something. Finally, intrinsic motivation to experience stimulation occurs when someone engages in an activity in order to experience stimulating sensations derived from one's engagement in the activity.

Contrary to intrinsic motivation, extrinsic motivation pertains to a wide variety of behaviours that are engaged in as a means to an end, rather than for its own sake (Deci, 1975). The distinction between intrinsic and extrinsic motivation is frequently made on the basis of whether there is an externally mediated reward or constraint present in the situation (Deci & Ryan, 1985). When people receive a reward such as money, praise, or the avoidance of punishment for doing an activity, they are considered to be extrinsically motivated. If there is no apparent external reward, they are said to be intrinsically motivated, whereas the reward is supposed to be in the activity itself. In

the past, extrinsically motivated behaviour was viewed as prompted by forces external to the individual (Deci, 1975). However, more recently it was proposed that there are different forms of extrinsic motivation that may be ordered along a self-determination continuum (Ryan, Connell, & Grolnick, 1992; Ryan & Deci, 2000). Levels of self-determination, from low to high, include: external regulation, introjected regulation and identified regulation (Figure 2). External regulation refers to behaviour that is controlled by external sources, such as material reward or constraints imposed by others. Introjected regulation occurs when the external source of motivation has been internalised such that behaviours are reinforced through internal pressures such as guilt or anxiety. Finally, identified regulation is in operation when the individual comes to value and judge the behaviour as important and, therefore, performs it out of choice.

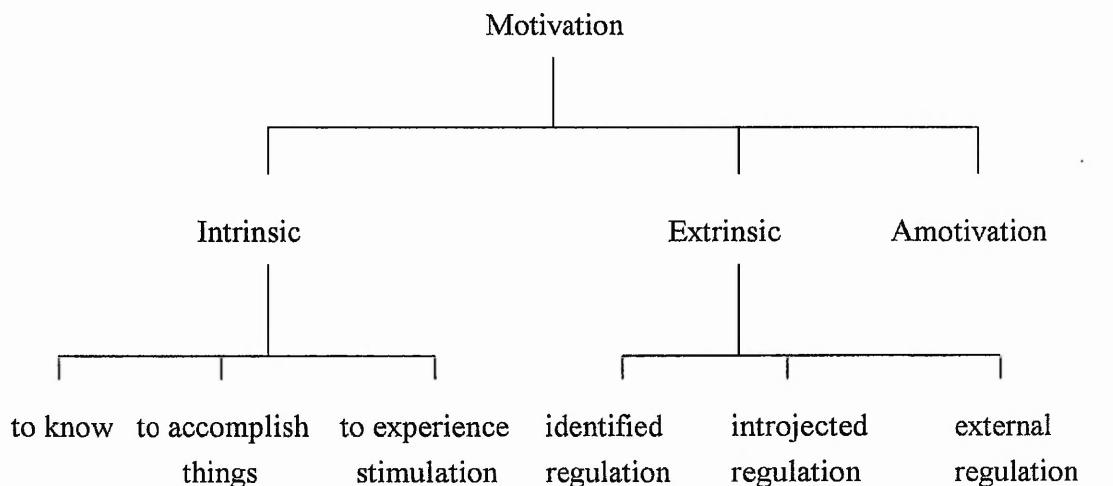


Figure 2. Taxonomy of motivational orientation

Apart from intrinsic motivation and extrinsic motivation, Deci and Ryan (1985) identified another form of motivation, which is quite similar to the concept of learned helplessness (Abramson, Seligman, & Teasdale, 1978) termed 'amotivation'.

Amotivation refers to a lack of intent to engage in a particular behaviour and, therefore, represents a lack of motivation. Amotivated individuals do not perceive contingencies between their actions and the outcome of their actions. They experience feelings of incompetence and lack of control. They are neither intrinsically motivated nor extrinsically motivated, and eventually they may stop practicing their sport.

Intrinsic/extrinsic motivation research in sport and physical activities

Many studies have been conducted to understand why children participate in sport programs by using the source of motivation as an approach (Blais, Sabourin, Boucher, & Vallerand, 1990; Deci & Ryan 1980; Vallerand & Reid, 1990; Vlachopoulos, Karageorghis & Terry, 2000; Wankel & Kreisel, 1985). Wankel and Kreisel (1985) assessed participant motives of 822 children, and identified intrinsic factors such as ‘excitement of sport’, ‘personal accomplishment’, ‘improving skills’, ‘pleasing others’ and ‘being with friends’ as being more important to youth sport participants than extrinsic factors such as ‘winning the game’ and ‘getting rewards’. In proposing their cognitive evaluation theory, Deci and Ryan (1980) submit that intrinsic motivation is based on the needs for self-determination and competence. The theory suggests that an event that affects an individual’s perceptions of control or self-determination can affect one’s level of intrinsic motivation. Research findings also support the fact that there is a corresponding pattern of consequences associated with different types of motivation (Blais et al., 1990; Vallerand & Reid, 1990). In sports, the various self-determined forms of motivation (three types of intrinsic motivation and identification) have been associated with greater persistence, positive emotions and greater interest and sport satisfaction. However, it is also argued that individuals can be high in both intrinsic and extrinsic motivations. Recently, Vlachopoulos, Karageorghis and Terry (2000) conducted a study using the Sport

Motivation Scale (SMS; Pelletier et al., 1995) and a range of self-report measures to assess outcome variables with adult participants at sports clubs, community centres and sports teams at universities in London. The entire data set was split into two independent samples (Sample 1, n = 590; and Sample 2, n = 555). Exploratory cluster analysis was applied to the first sample to explore the pattern of motives. The clusters that emerged were cross-validated by using confirmatory cluster analysis with the second sample. The analyses identified two clusters of sport participants. The first comprised participants with high scores on both non-self-determined and self-determined motives. The second cluster comprised participants with high scores on self-determined motives but low scores on non-self-determined motives. Participants in the first cluster reported greater enjoyment, effort, positive and negative affect, stronger positive attitude towards sport participation, stronger and more self-determined intentions to continue participating in sport in the long term, and greater satisfaction compared to the group that was characterised by self-determined motivation only.

Relationship between perceived sport competence and intrinsic/extrinsic motivation

The relationship between self-determination, perceived competence and intrinsic motivation has been conflicting (Deci & Ryan, 1985; Vallerand, 1997). Markland (1999) conducted a study with 146 female aerobic class participants to find out the moderating role of self-determination and perceived competence on intrinsic motivation. He found that variation in perceived competence had a positive influence on intrinsic motivation only under conditions of low self-determination. Hence, he recommended that it is particularly important to foster perceptions of competence among individuals low in self-determination.

In an attempt to understand the variations in motivated behaviours in a school

physical education context, Ferrer-Caja and Weiss (2000) conducted a study with 407 high school students (mean age = 15.64 years, $SD = .96$) to examine the predictors of intrinsic motivation. The relationships among social and individual factors, intrinsic motivation, and motivated behaviours were examined on the basis of cognitive evaluation theory (Deci & Ryan, 1985) and achievement goal theory (Nicholls, 1989). By using structural equation modelling, the study revealed that perceived competence and goal orientations directly predicted intrinsic motivation, and, in turn, intrinsic motivation directly predicted effort and persistence. Based on the hypothesised model suggested by Ferrer-Caja and Weiss (2000), the strongest predictors of intrinsic motivation, effort and persistence were task goal orientation, perceived competence and learning climate.

The intimate relationship between perceived competence and intrinsic motivation has been studied within the framework of Harter's (1978, 1981) competence motivation theory (Klint & Weiss, 1987; Weigand & Broadhurst, 1998). From a study with 124 British football players, Weigand and Broadhurst (1998) utilised hierarchical multiple regression analysis and concluded that, after the 'years of experience' factor ($\beta = .58, p < .001$), the best predictor of perceived football competence was players' levels of intrinsic motivation ($\beta = .40, p < .001$) and their perceived control ($\beta = .32, p < .001$) over the causes of success. Similarly, Klint and Weiss (1987) conducted a study with 67 children involved in a youth gymnastic program and found that those who scored high in perceived physical competence rated the intrinsic reason of skill development as a more important reason for participating than those who scored low in perceived physical competence.

To conclude, several researchers (Ferrer-Caja & Weiss, 2000; Klint & Weiss, 1987; Markland, 1999; Weigand & Broadhurst, 1998) have utilised different approaches to study perceived sport competence and intrinsic motivation. The results

generally revealed that a positive relationship existed between perceived sport competence and intrinsic motivation, whereas a negative relationship occurred between perceived competence and amotivation. Some studies (Klint & Weiss, 1987; Weigand & Broadhurst, 1998) supported that intrinsic motivation is a good predictor of perceived competence. However, some studies (Ferrer-Caja & Weiss, 2000; Markland, 1999) supported perceived competence as one of the predictors of intrinsic motivation alongside other mediating factors such as self-determination and goal orientations. Also, it has been found out that individuals can be high in both intrinsic and extrinsic motivations (Vlachopoulos, Karageorghis & Terry, 2000); however, the relationship between extrinsic motivation and perceived competence has seldom been studied. Therefore, the relationship with and the predictive ability of intrinsic motivation, extrinsic motivation, and amotivation on perceived competence were examined in this study.

Task/Ego Goal Orientation

Theoretical concepts of task/ego goal orientation

Another approach to understand motivation as suggested by Dweck (1986), Maehr and Nicholls (1980), and Nicholls (1984, 1989) was to identify the goals of action that are expressed in the function and meaning of behaviour. They suggested that variation in behaviour may be the result of the manifestation of different perceptions of appropriate goals. A major assumption of this approach is that individuals act to demonstrate competence or ability in achievement contexts (Dweck, 1986; Nicholls, 1989). Two dimensions of goal perspectives have emerged consistently in extensive investigations. The terms task-involved and ego-involved have been used by Nicholls (1979, 1984) to describe these dimensions. These terms

subsequently developed into 'task goal orientation' and 'ego goal orientation' and have been widely used in research. In the current study, this operational definition of goal orientation will be adopted.

According to Nicholls (1984), individuals in achievement situations predominantly operate under two different goal perspectives, and they view their conceptions of ability in dissimilar manners when they adopt one goal perspective over the other. When a person is task-involved, perceptions of ability are related to self-referenced standards. An athlete who is task-involved will judge his or her level of ability according to how much he or she has learned or improved progressively. In a state of task involvement, the more effort needed to master a skill, the higher an individual perceives his or her ability to be when succeeding on that task. On the other hand, when ego involvement prevails, level of ability is construed with reference to the performances of others. To perceive high ability, one must perform better than others on a particular task.

Duda (1992) supported the theoretical predictions that task-involved individuals exhibit adaptive motivational behaviours that include choosing challenging tasks, exerting maximum effort and persisting even in the face of obstacles. In contrast, ego-involved individuals exhibit these same adaptive motivational behaviours only as long as high perceptions of competence are maintained. Consequently, ego-involved individuals are susceptible to maladaptive motivational behaviours characterised by the avoidance of challenging tasks, minimal effort and the possible withdrawal from an activity.

Task/ego goal orientation research in sport and physical activities

The contrast between individuals who are task goal-oriented and ego goal-oriented and how these orientations manifest themselves in future motivated

behaviour has been extensively studied. Duda (1989) studied 128 male (mean age = 17.8) and 193 female (mean age = 17.1) varsity interscholastic athletes and found that females were more task-oriented while males were more ego-oriented in sport. She suggested that there may be some distinctions in the way male and female high school athletes tend to construe their levels of competence and process their success and failure experiences. Thus gender differences in task/ego orientation need to be considered in this area of research.

Beliefs about success in sport, persistence and participation in sport have also been investigated from a goal perspective approach. In a study of 142 ten year-old British children, Duda, Fox, Biddle and Armstrong (1992) found that goal orientation was associated with independent sets of beliefs in sport. Children adopting predominantly task-orientated goals believed that success was achieved through application of effort and co-operation, and this tended to be associated with adaptive learning practices and persistence, regardless of level of perceived competence. The ego-oriented children, on the other hand, believed that sport achievement was dependent on showing high ability. This suggested that children had low motivation when low competence was perceived.

Fox et al. (1994) conducted a study to investigate the task and ego profile of children in sport. By using the mean split method, as there were no published population-specific norms for the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1989), they found that there was a fairly even distribution of the four goal profiles among children. Children who adopted both high task and high ego (task = 4.63; ego = 4.26) competence views were most involved in sport and had high levels of enjoyment. Few differences were found between this group and those who were dominated by task involvement (task = 4.62; ego = 2.79). Those who were high in ego involvement (task = 3.76; ego = 4.08), particularly when

accompanied by low perceived sport competence were similar with those who were low in both orientations (task = 3.74; ego = 2.85) with poor involvement in sport and high attrition rate. Fox et al. (1994) concluded that mastery and task improvement provide the strongest motivational foundation in sport for children. Notably, in the same study, the researchers also found that the low/low group comprised mainly girls with low perceived sport competence which can be important to recognise for its implications, for example, when developing PE curriculum.

Relationship between perceived sport competence and task/ego goal orientation

Several studies have examined the composite impact of the interaction between goal orientation and perceived competence (Burton, 1989; Duda & Chi, 1989; Duda, Chi, Newton, Walling, & Catley, 1995; Duda & Nicholls, 1992; Dunn, 2000; Hall, 1990; Seifriz, Duda, & Chi, 1992).

Duda et al. (1995) hypothesised that there was little association between goal orientations and perceived competence. However, their results revealed a moderate positive relationship between task orientation and perceived competence in one of the two samples. The association between task orientation and perceived competence was also supported from findings that indicated that task orientation predicted perceived competence and effort (Duda & Nicholls, 1992; Seifriz et al., 1992). Specifically, high school athletes who scored higher on task goal orientation also reported themselves as higher in ability and exerting greater effort than those scoring lower in task goal orientation.

In studying 65 children with movement difficulties, Dunn (2000) found that physical education classes that emphasised a mastery climate tended to be higher in perceived competence for children with movement difficulties. Burton (1989) believed that an emphasis on mastery, learning, and improvement will foster feelings

of competence and result in increased effort. In his study, he found that swimmers, who trained in a goal-setting program that emphasised success relative to personal performance standards rather than performance outcome, were higher in perceived competence than swimmers who were not involved in the training program.

Duda and Chi (1989) explored the effect on perceived competence of either an ego- or task-involving one-on-one basketball game by assessing the pre-and post-game perceived competence of the participants. Seventy-nine college-age male students were assigned to play against an opponent of equal skill under a task-involving condition and an ego-involving condition. Participants were asked to rate their perceived basketball competence after the game. It was found that participants under the task-involving condition demonstrated higher levels of perceived competence after the game than they did under the ego-involving condition. Most studies (Burton, 1989; Duda & Chi, 1989; Duda et al., 1995; Duda et al., 1992; Duda & Nicholls, 1992; Dunn, 2000; Hall, 1990; Seifriz et al., 1992) suggested that an emphasis on task mastery (task orientation) fosters feelings of competence and greater effort, whereas the goal of outperforming others (ego orientation) is likely to lead to feelings of incompetence and less persistence which is an important consideration in the planning and structuring of sport and physical activities.

The mediating role of perceived competence on effort as hypothesised by Nicholls (1989) and Nicholls and Miller (1984) has also been studied. The work of Hall (1990) indicated that both achievement orientation and perceived ability influence motivation by mediating the relationship between goal setting and performance. Hall found that participants with low perceived ability performing under a normative goal structure exhibited potentially debilitating cognitions and significantly poorer performance on a 'stabilometer' task over a series of six trials. In a study of 174 physical education students (mean age = 12.7, $SD = 1.07$), Williams

and Gill (1995) found that task orientation was a good predictor of effort; however, the interaction of ego orientation and perceived competence failed to adequately predict effort. They concluded that task goal rather than ego goal orientation is a more salient construct when children are evaluating their perceived competence and judging how much effort they exert.

A number of studies have examined goal orientation and utilised various approaches and perspectives (Burton, 1989; Duda & Chi, 1989; Duda et al., 1995; Duda & Nicholls, 1992; Dunn, 2000; Hall, 1990; Seifriz et al., 1992). Results generally indicated that goal orientation affects the level of participation and, hence, the enjoyment in sport and physical activities. Gender differences were also found in the adoption of goal orientations. Female athletes were found to be more task-orientated than males; however, girls were also found to be lower in both task and ego orientation with regard to participation in sport activities. There has been considerable empirical support to indicate that a direct association exists between task goal orientation and perceived competence; and that participants in sport and exercise situations emphasising mastery climate are able to perceive feelings of competence and thus exert greater effort. However, the strength of the relationship between perceived competence and task-goal orientation has shown to be equivocal and sometimes has reflected a mediating and indirect role (William & Gill, 1995). This is an important area for further exploration.

Anxiety

Theoretical concepts of anxiety

Anxiety has been described as a by-product resulting from the cognitive process that is attached to either a situation that is perceived as threatening or applied to

thoughts that signify some kind of threat to an individual's psychosocial or physical well-being (Cratty, 1989). Often, anxious feelings are irrational reactions to perceptions that consist of different combinations of feelings of tension, apprehension and nervousness, unpleasant thoughts and worries and also physiological changes (Spielberger, 1989).

There have been a number of theories that have been developed to explain the effect of anxiety on performance. According to Murphy and Woolfolk's (1987) review, it was found that an interaction existed between the amounts of anxiety necessary to maximally perform certain specific tasks. However, most theories like the inverted-U hypothesis (Yerkes & Dodson, 1908), individualized zone of optimal functioning (Hanin, 1997), and the catastrophe model (Hardy, 1990, 1996) seem to agree that performance is reduced by high levels of anxiety. Consequently, most research on affect in youth sport has focused primarily on the negative manifestations of affect, in the form of trait or state anxiety.

Based on Martens' (1977) original definition, competitive trait anxiety represents a predisposition to perceive the competitive situation as threatening or non-threatening and thus is an enduring perception of a person entering into a sport setting. Depending on the perception of the situation, that person responds with varying levels of competitive state anxiety. Competitive state anxiety is characterised by the anxious feeling that an individual experiences just prior to a particular competition and has been found to be a reliable factor in predicting performance. However, competitive trait anxiety has been found to be a determinant of the competitive state anxiety that an individual may feel (Cooley, 1987; Martens & Gill, 1976). Higher levels of competitive trait anxiety may represent negative affect for athletes because previous competitive experiences have provoked apprehension about participation in the sporting domain.

In the further classification of competitive state anxiety, Martens, Vealey and Burton (1990) proposed that there are two components. One is a physical component known as 'somatic anxiety' and the other is a mental component known as 'cognitive anxiety'. Somatic anxiety is the physiological response to threatening situations, such as an increase in heart rate, blood pressure and ventilation volume. Cognitive anxiety includes negative thoughts or cognitions that are created by threatening situations which may trigger somatic anxiety responses. They suggested that somatic anxiety has an inverted-U relationship with performance that peaks at the beginning of competition. On the other hand, cognitive anxiety has a negative relationship or inverse relationship with performance and maintains or increases its level throughout competition and, hence, has a greater effect on performance than somatic anxiety. In the current investigation, attention would be focused on examining cognitive trait anxiety which is a dispositional attribute of an individual that influences attitudes towards sport and physical activities participation.

Anxiety research in sport and physical activities

Anxiety, in the form of competitive trait anxiety, has been frequently studied in the area of youth sport research. Weinberg and Genuchi (1980) studied the relationship between sport anxiety and sport performance of collegiate golfers. Ten low, ten moderate and ten high competitive trait anxiety golfers performed in a practice round on two days of a competitive tournament. The results indicated that golfers with low levels of state-anxiety produced significantly higher performances than golfers with moderate or high levels of anxiety. The results also supported the notion that competitive trait anxiety was found to be a source of competitive state anxiety in golfers. Cook et al. (1983) replicated and extended the findings of Weinberg and Genuchi (1980) with 103 male amateur golfers and supported the finding that

lower pre-competition anxiety resulted in better golf performance. In a study with 30 female novice university basketball players, Sonstroem and Bernardo (1982) supported the tenets of the inverted-U hypothesis as players performed best at a moderate level of arousal.

Cox's (1986) research, however, was not totally supportive of the findings reported by Sonstroem and Bernardo (1982). Cox (1986) studied the effect of state anxiety levels of female volleyball players on performance and concluded that lower anxiety levels produced better performance in spiking and serving. The findings seemed to be in support of those reported by Weinberg and Genuchi (1980) and Cook et al. (1983) which indicated that players' performances increased linearly when sport anxiety was lower.

Relationship between perceived sport competence and competitive trait anxiety

The impact of anxiety on youth sport involvement has been studied using Harter's (1978, 1981) competence motivation theory as a framework. Harter's theory proposes that negative affect in the form of anxiety attenuates competence motivation when an individual perceives that one lacks the required competencies to achieve mastery, or does not possess adequate situational control. Passer (1983) examined a number of personality variables as a means of identifying correlates of competitive trait anxiety in male soccer players aged 10 to 15 years. Results indicated that players in the upper and lower quartiles of the sample differed in that high competitive trait anxiety players had lower levels of self-esteem, reduced expectations for personal performance, worried more frequently about poor performance and also worried more about incurring negative evaluation from important others. However, the prediction of sport-specific perceptions of personal competence on competitive trait anxiety levels was not supported.

Brustad and Weiss (1987) replicated and extended Passer's (1983) work by studying both male and female participants. Using Harter's (1978, 1981) model of competence motivation, 55 male baseball players and 58 female softball players were examined (mean age = 11.4, $SD = 1.1$) to study the relationship between cognitive and affective characteristics. It was found that males with high competitive trait anxiety reported lower levels of self-esteem and more frequent worries about their performance than those with low competitive trait anxiety. For females, no significant relationships were found between levels of competitive trait anxiety and the cognitive variables that were examined. Furthermore, similar to the study by Passer (1983), Brustad and Weiss (1987) did not find a relationship between competitive trait anxiety levels and, in this case, perceived baseball competence (i.e., the sport-specific measure of esteem). The authors attributed the absence of a relationship to an overly rigid adherence to Harter's Perceived Physical Competence Scale (1982) which could not accurately tap children's perceptions of their ability for the different component skills (batting, throwing, running) in baseball.

In another study with 207 male and female basketball players (mean age = 10.8, $SD = 1.1$) during a competitive season, Brustad (1988) included positive affective outcome and again used Harter's competence motivation theory (1978, 1981) as a guide to study the potential correlates of positive and negative affect. It was found that greater enjoyment was predicted by high intrinsic motivation and low perceived parental pressure for both boys and girls. High competitive trait anxiety was predicted for boys and girls according to scores of low self-esteem. Similar to previous studies (Brustad & Weiss, 1987; Passer, 1983), sport-specific high perceived competence was not predictive of season-long, sport-related enjoyment or lower competitive anxiety as usually contested by Harter (1978, 1981).

Ommundsen and Vaglum (1991) claimed that cultural bias might exist as the

studies, to-date, comprised American samples only; therefore, they conducted their research with European participants. Their research was based on Harter's (1978, 1981) competence motivation theory, with 223 twelve to 16 year-old Norwegian male soccer players. They found that low soccer-related self-esteem was associated with soccer competitive anxiety; whereas high perceived soccer competence and parents' and coaches' positive emotional involvement were predictive of enjoyment in soccer among the young players. The results supported Harter's (1978, 1981) research as they indicated that anxiety can affect an individual's perceived competence.

In another study with 136 Norwegian athletes aged 13 to 18 years, Ommundsen and Pedersen (1999) examined participants in organised sport. Goal orientation theory (Nicholls, 1989) and competence motivation theory (Harter, 1978, 1981) were used to examine the relationships between young athletes' achievement goals and indices of somatic and cognitive trait sport competitive anxiety. It was found that ego-orientated achievement goal has no relationship with indices of anxiety, whereas high task goal orientation and high perceived sport competence predicted a reduced tendency for cognitive anxiety. Also, athletes with high perceived sport competence were found to be less predisposed to experiencing somatic anxiety in the form of elevated physiological arousal when competing than those who doubted their competence. However, the finding in the study was limited to soccer-related self-esteem, but not perceived soccer competence. Similar to Brustad and Weiss's (1987) study, the index used to measure perceived soccer competence was too general and could not cover different skill components of soccer ability.

Generally, the studies revealed that high competitive trait anxiety was associated with low self-esteem and low perceived sport competence, and high perceived sport competence was typically associated with low competitive trait anxiety and enjoyment. Yet, owing to the difficulties in the construction of a sport-specific competence scale

(Brustad & Weiss, 1987; Ommundsen & Pedersen, 1999), the relationship between domain-specific esteem and competitive trait anxiety does not emerge in most of the studies. Also, most of the studies were conducted with athletes under competitive settings, rather than general physical activity settings. The current investigation will assess the impact of competitive trait anxiety for children in a physical education class setting.

Summary for review of literature

Self-confidence has been regarded as a crucial trait in affecting individuals' motivations towards participation in sport and physical activities. Among different self-confidence theories, Harter's (1978, 1981) competence motivation theory, due to its "domain-general self-perception" (Biddle, 1997; p.63) and its developmental nature, was found to be an appropriate approach for the study of junior secondary students between the ages of 12 and 15 years towards participation in general sport and physical activities for this study (Feltz & Petlichkoff, 1983; Klint, 1985; Klint & Weiss, 1986; Roberts et al., 1981). In Harter's theory (1978, 1981), perceived sport competence is hypothesised as the main construct that determines an individual's likelihood to continue or discontinue participation in sport and physical activities. Several studies (Caroll & Loumidis, 2001; Klint & Weiss, 1987; Roberts et al., 1981; Weiss et al., 1986) have found that perceived sport competence is directly related to higher participation in sport activities, greater persistence, greater enjoyment and a stronger motive for skill development.

While examining the source of motivation in terms of intrinsic motivation, extrinsic motivation and amotivation (Deci, 1975; Deci & Ryan, 1985), there has been strong support that intrinsic motivation is associated with greater persistence and more positive affect towards participation in sport and physical activities (Deci & Ryan,

1980; Wankel & Kreisel, 1985). Vlachopoulos et al. (2000) also suggested that individuals can be high in both intrinsic and extrinsic motivation. Furthermore, there is strong support for the relationship between perceived sport competence and intrinsic motivation (Ferrer-Caja & Weiss, 2000; Klint & Weiss, 1987; Markland, 1999; Weigand & Broadhurst, 1998). When coordinating various approaches, some research has supported intrinsic motivation as a good predictor of perceived sport competence (Klint & Weiss, 1987; Weigand & Broadhurst, 1998); yet, some research suggested that perceived sport competence was a predictor of intrinsic motivation (Ferrer-Caja & Weiss, 2000; Markland, 1999).

Based on the goal orientation approach (Dweck, 1986; Maehr & Nicholls, 1980; Nicholls, 1984, 1989), the literature has indicated that participation in sport and physical activities can be fostered by adopting a high task goal orientation through adaptive learning practices and persistence (Duda et al., 1992; Fox, 1994). Gender differences were also found whereby female athletes were more task orientated than males (Duda, 1989), but girls were found to be lower in both task and ego orientations towards sport and exercise participation (Fox, 1994). The association between task goal orientation and perceived sport competence was supported in some studies (Burton, 1989; Duda & Chi, 1989; Duda & Nicholls, 1992; Dunn, 2000; Hall, 1990; Seifriz et al., 1992) but have shown different degrees of association (Duda et al., 1995), and findings sometimes reflected an indirect role (William & Gill, 1995).

The perception of a situation as being threatening has also been shown to affect an individual's motivation towards sport participation. Studies have supported that lower anxiety levels facilitate better performance (Cook et al., 1983; Cox, 1986; Weinberg and Genuchi, 1980). Some studies (Ommundsen & Pedersen, 1999; Ommundsen & Vaglum, 1991) supported the notion that competitive trait anxiety is negatively related to perceived sport competence; however, some studies (Brustad &

Weiss, 1987; Passer, 1983) that have tested Harter's (1978, 1981) competence motivation theory have found that a negative relationship existed between competitive trait anxiety and self-esteem.

In sum, high perceived sport competence, high intrinsic motivation orientation and low amotivation, high task goal orientation, foster high participation in sport and physical activities. Also, low competitive trait anxiety is preferred in sport performance. Strong relationships have also been shown between perceived sport competence, and intrinsic motivation, task goal orientation and low competitive anxiety. Therefore, the joint investigation of these motivational constructs is warranted.

From a motivational standpoint, the literature has indicated that task involvement, intrinsic motivation and low competitive trait anxiety are favourable in PE and sport contexts because they are closely linked to perceptions of competence. However, in the contexts of PE and sport, competition is often emphasised and that inevitably promotes ego involvement and external locus of control as well as creating a situation that can be perceived as threatening. The way in which these diverse motivational attributes interact with each other and, consequently, impact on participant motives, is yet to be examined.

PURPOSE OF RESEARCH PROGRAMME

To date, most research that has examined motivational climate in order to foster participation in physical activities has been conducted in Western cultures. Indeed, only a few studies (Wang & Wiese-Bjornstal, 1995; Yoo & Kin, 2002) were conducted in the East. In a review on the psychological consideration of youth in sport, Brustad, Babkes and Smith (2001) commented that most of the findings were generated from the populations in North America. They recommended that the breadth

and content of research should be extended to other cultures that might have a different experience and meaning towards youth sport participation. Similar comments were also made by Biddle (1997) on Harter's Theory (1978, 1981) as he stated that "the cultural validity of the theory has not received a great deal of attention" (p. 64). The need for studies from different cultural settings is important not only for validation of existing theories and concepts, but also for purposes of generalisability.

Research that has been conducted in the East to assess perceived sport competence and goal orientation has revealed important findings. Wang and Wiese-Bjornstal (1995) examined the physical and cognitive domains of Harter's competence motivation theory (1978, 1981) in the People's Republic of China with 465 students (males = 261, females = 204) from sport schools and normal schools. Findings supported that domain-specific competence was higher for students from sport schools in the physical domain but less in the cognitive domain than students from normal schools. In another study, Yoo and Kin (2002) investigated goal orientation and the sources of enjoyment for young (12 to 18 years old) Korean athletes ($N = 334$; 244 boys, 90 girls). Their findings confirmed those of Western studies, whereby task goal orientation was related with self-referenced sources of enjoyment, but ego goal orientation was related to social recognition. However, research from South-Eastern Asia has not yet explored the relationship between perceived sport competence and other motivational orientations.

The purpose of this study was to examine the motivation of junior secondary school children of ages between 12 to 15 years with regard to participation in sport and physical activities in Hong Kong. Specifically, the study examined whether junior secondary school children who perceived themselves to be more competent in sport were more likely to participate in sport and physical activities. Also, as an extension of previous research the study examined the relationships between perceived sport

competence and other motivational orientations of intrinsic/extrinsic motivation, task/ego goal orientation and high/low competitive trait anxiety in the Hong Kong junior secondary school context. The findings from this research can be used to contribute to the study of perceived competence and other motivational orientations by investigating participants under the Eastern culture. Also, participants were junior secondary school students from the general public and have seldom been investigated in previous research. Results will additionally be used to help in the development of effective motivational programmes to enhance the enjoyment and persistence of youngsters in PE and sport participation in Hong Kong. Finally, findings from this study can be useful to generate practical recommendations for the reform of the current junior secondary PE curriculum, and to best-prepare students for their senior secondary curriculum according to the new “3-3-4” secondary educational reform in Hong Kong (Curriculum Development Council, 2005).

Research Questions

The aim of this programme of studies is to investigate the behavioural pattern of junior secondary students in Hong Kong when participating in sport and physical activities. The study will examine perceived competence which is the main construct in Harter's competence motivation theory with further inclusion and analysis of determinant factors such as intrinsic/extrinsic motivational orientation, ego/task goal orientation, and level of competitive trait anxiety.

The following research questions will guide the investigation:

1. Is the translated Chinese version of questionnaires a valid and reliable instrument for this study in Hong Kong Chinese?
2. What are the behavioural patterns of participation for junior secondary school students in Hong Kong in sport and physical activities in terms of

intrinsic/extrinsic motivation, task/ego goal orientation, competitive trait anxiety and perceived competence?

3. How do gender, age, level of participation differences relate to perceived sport competence, intrinsic/extrinsic motivation, goal orientation and competitive trait anxiety?
4. What are the relationships between perceived sport competence and intrinsic/extrinsic motivation, motivational orientations of task/ego goals, and low/high competitive trait anxiety?
5. How do intrinsic/extrinsic motivation, the motivational orientations of task/ego goal orientation and competitive trait anxiety interact in affecting the perceived competence in junior secondary students in Hong Kong?

Chapter 2

VALIDATION STUDIES

INTRODUCTION

Validation of questionnaires

In Hong Kong, 99% of the population are Chinese (Census and Statistics Department, 2001). Chinese language is used both in spoken and written communication purposes. Most research conducted in Hong Kong must use Chinese as the medium to guarantee that participants can fully understand. Also, participants are more willing to respond if they do not have the burden of comprehending a foreign language. For example, studies conducted by Lindner (1997) with 4,690 primary and secondary students, and Tsang, Szabo and Robinson (2003) with 112 Hong Kong university students have required the translation of the original English versions of questionnaires into Chinese prior to conducting the investigations.

In this study, the original questionnaires were in English, and it would have been difficult for junior secondary school students in Hong Kong to understand their meaning. Thus, it was necessary to translate them into Chinese to avoid misinterpretation. The aim of this study was to translate the questionnaires to be used in the research programme into Chinese and to examine the translated versions' validity and reliability. Data from a representative sample was collected and analysed for this explicit purpose. Internal consistency of the instrument was examined by observing the Cronbach's alpha (Coefficient α). Also, confirmatory factor analysis was performed to confirm the factorial validity of the translated questionnaires.

Specifically, the following four research questions were addressed:

1. Was the Chinese version (SPPC-Chi) of the Self-Perception Profile for Children (SPPC; Harter, 1985) a valid and reliable questionnaire for this study with Hong Kong Chinese?
2. Was the Chinese version (SMS-Chi) of the Sport Motivation Scale

(SMS; Pelletier et al., 1995) a valid and reliable questionnaire for this study with Hong Kong Chinese?

3. Was the Chinese version (TEOSQ-Chi) of the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1989) a valid and reliable questionnaire for this study with Hong Kong Chinese?
4. Was the Chinese version (SCAT-Chi) of the Sport Competition Anxiety Test (SCAT; Martens et al., 1990) a valid and reliable questionnaire for this study with Hong Kong Chinese?

During the analysis of the first set of data, it was discovered that participants were not properly instructed and many of them did not complete one of the questionnaires (SPPC-Chi) correctly. As a result, there was much invalid data, and proper validation analysis of SPPC-Chi could not be performed with the first data set. Subsequently, another new set of data was collected in the same school just for SPPC-Chi with detailed instructions. Separate analysis for the second set of data was performed.

Internal consistency

Internal consistency measures the degree to which items in the same subscale are homogeneous (Nunnally & Bernstein, 1994). It is based on the average correlation among the number of items in each subscale. Cronbach's alpha (Coefficient α) was computed to assess the internal consistency of the SPPC-Chi, SMS-Chi, TEOSQ-Chi and SCAT-chi using the data collected as specified above. Nunnally and Bernstein (1994) advocated that an alpha of .70 can be considered as an adequate value and .65 can be accepted as the lowest value. However, there have been studies that have

indicated a value of .60 to be adequate (Feltz & Brown, 1984; Klint & Weiss, 1987). In this study, an alpha value of .70 was determined to be adequate, and an alpha of .65 was considered the lowest acceptable value in consideration with other psychometric properties.

Confirmatory factor analysis

To confirm the factorial validity of the translated questionnaires, a stronger method of validating the translated instruments was to conduct confirmatory factor analysis (CFA). In this study, the analyses were performed using the EQS for Windows 6.1 (Bentler, 1995). Confirmatory factor analysis is theory-driven, and involves the a priori postulation of a latent variable structure based on the original theoretical consideration. To confirm the factor structure of various models in each of the questionnaires, a priori parameter models specifying different configurations of the questionnaires were put forward and tested. For the assessment of models in this study, a cutoff value close to or greater than .95 for comparative fit index (CFI) in combination with a cutoff value close to or smaller than .08 for standardized root mean squared residual (SRMR) was used to evaluate the model fit, as recommended by Hu and Bentler (1999). Other indices were also recorded for reference purpose, including chi-square (χ^2), degrees of freedom (df), non-normed fit index (NNFI), adjusted goodness of fit index (AGFI), and root mean squared error of approximation (RMSEA).

Hypotheses

Based on the above, the following hypotheses were generated and tested:

Hypothesis 2.1 The Chinese version (SPPC-Chi) of the Self-Perception Profile for Children (SPPC; Harter, 1985) would be a valid and reliable

questionnaire by demonstrating an adequate alpha value (.70) for internal consistency and a good model fit in the confirmatory factor analysis.

Hypothesis 2.2 The Chinese version (SMS-Chi) of the Sport Motivation Scale (SMS; Pelletier et al., 1995) would be a valid and reliable questionnaire by demonstrating an adequate alpha value (.70) for internal consistency and a good model fit in the confirmatory factor analysis.

Hypothesis 2.3 The Chinese version (TEOSQ-Chi) of the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1989) would be a valid and reliable questionnaire by demonstrating an adequate alpha value (.70) for internal consistency and a good model fit in the confirmatory factor analysis.

Hypothesis 2.4 The Chinese version (SCAT-Chi) of the Sport Competition Anxiety Test (SCAT; Martens et al., 1990) would be a valid and reliable questionnaire by demonstrating an adequate alpha value (.70) for internal consistency and a good model fit in the confirmatory factor analysis.

VALIDATION STUDY 1

Method

Participants

Pentecostal Wing Kong Secondary School in Kowloon, Hong Kong was chosen for this study. The school is a co-educational grammar school with six classes in each grade from Secondary 1 to Secondary 5, and 2 classes for Lower and Upper 6. Each class has two PE lessons each week that last for 40 minutes each, and this is the typical time-tabling arrangement in Hong Kong. The school also participates regularly in inter-school competitions. A total of 224 students were tested after consent was obtained from the Principal of the school. A total of six classes were tested, whereby there were two classes from each level of Secondary 1, 2 and 3. There were approximately 38 students in each of the 6 classes. Participant mean age was 13.76 years ($SD = 1.26$), with a range of 12 to 17 years. There were 77 students studying in Secondary One, 68 were in Secondary Two and 79 in Secondary Three. There was an approximately equal distribution of males ($n = 107$) and females ($n = 117$) in the sample. With regard to level of involvement in physical activity, approximately half of the sample ($n = 119$) seldom participated; while 49 students engaged regularly in recreational or leisure type of physical activity and 49 trained at competitive level. There were 7 students who did not indicate their level of involvement.

Instruments

Self-Perception Profile for Children (SPPC; Harter, 1985) (Appendix I)

Harter developed the Perceived Competence Scale for Children (PCSC) in 1982 to tap children's domain-specific judgments of their competence and global perception

of self-worth as a person. The instrument provided separate measures of an individual's perceived competence in different areas that could yield a more differentiated and contextual view of self-concept. The four domains were cognitive competence, social competence, physical competence and global self-worth. In 1985, Harter revised the PCSC by re-labelling several sub-scales and re-writing some of the items. Physical competence was replaced by athletic competence and there were two additional sub-scales of physical appearance and behaviour conduct to comprise a total of six sub-scales. The revised instrument is called the Self-Perception Profile for Children (SPPC) (Harter, 1985). The instrument is appropriate for children in the third through sixth grades (8 to 12 years). The internal consistency reliabilities (Cronbach's alpha) for each subscale range between .71 to .86 have been reported by Harter (Harter, 1985), and have been confirmed by other studies (Granleese & Joseph, 1993; Van Dongen-Melman, Koot, & Verhulst, 1993; Worth Gavin & Herry, 1996).

Each subscale has six items presented in a structured alternative format. Two statements reflecting opposing views of a child were presented to children, and they went through a two-step process in responding to the items. First, children were asked whether they are similar to other children who are good at a particular activity or similar to others who are not. For example, "Some children are really good at playing sports, BUT, other children are not very good at playing sports". After that, participants determined if that statement was 'sort of true' or 'really true' for them. Depending on how the child responded to the item, a value ranging from one to four (lowest to highest) was assigned.

The structured-alternative format has been shown able to reduce socially desirable responses (Fox & Corbin, 1989; Sonstroem & Potts, 1996). However, this format has also been found to create difficulties for participants who may respond

more slowly or mistakenly give responses to both the two alternative statements (Eiser, Eiser, & Haversmans, 1995; Marsh, 1994).

Another problem as pointed out by Roberts (1992) was that the format and wording of the SPPC leads the respondents to compare themselves to others. This may strengthen the respondents' intentions of using other-referenced criteria to judge themselves, which is in contrast with the mastery perspective to achievement strivings assumed in Harter's (1978, 1981) model. However, this issue is not a problem specific to the SPPC, and is evident in other similar instruments as well. Whether the respondents are using other-referenced criteria or self-referenced criteria, they are still unknown to the researcher. This issue must be considered when interpreting the findings.

Validation of the SPPC with participants in different cultural settings yielded satisfactory results. Worth Gavin and Herry (1996) conducted a validity and reliability study for a French version of the SPPC in Canada with fourth- (age = 9), fifth- (age = 10), and sixth-grade (age = 11) students. Cronbach's alpha coefficients for the subscales ranged from a marginal acceptable value of .69 to an adequate value of .84. Granleese and Joseph (1993) had similar results with Irish students.

In some previous studies (Brustad, 1988; Ferrer-Caja & Weiss, 2000; Klint & Weiss, 1987; Ommundsen & Pederson, 1999) researchers only used selected subscales because this method can yield distinct information without jeopardising the psychometric properties of the instrument. In the current study, only the physical appearance and athletic competence sub-scales were deemed relevant since the study was concentrating on physical activity-related areas.

Sport Motivation Scale (SMS; Pelletier et al., 1995) (Appendix II)

The Sport Motivation Scale (SMS) was validated by Pelletier and his colleagues (Pelletier et al., 1995) as an English version of the original ‘Echelle de Motivation dans le Sport’ (EMS; Briere et al., 1995). The SMS is based on the conceptualisation of different motivational constructs by Deci, Ryan and colleagues (Ryan, Connell & Grolnick, 1992; Ryan & Deci, 2000) and also Vallerand and colleagues (Vallerand et al., 1992, 1993). It is multidimensional in nature, and is composed of seven subscales that consist of three types of extrinsic motivation (external, introjected, and identified regulation), three types of intrinsic motivation (intrinsic motivation to know, to experience stimulation, and to accomplish) and the concept of amotivation.

Motivation in the SMS is operationalised as the perceived reasons for participation in sport. At the beginning of the scale, the question is asked “Why do you practice your sport?” Twenty-eight statements are listed representing different types of motivation in the form of perceived reasons for engaging in the activity. Participants have to choose a value ranging from one to seven depending on how they perceive the reason, i.e., ‘does not correspond at all’ (1), to ‘corresponds moderately’ (4), to ‘corresponds exactly’ (7). The SMS contains 28 items, which can be applied to most sport and physical activity settings. In a study conducted by Pelletier et al. (1995) with 593 university athletes, a mean Cronbach alpha of .82 was reported. In another study with 50 soccer players, a mean test-retest reliability coefficient of .69 was found across a one-month interval (Pelletier et al., 1995). The psychometric properties of the SMS have also been studied in other nations. Martens and Webber (2002) tested the Scale with 270 U.S. college athletes and calculated alpha scores for each subscale. Scores ranged from .70 (projection) to .82 (intrinsic motivation to know), with a mean value of .75. Hence, the researchers concluded that the SMS displayed adequate internal

consistency.

In a review on the measurement of intrinsic and extrinsic motivation, Vallerand and Fortier (1998) concluded:

SMS has some advantages relative to other contextual measures of intrinsic and extrinsic motivation. First, it is multidimensional in nature, assessing the different types of IM and EM. Second, it assesses intrinsic and extrinsic motivation independently from each other. Third, the assessment of intrinsic and extrinsic motivation is not confounded with motivational determinants and consequences. Fourth, the scale also measures amotivation... Finally, the SMS contains 28 items in all and can be applied to most sport and physical activity settings. (p. 95)

Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1989)
(Appendix III)

Nicholls developed the classroom-specific Motivation Orientation Scales (Nicholls, 1989) and determined that task and ego orientations are independent dimensions with a positive relationship between them. He then collaborated with Duda in developing a sport-specific measure, the Task and Ego Orientation in Sport Questionnaire (TEOSQ) (Duda & Nicholls, 1989). Participants are asked to think of a successful sport experience and respond to 13 items reflecting task- and ego-referenced criteria. Responses are indicated on a 5-point Likert Scale ranging from strongly disagree (1) to strongly agree (5).

From a summarised data of 56 studies that included a range of ages from 10-12 years with school children, as well as adolescents, adults and senior citizens, Duda and Whitehead (1998) reported mean internal reliability value of .79 and .81, respectively, for the task and ego subscales of TEOSQ. Further, the two subscales of the TEOSQ have been found to have acceptable test-retest reliability following a three-week

period ($r = .68$ and $.75$, respectively) (Duda, 1992), and after a soccer season ($r = .71$ and $.72$ respectively) (Van Yperen & Duda, 1997). Thus the TEOSQ has been found to exhibit acceptable internal consistency and ability to measure a dispositional proneness in a consistent manner over time. The TEOSQ has been widely used in sports motivational research and was translated to different languages, including Greek (Papaioannou & Macdonald, 1993), Romanian (Dorobantu & Biddle, 1997), Spanish (Balaguer, Duda, & Crespo, 1999), and Thai (Li, Harmer, Acock, Vongjaturapat, & Boonverabut, 1997).

Sport Competition Anxiety Test (SCAT; Martens et al., 1990) (Appendix IV)

Competitive anxiety was measured with the Sport Competition Anxiety Test (SCAT) that was developed in response to the need for a sport-specific measure of trait anxiety (Martens, 1977; Martens et al., 1990). The SCAT is used to assess individual differences in competitive trait anxiety, or the tendency to perceive competitive situations as threatening and respond to these situations with elevated state anxiety. The SCAT contains 15 items, and participants are asked to indicate how they generally feel when they compete in sports and games and respond to each item using a 3-point ordinal scale (hardly ever, sometimes, or often). Ten of the items assess individual differences in competitive trait anxiety proneness, and five spurious items are also included to reduce possible response bias. The total scores for the SCAT range from 10 (low competitive trait anxiety) to 30 (high competitive trait anxiety). SCAT has good internal reliability (KR-20 coefficient ranged from $.95$ to $.97$) and also demonstrated an acceptable test-retest reliability (Pearson $r = .77$); for concurrent validity, a low to moderate correlation (Pearson r range from $.28$ to $.46$) with other general indices of trait anxiety was reported (Martens et al., 1990).

SCAT has been a critical research tool within sport psychology since its development more than two decades ago. A vast majority of studies in which individual differences in competitive trait anxiety have been assessed have utilized the SCAT (e.g., Brustad, 1988; Brustad & Weiss, 1987; Ommundsen & Vaglum, 1991). In an evaluation of the SCAT, Smith, Smoll and Wiechman (1998) concluded that the SCAT measure contributed to the stimulation of research that has advanced the knowledge of the understanding of sport anxiety (p.117).

Demographic variables

Demographic variables include participant's present educational level in school (i.e., Secondary 1, Secondary 2 or Secondary 3), gender, age, district of residence, and level of participation in sport activities (i.e., seldom, recreational, and training).

Procedure

Translation of the questionnaires into Chinese followed the parallel back-translation procedure. The original questionnaires were translated into Chinese by the investigator who was knowledgeable of the rationale and theoretical background of different questionnaires. A native English-speaking academic was consulted on the conceptual accuracy of the items on the questionnaires. The Chinese version was then translated back into English by another teacher educator who was fluent in both English and Chinese languages. The original and the backward-translated English questionnaires were then compared by both translators in a conference and the Chinese instruments were refined until both translators were satisfied with them. Subsequently, the SPPC-Chi (Appendix V), SMS-Chi (Appendix VI), TEOSQ-Chi (Appendix VII) and SCAT-Chi (Appendix VIII) were drafted as the

final versions for validation. The final versions of the questionnaires were word-processed in Chinese and bundled together before their distribution for completion by the students.

Informed Consent letters (Appendix IX) were prepared and sent to the school Principal. After obtaining permission, the questionnaires were distributed and completed at the beginning of their physical education classes. The majority of the students completed the four questionnaires in approximately 15 minutes.

Data Analysis and Results

Demographic Data

224 students from Pentecostal Wing Kong Secondary School took part in this study. The mean age of participants was 13.76 years ($SD = 1.26$). Other information is summarised in Table 1.

Table 1

Demographic Data of Samples in Validation Study 1

Gender	Males			Females		
	107			117		
Age	12	13	14	15	16	17
	11	15	23	70	61	42
Class Level	One		Two		Three	
	77		68		79	
Participation	Seldom		Recreation		Training	
	118		49		49	

Internal consistency

The ratings of the questionnaires were inputted to an Excel data file rating-by-rating, which was later imported into the Statistical Package for Social Sciences (SPSS Version 12.0) data file for subsequent analyses. There was valid and missing data for different questionnaires. Details are summarised in Table 2.

Table 2

Response Rate for SPPC-Chi, SMS-Chi, TEOSQ-Chi and SCAT-Chi

	SPPC-Chi	SMS-Chi	TEOSQ-Chi	SCAT-Chi
Valid	137	212	216	213
Missing	87	12	8	11

The questionnaires, and when applicable the corresponding subscales, were analysed for internal consistency by calculating the Cronbach alpha values. Results are presented in Table 3.

Table 3

First Reliability Analysis of the Chinese TEOSQ, SCAT, SMS and SPPC

Instrument	Subscales		Alpha values
TEOSQ-Chi			.85
	Task		.79
	Ego		.84
SCAT-Chi			.80
SMS-Chi			.90
	Amotivation		.40
	Extrinsic Motivation		.84
		EM- external regulation	.36
		EM- introjected regulation	.73
		EM- identified regulation	.66
	Intrinsic Motivation		.86
		IM-to know	.64
		IM- accomplishment	.66
		IM- stimulation	.65
SPPC-Chi			.34
	Athletic competence		.07
	Physical appearance		.35

Confirmatory factor analysis

Confirmatory factor analysis was conducted by using the EQS for Windows 6.1 (Bentler, 1995) and was intended to be performed for each translated questionnaire. However, in consideration of the high missing data for SPPC-Chi and its low corresponding Cronbach alpha value, confirmatory factor analysis was not performed

for SPPC-Chi in this study.

SMS-Chi

The questionnaire consists of seven subscales: three subscales of intrinsic motivation (to know, to accomplish, to experience stimulation), three subscales of extrinsic motivation (external regulation, introjection, identification), and amotivation. Participants give the perceived reasons for participation in sport by responding to the question "Why do you practice your sport?" To assess the factor structure, three a priori models were postulated: (1) a null model (MM_0); (2) a 7-factor hypothesised model of the seven motivational orientation constructs (MM_7), whereby each factor consisted of each subscales' four corresponding items and all factors were allowed to correlate freely; (3) a simplex 3-factor model (MM_3) based on the combination of three intrinsic subscales into one subscale, three extrinsic subscales into one subscale, and the amotivation subscale corresponding to its four items.

A summary of fit indices for the SMS-Chi measurement model is shown in Table 4. Results indicated a poor fit for the 7-factor hypothesized model (MM_7) ($CFI = .77$, $SRMR = .07$). The Lagrange Multiplier Test results suggested that cross-loading of several items under different subscales should be made in order to improve the fit index of the model. However, results for the simplex 3-factor model (MM_3) composed of intrinsic motivation, extrinsic motivation and amotivation demonstrated a good fit for the model ($CFI = .96$, $SRMR = .05$). Moreover, in consideration of the relatively low Cronbach alpha values of some of the subscales (e.g., "external regulation" = .36), the simplex 3-factor model (MM_3) (Appendix X) will be used in this study for future analyses.

Table 4
Summary of Fit Indices for SMS-Chi Measurement Model

Model	χ^2	Df	NNFI	CFI	AGFI	SRMR	RMSEA
MM _o	2154.97	378					
MM ₇	752.55	347	.75	.77	.73	.07	.08
MM ₃	61.29	32	.95	.96	.90	.05	.07

Note. (MM_o) = null model; (MM₇) = seven-factor model; (MM₃) = simplex three-factor model. NNFI = non-normed fit index; CFI = comparative fit index; AGFI = adjusted goodness of fit index; SRMR = standardized root mean squared residual; RMSEA = root mean squared error of approximation.

TEOSQ-Chi

The questionnaire assesses two dimensions of achievement goal orientation in sport: (1) task orientation, which focuses on task mastery or personal improvement reflected by items such as: "I learn a new skill by trying hard", and (2) ego orientation, which emphasises the importance of superiority over others as reflected by items such as "I can do better than my friends". To confirm that the two-factor TEOSQ model provided an adequate fit to the observed data, three a priori parameter-nested models specifying different configurations of the TEOSQ structure were postulated: (1) a null model (MG_o), (2) a single-factor model (MG_s), (3) a two-factor hypothesised orthogonal model of the two goal orientation constructs (MG_u).

A summary of fit indices for the TEOSQ-Chi measurement models is shown in Table 5. Model MG_u was a two-factor orthogonal model of which the TEOSQ-Chi items were specified to load on to either the task or ego orientation sub-scale as in the original TEOSQ. However, the model fit indices did not appear to be good (CFI = .82, SRMR = .18). The Lagrange Multiplier Test results showed that the model could be improved by adding a covariance parameter between task and ego orientation

subscales. Also, by cross-loading two of the task orientation items (i.e., G11 "A skill I learn really feels right" and G13 "I do my very best") on both task and ego orientation subscales.

Subsequently, two measurement models (Model MG_{c1} and Model MG_{c2}) were put to test. In Model MG_{c1}, a covariance parameter was added between task and ego orientation subscales. Model fit indices were greatly enhanced but still did not appear very well (CFI = .92, SRMR = .06). In Model MG_{c2}, in addition to adding a covariance parameter between the task and ego orientation subscales, the two task orientation items aforementioned were cross-loaded on both task and ego orientation subscales. The data fitted Model MG_{c2} well (CFI = .95, SRMR = .04). Model MG_{c2} (Appendix XI) was thus accepted as the TEOSQ-Chi measurement model for use in subsequent analyses.

Table 5

Summary of Fit Indices for TEOSQ-Chi Measurement Model

Model	χ^2	Df	NNFI	CFI	AGFI	SRMR	RMSEA
MG _o	1044.67	78					
MG _s	347.72	65	.65	.71	.66	.11	.14
MG _u	241.33	65	.78	.82	.82	.18	.11
MG _{c1}	197.19	64	.90	.92	.92	.06	.07
<u>MG_{c2}</u>	<u>129.17</u>	<u>62</u>	<u>.93</u>	<u>.95</u>	<u>.93</u>	<u>.04</u>	<u>.05</u>

Note. (MG_o) = null model; (MG_s) = a single-factor model; (MG_u) = two-factor orthogonal model; (MG_{c1}) = two-factor oblique model; (MG_{c2}) = two-factor oblique model, cross loading of two items. NNFI = non-normed fit index; CFI = comparative fit index; AGFI = adjusted goodness of fit index; SRMR = standardized root mean squared residual; RMSEA = root mean squared error of approximation.

SCAT-Chi

The questionnaire assesses the uni-dimensional factor of competitive trait anxiety. Participants respond to 15 items using a 3-point ordinal scale which indicate how they generally feel when competing in sports and games. To confirm the factorial validity, a hypothesised model (MA_u) was built by loading the ten relevant items and excluding the five spurious items to compare with the null model (MA_o) and a restricted model (MA_r) with all 15 items.

A summary of fit indices for the SCAT-Chi measurement models is shown in Table 6. All items loaded on the uni-dimensional scale as hypothesised. The data fit the Model MA_u well ($CFI = .97$, $SRMR = .04$). Model MA_u (Appendix XII) thus was accepted as the SCAT-Chi measurement model for use in subsequent analyses.

Table 6
Summary of Fit Indices for SCAT-Chi Measurement Model

Model	χ^2	Df	NNFI	CFI	AGFI	SRMR	RMSEA
MA_o	747.25	91					
MA_r	228.14	77	.73	.77	.81	.09	.09
MA_u	104.22	35	.96	.97	.93	.04	.06

Note. (MA_o) = null model; (MA_r) = 15-item restricted model; (MA_u) = 10-item theoretical model.
NNFI = non-normed fit index; CFI = comparative fit index; AGFI = adjusted goodness of fit index;
SRMR = standardized root mean squared residual; RMSEA = root mean squared error of approximation.

Validation Study 1 Discussion

Internal consistency

In this study, the main subscales in three of the four translated questionnaires

yielded adequate alpha values and were above the recommended level of .70 as recommended by Nunnally and Bernstein (1994). The internal consistencies of the task- and ego-orientation subscales of the TEOSQ-Chi were either similar (task-orientation .78 vs. .79) or higher (ego-orientation, .84 vs. .81) than what was originally reported by Duda and Whitehead (1998). For the SCAT-Chi the Cronbach alpha was also similar (.80 vs. .82) to that reported for the originally developed version (Martens et al., 1990). The overall internal consistency of the SMS-Chi was also better (.90 vs. .82) than that of the original version of Pelletier et al. (1995). The alpha values of extrinsic motivation (Coefficient $\alpha = .84$) and intrinsic motivation (Coefficient $\alpha = .86$) were also acceptable.

However, the alpha values of some subscales in SMS-Chi met only the lowest acceptable value of .65 or below. The subscales "amotivation" and "external regulation" of the extrinsic motivation subscale had low reliability coefficients (.40 and .36, respectively). This can be attributed to the limited items in each subscale (4 items) and the relatively small sample size, whereby in such cases, even small variations can decrease the alpha value as indicated in earlier studies (Smith, Schutz, Smoll & Ptacek, 1995; Vallerand, Fortier & Guay, 1997). The similarities between subscales under intrinsic and extrinsic motivations can also result from the overlapping of responses between similar subscales. Further examination of the results of the confirmatory factor analysis is required.

Finally, the SPPC and its subscales yielded low reliability coefficients to the point that they were deemed unacceptable. The reason was attributed to the complexity of the SPPC that requires detailed explanation of the completion method in addition to the written instruction provided on the forms. During this study, participants were asked to read the instructions themselves and no further verbal instructions were given during completion of particular questionnaires. After careful

examination of the responses, it was found that a number of invalid responses were caused by participants mistakenly giving responses to both the two alternative statements in the same item. Such a problem has been pointed out in earlier studies (Eiser, Eiser, & Haversmans, 1995; Marsh, 1994).

Accordingly, it was decided that another study, using another sample with detailed instructions to further examine the internal consistencies of SPPC-Chi was warranted before undertaking the main investigation.

Confirmatory factor analysis

SMS-Chi

The findings showed that the hypothesised seven-factor structure of the SMS-Chi was not supported. Results showed that participants did not perceive distinct factors among the intrinsic and extrinsic latent factors. They treated the different subscales under intrinsic motivation and extrinsic motivation as the same. Similar findings were also reported in a recent study by Martens and Webber (2002) when re-examining the psychometric properties of the SMS. The researchers raised a query regarding whether the latent intrinsic factors should be interpreted as distinct factors. Li and Harmer (1996) also tested a well-fitting simplex model by combining the three intrinsic subscales into one. Under such condition, the simplex three-factor model (MM_3) was postulated and tested. Results indicated that the pattern that emerged for this sample yielded a well-fitting model.

In view of the fact that motivational orientations appeared to comprise three factors (intrinsic motivation, extrinsic motivation, amotivation) in this study among Hong Kong Chinese, the low alpha value demonstrated in the internal consistency analysis, thus the subscales under intrinsic and extrinsic motivations will not be

analyzed in subsequent study.

TEOSO-Chi

Findings showed that this newly developed instrument was valid and reliable. Task and ego orientations were found to be significantly correlated ($r = .41$, $p < .05$). This did not seem in line with studies conducted in other countries (Duda & Whitehead, 1998). However, it is possible that judgment of success in sports can be based both on personal improvement and also on the demonstration of superiority. Thus, it is not unusual to find significant correlation between the two achievement goals in homogeneous groups. Similar findings have been concluded in Eastern studies concerned with Korean (Kim & Gill, 1997) and Thai (Li et al., 1996) athletes.

When doing the confirmatory factor analysis for the TEOSQ-Chi, the Lagrange Multiplier Test results identified that two items “a skill I learn really feels right” and “I do my very best” loaded positively on both task and ego orientations. These implied that Hong Kong Chinese can perceive both situations as challenges to themselves as well as doing better than others. With more data collected in future studies, decisions may then be made regarding retention of this item in the TEOSQ-Chi. Since the overall fit of the model is not affected, this model can be accepted as suitable in this study.

SCAT-Chi

The findings showed that the translated SCAT-Chi is valid and reliable. However, two items (i.e., “before I compete I am calm” and “before I compete I feel relaxed”) showed a weak association with its latent factor. These two items were the only two reverse-scored items in the questionnaire. Findings, therefore, may be attributed to the method effect embedded in positively- and negatively-worded items (Thomas &

Oliver, 1999). Since these two items did not affect the overall fit of the model, the SCAT-Chi can be accepted as suitable for use in Hong Kong Chinese.

Summary

Validation Study 1 was conducted for the validation of measuring instruments to be used in subsequent studies for this research programme. Three (SMS-Chi, TEOSQ-Chi and SCAT-Chi) out of four questionnaires were shown to be valid. Thus, Hypotheses 2.2, 2.3 and 2.4 have been supported. Testing of the SPPC-Chi was not performed due to a large amount of invalid data owing to insufficient instructions during administration. It was decided that another set of data collection concentrating solely on the SPPC-Chi, would be immediately collected in the same school with another sample for validation analysis. Additional instructions would be given to participants for the completion of the questionnaire.

VALIDATION STUDY 2

This study was conducted due to result of Validation Study 1 whereby the SPPC-Chi appeared to have a number of invalid responses due to insufficient instructions and the complex structure of the questionnaire. Data were collected from the same school (Pentecostal Wing Kong Secondary School). Similar to Validation Study 1, two classes from each level of Secondary 1, 2 and 3 with a total of 236 students were invited to participate in this study. Only basic demographic data regarding educational level and gender were obtained. Special instructions with reference to the SPPC manual (Harter, 1985) (Appendix XIII) were given in Chinese prior to the completion of the questionnaire. Participants were encouraged to ask questions at any time if they were in doubt. Students tended to complete the questionnaire in approximately 3 minutes.

Data Analysis & Results

Demographic Data

Two hundred and thirty six (108 males and 128 females) students from Pentecostal Wing Kong Secondary School took part in this study. Seventy five students were from Secondary 1, 79 from Secondary 2 and 82 from Secondary 3. All 236 returned questionnaires provided valid data for analysis.

Internal consistency

As previously, the ratings of the questionnaires were inputted to an Excel data file and later imported into an SPSS data file for analyses. The questionnaire and the subscales of athletic competence and physical appearance were analysed for internal

consistency by calculating the Cronbach alpha values. The alpha value for athletic competence sub-scale was .61, physical appearance was .75 and overall questionnaire for perceived sport competence was .73.

Confirmatory factor analysis

The questionnaire was adopted from Harter's (1985) original six-sub scales measurement of SPPC by selecting only the athletic competence and the physical appearance sub scales to assess for general perceived sport competence. Each question consists of two opposing statements. First of all, participants had to decide which statement was more suitable for them, and then have to determine if that statement is "sort of true" or "really true". To confirm the factor structure, two a priori models were postulated for testing: (1) a null model (MC_0) and, (2) a 3-Tier model (MC_u) composed of athletic competence and physical appearance as the first-order factor and perceived competence as the higher-order factor.

A summary of fit indices for the SPPC-Chi measurement models is shown in Table 7. Model MC_u was a 3-Tier model of specific loading on either the athletic competence or physical appearance sub-scales as extracted from the original SPPC. However, the model fit indices did not appear to be good ($CFI = .86$, $SRMR = .09$). The Lagrange Multiplier Test results showed that the model could be improved by cross-loading three of the athletic competence items (i.e., C3, C5 and C6) and two of the physical appearance items (i.e., C7 and C12) on both subscales. Thus, a new model (MC_c), by cross-loading three athletic competence items and two physical appearance items on both subscales, was tested. The data provided an adequate fit ($CFI = .93$, $SRMR = .07$) for the model. Athletic competence accounted for 58% of variance of perceived sport competence, and 41% of variance of perceived competence can be explained by physical appearance. Thus, the model (MC_c)

(Appendix XIV) can be accepted as the measurement model to be used in this programme of studies.

Table 7
Summary of Fit Indices for SPPC-Chi Measurement Model

<u>Model</u>	<u>χ^2</u>	<u>Df</u>	<u>NNFI</u>	<u>CFI</u>	<u>AGFI</u>	<u>SRMR</u>	<u>RMSEA</u>
MC _o	324.81	66					
MC _u	196.78	48	.81	.86	.89	.09	.09
MC _c	129.17	41	.92	.93	.93	.07	.08

Note. (MC_o) = null model; (MC_u) = 3-Tier theoretical model; (MC_c) = 3-Tier theoretical model, cross loading of 5 items. NNFI = non-normed fit index; CFI = comparative fit index; AGFI = adjusted goodness of fit index; SRMR = standardized root mean squared residual; RMSEA = root mean squared error of approximation.

Validation Study 2 Discussion

Findings from the internal consistency analysis showed that the SPPC-Chi yielded adequate alpha value ($\alpha = .73$) which was above the recommended level of .70 as recommended by Nunnally and Bernstein (1994), and it was also within the range (.71 to .80) reported by Harter (1985). However, the athletic competence subscale had a relatively low alpha value of .61 that required further examination.

The findings from the confirmatory analysis showed that the fit indices for the perceived sport competence component of the model (CFI = .93, SRMR = .07), while not meeting the stricter criteria for a good model fit (i.e., CFI $\geq .95$; Hu & Bentler, 1999) could at least be categorised as adequate. The factor loadings between athletic competence (.76) and physical appearance (.64) were moderate and could be accepted that these two factors contributed to the perception of perceived sport competence. The percentage of variance of perceived sport competence that could be explained by

the subscale of athletic competence (58%) was higher than the subscale of physical appearance (41%). Thus it could be reasonably accepted that participants in this study felt that athletic competence was more important than physical appearance in terms of perceived sport competence. The cross-loading suggested by the Lagrange Multiplier Test reflected that junior secondary students in this sample might not possess a highly definitive concept of perceived sport competence and were likely to confuse this with athletic competence and physical appearance. The relatively low alpha value in the internal consistency analysis for athletic competence (.61) also confirmed this finding. Thus, caution must be taken when using the SPPC-Chi subscales for analysis in future studies. In this study, since the purpose of the SPPC-Chi was used to tap the general perceived sport competence and the overall fit of the model was adequate, it was accepted as suitable for use.

Summary

The purpose of conducting Validation Studies 1 and 2 was to validate the measuring instruments that were to be used in this programme of studies. In Validation Study 1, SMS-Chi, TEOSQ-Chi and SCAT-Chi were successfully validated, and in Validation Study 2, with careful administration of data collection, analysis of data also confirmed the validity of the SPPC-Chi.

In the validation of the TEOSQ-Chi, the findings of the confirmatory factor analyses supported the two-factor oblique measurement model of task and ego subscales. The study on SMS-Chi recommended that the seven sub scales of the SMS should be reduced to three sub scales of intrinsic motivation, extrinsic motivation and amotivation for analysis. Also, the sub scales of athletic competence and physical appearance of the SPPC should be combined to assess respondents' perceived sport competence. Consequently, seven subscales were used for further analysis in this

programme of studies: perceived sport competence, intrinsic motivation, extrinsic motivation, amotivation, task goal orientation, ego goal orientation and competitive trait anxiety. Table 8 shows a summarised of statistics for the validation of translated instruments and the subscales that were used in this study. While all questionnaires were proved valid and reliable for the study, it should be noted that the amotivation subscale had a low internal consistency alpha value that needs to be examined in further studies with another larger sample. Also, special care should be taken when administering the SPPC-Chi as it requires detailed instructions.

Table 8

Summary of Fit Indices for SPPC-Chi, SMS-Chi, TEOSQ-Chi, and SCAT-Chi Measurement Model and Cronbach Alpha Values for the Main Subscales

Questionnaire	CFI	SRMR	Coefficient α
SPPC-Chi	.93	.07	.72
SMS-Chi	.96	.05	.90
Amotivation			.40
Extrinsic			.84
Intrinsic			.86
TEOSQ-Chi	.95	.04	.85
Task			.79
Ego			.84
SCAT-Chi	.97	.04	.80

Note. (SPPC-Chi) = Chinese Self-Perception Profile for Children; (SMS) = Chinese Sport Motivation Scale; (TEOSQ) = Chinese Task and Ego Orientation in Sport Questionnaire; (SCAT-Chi) = Chinese Sport Competition Anxiety Test. CFI = comparative fit index; SRMR = standardized root mean squared residual; Coefficient α = Cronbach alpha

Chapter 3

PILOT STUDY

AIM

The purpose of this Pilot Study was to further examine the validity of the translated Chinese instruments of SPPC-Chi, SMS-Chi, TEOSQ-Chi and SCAT-Chi to be used in the Main Study.

Another purpose was to perform preliminary data analysis to assess the feasibility of the proposed large scale research for the Main Study. Data were collected from one school and were analysed to test the proposed hypothesis of the Main Study.

Validation of measuring instruments

The translated Chinese instruments were validated in Studies 1 and 2. The psychometric properties of the instruments were further assessed in the Pilot Study to confirm that they were valid and reliable for use in the Main Study. Hence, the following hypothesis was tested:

Hypothesis 3.1 The translated instruments of SPPC-Chi, SMS-Chi, TEOSQ-Chi and SCAT-Chi were valid and reliable questionnaires as they demonstrated adequate alpha values for internal consistency and a good model fit in the confirmatory factor analyses.

Significant differences between sub-groups

Previous studies had found significant differences between gender (Duda, 1989; Fortier, Vallerand, Briere & Provencher, 1995; Fox et al., 1994; Kim, William & Gill, 2003; Petherick & Weigand, 2002), between ages (Harter, 1978, Horn & Hasbrook, 1987; Horn & Weiss, 1991; Weiss & Amorose, 2005, Weiss et al., 1986) and between level of participation (Ames, 1992; Duda, 1988; Gernigon & Le Bars, 2000) in perceived sport competence, intrinsic/extrinsic motivation , goal orientation and

competitive trait anxiety. A variety of findings were reported across the above-specified studies, and results were contingent upon the particular focus or conditions that the studies were conducted, e.g., female athletes were found to be more task-orientated than males (Duda et al., 1995), and children moved from an intrinsic to extrinsic motivational locus of control with age (Weiss et al., 1986). Realising the importance of understanding these group differences in formulating strategies to encourage participation in sport and physical activities for specific groups, the current study examined whether distinct profiles emerged based on variations in gender, age and level of participation in junior secondary students in Hong Kong.

Based on the review of previous studies, the following hypotheses would be examined:

Hypothesis 3.2 There will be significant ($p < .05$) differences in gender towards perceived sport competence, intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety.

Hypothesis 3.3 There will be significant ($p < .05$) differences in age towards perceived sport competence, intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety.

Hypothesis 3.4 There will be significant ($p < .05$) differences in level of participation in sport activities towards perceived sport competence, intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety.

Hypothesis 3.5 There will be significant ($p < .05$) differences in the interaction of gender, age and degree of participation variables in sport activities towards perceived sport competence, intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety.

Relationships between perceived sport competence, intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety

Perceived sport competence was the central construct to be examined in the current study. The relationships between perceived sport competence and other motivational constructs have been studied extensively in the Western culture under different sport situations. The present study would extend previous research by examining whether these relationships exist in junior secondary students in Hong Kong towards participation in general sport and physical activities.

The following hypotheses would be examined:

Hypothesis 3.6 There will be a significant ($p < .05$) and positive relationship between perceived sport competence and intrinsic motivation orientation.

Hypothesis 3.7 There will be a significant ($p < .05$) and positive relationship between perceived sport competence and task goal orientation.

Hypothesis 3.8 There will be a significant ($p < .05$) and negative relationship between perceived sport competence and amotivation.

Hypothesis 3.9 There will be a significant ($p < .05$) and negative relationship between perceived sport competence and competitive trait anxiety.

Role of intrinsic/extrinsic motivation, amotivation, task/ego goal orientation, competitive trait anxiety in predicting perceived sport competence

The literature reviewed in Chapter 1 supported that intrinsic/extrinsic motivation, amotivation, task/ego goal orientation and competitive trait anxiety affected an individual's perceived sport competence. The concurrent influence of these motivational variables on perceived sport competence has yet to be examined. Therefore, one of the purposes of the present study was to examine the predictive ability of the motivational variables on perceived sport competence. One of the ways

to verify the relationships between independent variables, moderators and dependent variables is through multiple-group path analysis (i.e., structural equation modelling). Structural equation modelling (SEM) is a sophisticated large sample statistical technique (Hu et al., 1992) used to examine a set of relationships between several variables. According to Ullman (2001), calculating path analysis is preferred to correlation because relationships among different factors are free of measurement error since the error has been estimated and removed. Reliability of measurement can be accounted for explicitly within the analysis of the common variance.

Specifically, by using path analysis the following hypotheses were tested:

Hypothesis 3.10 Intrinsic motivation, extrinsic motivation, task goal orientation and ego goal orientation will positively affect perceived sport competence.

Hypothesis 3.11 Amotivation and competitive trait anxiety will negatively affect perceived sport competence.

METHOD

Participants

The participants in this study were 237 students with 123 males and 113 females (1 = not specified). Individuals were from six classes, two classes from each level of Secondary 1 (S.1; $n = 78$), Secondary 2 (S.2; $n = 78$), and Secondary 3 (S.3; $n = 81$) at a secondary school (Wa Ying Secondary School, Kowloon, Hong Kong). Their ages ranged from 11 to 16 with a mean age of 13.41 years ($SD = 1.18$). Among them, 119 claimed that they 'seldom' participated in sport and physical activities, while 61 participated in a 'recreation' level, 54 of them had regular 'training' and three participants did not specify.

Instruments

Variables included in this pilot study were perceived sport competence, intrinsic motivation, extrinsic motivation, amotivation, task goal orientation, ego goal orientation, and competitive trait anxiety.

Perceived sport competence

The Chinese version of the Self-Perception Profile for Children (SPPC-Chi) (Appendix V) that was established in Validation Study 2 was used for the current study. The data collected in Validation Study 2 suggested that the subscales of athletic competence and physical appearance could be combined to specifically assess the perceived sport competence of the participants. Internal consistency of the questionnaire was found to be satisfactory (Cronbach alpha = .73).

Intrinsic motivation, extrinsic motivation and amotivation

The Chinese version of the Sport Motivation Scale (SMS-Chi) (Appendix VI) that was established in Validation Study 1 was used for the current study. From the confirmatory factor analysis in Validation Study 1, it was confirmed that the three subscales of intrinsic motivation and the three subscales of extrinsic motivation should be combined to form single attributes for intrinsic and extrinsic motivation respectively. The amotivation subscale could be interpreted as another attribute of motivation. The internal consistencies for the two subscales of intrinsic motivation and extrinsic motivation were adequate (Cronbach alpha = .86 and .84, respectively), but the amotivation subscale was low (.40).

Task and ego goal orientation

The Chinese version of the Task and Ego Orientation in Sport Questionnaire (TEOSQ-Chi) (Appendix VII) that was established in Validation Study 1 was used for the current study. The data collected in Validation Study 1 supported the use of a 2-factor oblique measurement model for the TEOSQ-Chi. Internal consistencies of

task and ego subscales were found to be satisfactory (Cronbach alpha = .79 and .84, respectively).

Competitive trait anxiety

The Chinese version of the Sport Competition Anxiety Test (SCAT-Chi) (Appendix VIII) that was established in Validation Study 1 was used for the current study. Following the original SCAT format, participants were required to respond to the 15 items that asked how they felt about competition on a 3-point scale, with 1 representing 'hardly ever', 2 representing 'sometimes' and 3 for 'often'. Internal consistency for this scale was found to be adequate (Cronbach alpha = .80).

Procedure

After obtaining permission from the school's Principal and under the assistance of the school physical education teachers, the questionnaires were administered at the start of students' physical education lessons. The PE teachers were briefed on the aims and purpose of the study. Covering letters specifying the purpose of the study were attached to the questionnaires. Students were encouraged to answer all questions honestly and were assured that the responses would remain anonymous. Based on prior experience from Validation Study 1, individuals were given 15 minutes to complete the entire set of four questionnaires. Special detailed explanation was given in Chinese on the completion method of the SPPC with reference to the instructions given by Harter (1985) in the SPPC manual (Appendix VI). Participants were told that for each question, first of all, they needed to identify which description was more appropriate to them. It could be either on the right-hand-side or the left-hand-side. After that, they had to choose whether that description was 'sort of true' or 'really true' for them. Emphasis was stressed that there was only one answer for each question.

Data Analyses

According to the recommendations from the validation studies in Chapter 2 (p.64, 65), the questionnaire items were reduced to seven scores: perceived sport competence, intrinsic motivation, extrinsic motivation, amotivation, task goal orientation, ego goal orientation and competitive trait anxiety. The validity and internal reliability of the translated Chinese questionnaires was re-examined by performing confirmatory factor analysis and by calculating the Cronbach alpha values. General behavioural patterns and perceived sport competence were assessed in terms of the mean score and standard deviation of each group, and findings were also considered in light of previous research.

Analysis of variance (ANOVA) was utilised to examine whether gender, educational level (S.1, S.2, S.3) and level of sport participation (seldom, recreational, and training) differed for perceived sport competence, motivational orientation, goal orientation and competitive trait anxiety. Scheffe Post hoc analyses were used to examine any interaction effects.

Group differences were also examined by calculating the effect size (d) which determines the amount of overlap between two population distributions. Appraisal on the magnitude of effect size was based on the recommendations established by Cohen (1988) that effect size (d) greater or equal to .20, .50, and .80 represented small, moderate, and large effect sizes, respectively. According to Cohen (1988, p.26), a moderate effect size could be conceived as one large enough to be visible to the naked eye.

To examine the interaction of gender, education level (S.1, S.2, S.3) and level of sport participation (seldom, recreational, and training) in affecting perceived competence, motivational orientation, goal orientation and competitive trait anxiety, multivariate analysis of variance (MANOVA) was conducted. The ratio of subject

numbers in relation to number of dependent variables satisfied criterion levels suggested for multivariate analyses (Pedhazur, 1982).

The relationships between perceived competence and the three motivational orientations were examined using zero order correlation coefficients (r). Analyses of data were examined using the .01 and .05 levels of significance.

To explore the relationships between different motivational variables and test whether these variables were able to predict perceived sport competence, path analysis using structural equation modelling (SEM) was conducted. Path diagrams are used to set up a model by combining relevant variables for analysis. Independent variables appear in boxes connected by lines with arrows to the dependent variable indicating a prediction. A line with two arrows joining the independent variables indicates a correlation between them. The presence of a residual at the dependent variable indicates imperfect prediction.

The first step in path analysis is to build a hypothesised structural model and test whether it was meaningful. In this Pilot Study, a hypothesised model (M_h) was devised based on the assumptions that the motivational variables of task/ego goal orientation, intrinsic/extrinsic motivation, amotivation and competitive trait anxiety were closely related with each other and, at the same time, had direct influence on perceived sport competence (Figure 3). The model was tested to evaluate whether the hypotheses were valid with the aid of various fit indexes.

The comparative fit index (CFI) and standard root mean squared residual (SRMR) were used in the current study. These indexes were selected following the recommendations from researchers (e.g., Hu & Bentler, 1999) who suggested using multiple indexes representing absolute and incremental fit measures. It was suggested that, for the maximum likelihood (ML)-based method, a cutoff value close to .95 for CFI, and .08 for SRMR was appropriate. The fitness of the model was revised by

altering the paths either by adding or dropping the original paths by considering the statistical recommendations from the Lagrange Multiplier (LM) Test and the Wald Test. The Good fit model would provide a basis for analysis and interpretation.

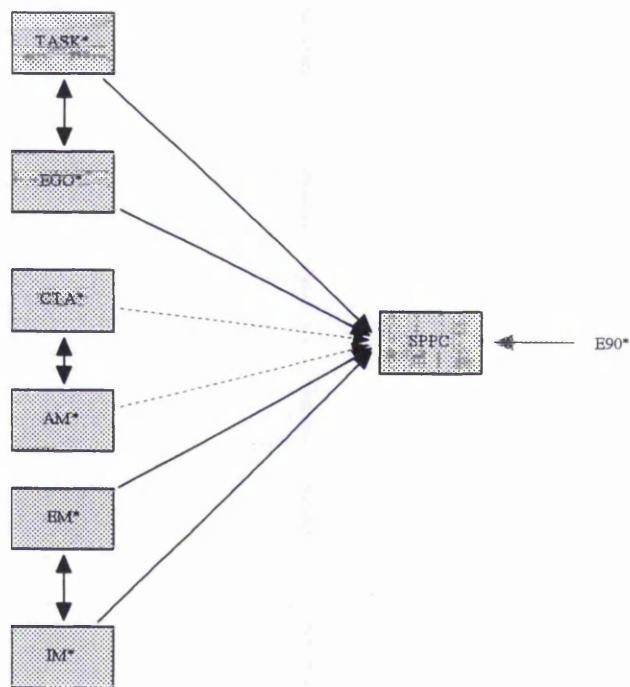


Figure 3. Hypothesized Multiple Regression Path Model (M_h) of Relationships among the Variables

Note. *TASK* = task goal orientation; *EGO* = ego goal orientation; *CTA* = competitive trait anxiety; *AM* = amotivation; *EM* = extrinsic motivation; *IM* = intrinsic motivation; *SPPC* = perceived sport competence

Continuous lines indicate positive relationship; discontinuous lines indicate negative relationship

RESULTS

Findings from the demographic data, confirmatory factor analysis, internal consistency, general behavioural patterns, significant differences between sub-groups, relationships between motivational variables and path analysis are provided below. Significant results are all represented at the level of $p < .05$, unless otherwise specified.

Demographic Data

Two hundred and thirty seven students from Wa Ying Secondary School took part in this study. The mean age was 13.41 years ($SD = 1.18$). Other information is summarized in Table 9.

Table 9
Demographic Data of Samples in Pilot Study

Gender	Males			Females			Missing Data
	123			113			
Age	11	12	13	14	15	16	3
	60	65	78	18	10	3	
EDucational Level	One		Two		Three		0
	78		78		81		
Participation	Seldom		Recreation		Training		3
	119		61		54		

Confirmatory factory analysis

To confirm the factor loadings, two a priori models were postulated for each translated Chinese measurement tools: (1) a null model, and (2) the validated model from Studies 1 and 2. A summary of fit indices for each measurement model is show in Table 10.

As anticipated, the data fit their respective models as they were either above (SMS-Chi, CFI = .95; TEOSQ-Chi, CFI = .96; SCAT-Chi, CFI = .97) or close to (SPPC-Chi, CFI = .94) the recommended cutoff value of .95 for comparative fit index (CFI) and close to or smaller than .08 for standardized root mean squared residual (SRMR) (Hu & Bentler, 1999). Thus, models for SPPC-Chi (MC_c), SMS-Chi (MM_3), TEOSQ-Chi (MG_{c2}) and SCAT-Chi (MA_u) were accepted as the measurement models for use in this and subsequent studies.

Table 10

Summary of Fit Indices for SPPC-Chi, SMS-Chi, TEOSQ-Chi and SCAT-Chi Measurement Model in the Pilot Study (N = 237)

Model	χ^2	Df	NNFI	CFI	AGFI	SRMR	RMSEA
SPPC-Chi							
MC _o	505.95	66					
MC _c	85.73	36	.93	.94	.92	.08	.08
SMS-Chi							
MM _o	1020.06	45					
MM ₃	95.57	32	.94	.95	.94	.07	.08
TEOSQ-Chi							
MG _o	917.58	78					
MG _{c2}	102.59	58	.95	.96	.94	.04	.04
SCAT-Chi							
MA _o	697.24	45					
MA _u	98.97	32	.97	.97	.95	.04	.05

Note. (MC_o) = null model for SPPC-Chi; (MC_c) = 3-Tier theoretical model, cross loading of 5 items for SPPC-Chi; (MM_o) = null model for SMS-Chi; (MM₃) = simplex three-factor model for SMS-Chi; (MG_o) = null model for TEOSQ-Chi; (MG_{c2}) = two-factor oblique model, cross loading of two items for TEOSQ-Chi; (MA_o) = null model for SCAT-Chi; (MA_u) = 10-item theoretical model for SCAT-Chi. NNFI = non-normed fit index; CFI = comparative fit index; AGFI = adjusted goodness of fit index; SRMR = standardized root mean squared residual; RMSEA = root mean squared error of approximation.

Internal consistency

The ratings of the questionnaires were entered into an Excel data file and later imported into an SPSS data file for analysis. There were 237 valid data for SMS-Chi, TEOSQ-Chi and SCAT-Chi; however, there were 226 valid data for SPPC-Chi with 11 instances of missing data. The questionnaires and their corresponding subscales were analysed for internal consistency by calculating Cronbach alpha values. Results are presented in Table 11.

The Cronbach alphas of each set of questionnaires were calculated to verify their internal consistency. Five out of the seven subscales demonstrated an acceptable internal reliability, for TEOSQ (respective Cronbach alphas for task and ego = .78 and .79), SCAT (Cronbach alpha = .82) and SMS (respective Cronbach alphas for extrinsic motivation and intrinsic motivation = .87 and .88). However, the Cronbach alpha value for SPPC (.68) just demonstrated a marginal internal consistency, while amotivation still reported a low internal consistency value (Cronbach alpha = .50).

Table 11

Reliability Analysis of the Chinese TEOSQ, SCAT, SMS and SPPC in the Pilot Study

Instrument	Subscales		Alpha values
TEOSQ			.81
	Task		.78
	Ego		.79
SCAT			.82
SMS			.75
	Amotivation		.50
	Extrinsic Motivation		.87
		EM-external regulation	.72
		EM- introjected regulation	.74
		EM- identified regulation	.71
	Intrinsic Motivation		.88
		IM-to know	.75
		IM- accomplishment	.75
		IM- stimulation	.73
SPPC			.68
	Athletic competence		.49
	Physical appearance		.65

General behavioural patterns

The means and standard deviations for the different subscales and respective comparisons to other relevant studies are presented in Table 12.

Table 12

Comparison in the General Behavioural Pattern between the Total Sample in the Pilot Study (N = 237) with Other Studies

	Mean	SD	Mean or ranges for other studies
TASK	4.01	0.56	Mean = 3.91
EGO	3.67	0.72	Mean = 2.69
CTA	21.66 (boys) 22.80 (girls)	4.46 3.91	Mean = 17.50 (boys) 19.10 (girls)
AM	3.57	1.07	2.40 to 2.70
EM	4.30	1.04	3.60 to 4.50
IM	4.87	0.99	4.50 to 5.00
SPPC	2.42	0.39	2.40 to 2.90

The mean score for participants in this sample for perceived sport competence was 2.42 (range = 1 to 4) and standard deviation was .39. Whilst this finding was difficult to compare to scores in other studies, a brief review of previous studies (Allen & Howe, 1998; Black & Weiss, 1992; Ferrer-Caja & Weiss, 2000; Ommundsen & Pedersen, 1999; William & Gill, 1995) indicated that scores tended to range from 2.40 to 2.91. In comparison, the mean score for the sample in this Pilot Study was on the low end of the reported range.

The scores for the SMS (range 1 – 7) indicated that participants scored higher in

intrinsic motivation (4.87), followed by extrinsic motivation (4.30), and that amotivation (3.57) was the lowest. This finding is also quite similar to other studies that have used the SMS (Doganis, 2000; Pelletier et al., 1995; Petherick & Weigand, 2002). Comparison is difficult since most participants in the studies were athletes. However, the reported values were typically in the range of 4.50 to 5.00 for intrinsic motivation, 3.60 to 4.50 for extrinsic motivation, and 2.40 to 2.70 for amotivation. Generally, the scores for intrinsic and extrinsic motivations of the participants in the current study fell inside the range, although amotivation scored higher (3.57) for this study.

Participants in this sample scored higher in task (4.01) than ego goal orientation (3.67) (max. = 5) which were quite similar with other studies that have utilised the TEOSQ (see Duda & Whitehead, 1998, for a review of studies). According to Duda and Whitehead (1998), computed mean scores for task (4.08) and ego (2.87) goal orientations were provided for reference (p.25, 26). When extracting only those studies concerned with school children from a similar age range, the mean score for task is 3.91 and ego is 2.69. Therefore, the participants in this Pilot Study scored higher in both task and ego goal orientations.

With regard to competitive trait anxiety, the mean score for participants was 21.66 (min. = 10; max. = 30) and standard deviation was 4.34. Martens et al. (1990) developed specific norms for different kinds of sports; however it is not appropriate to compare the findings in this study with those reported by athletes. In light of a more comparable study that included 113 children from the ages of 9 to 13 (mean age = 11.40, $SD = 1.10$), Brustad and Weiss (1987) classified the sample into high, medium and low competitive trait anxiety groups according to the score of SCAT. By assigning the upper and lower 30% of the distribution to high and low competitive trait anxiety groups, they came up with a recommendation that the mean scores from high to low

groups for boys were 21.90, 17.50 and 12.40, respectively; for girls, 24.90, 19.10 and 14.30, respectively. Using the categorisation of Brustad and Weiss (1987) as a reference for interpretation, the sample from this Pilot Study was, thus, a high competitive trait anxiety group.

Significant differences across sub-groups

Comparisons were made between gender, educational level, and level of participation in sport activities with analysis of variance (ANOVA) statistical testing procedure.

For gender (Table 13), significant differences were found in the competitive trait anxiety ($F_{1,234} = 15.32$, $p < .01$; $d = .45$), with females (22.80) scoring significantly higher than males (20.65). Males scored significantly higher than females in extrinsic motivation ($F_{1,234} = 29.33$, $p < .01$; $d = .67$) (4.64 vs. 3.94), intrinsic motivation ($F_{1,234} = 12.72$, $p < .01$; $d = .46$) (5.09 vs. 4.64) and perceived sport competence ($F_{1,234} = 21.96$, $p < .01$; $d = .62$) (2.54 vs. 2.30).

Table 13

Comparisons of Motivational Variables between Genders in the Pilot Study

	Male (<i>n</i> = 123)		Female (<i>n</i> = 113)		Effect size (<i>d</i>)	F-Ratio
	Mean	<i>SD</i>	Mean	<i>SD</i>		
TASK	4.05	0.58	3.97	0.52	.14	1.26
EGO	3.61	0.79	3.71	0.64	.14	1.14
CTA	20.65	4.46	22.80	3.91	.45	15.32**
AM	3.54	1.07	3.59	1.09	.05	0.13
EM	4.64	0.93	3.94	1.05	.67	29.33**
IM	5.09	0.95	4.64	0.98	.46	12.72**
SPPC	2.54	0.36	2.30	0.38	.62	21.69**

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

Comparisons between educational levels (Table 14) revealed few differences, except for amotivation ($F_{2, 234} = 5.20$, $p < .05$) with students in the higher form (3.87) having scored significantly higher than students in the lower form (3.40). By using the Scheffe Post hoc analysis, the mild interaction effect occurred between S.3 and S.2 ($p < .05$, $d = .43$) and S.3 and S.1 ($p < .05$, $d = .44$), which demonstrated a moderate effect size (Table 15).

Table 14

Comparisons of Motivational Variables between Educational Levels in the Pilot Study

	S.1 (<i>n</i> = 78)		S.2 (<i>n</i> = 78)		S.3 (<i>n</i> = 81)		F-Ratio
	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>	
TASK	4.02	0.64	3.96	0.59	4.05	0.42	0.56
EGO	3.62	0.73	3.55	0.77	3.77	0.65	1.92
CTA	21.40	4.49	21.68	4.23	21.89	4.32	0.26
AM	3.40 ^a	1.05	3.41 ^b	0.98	3.87 ^{a,b}	1.12	5.20*
EM	4.21	1.25	4.18	0.96	4.56	0.87	2.61
IM	4.80	1.16	4.72	0.87	5.08	0.89	2.94
SPPC	2.46	0.43	2.43	0.34	2.38	0.38	0.92

Note. ^{aa, bb} Significant difference by Scheffe Post hoc analysis**p*<.05, ***p*<.01

Table 15

Post Hoc Test Level of Significance (p) and Effect Size (d) for Educational Level in the Pilot Study

	S.1-S.2		S.1-S.3		S.2-S.3		F-ratio
	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	
TASK	.11	.80	.05	.94	.16	.58	.56
EGO	.10	.84	.21	.42	.31	.16	1.92
CTA	.06	.92	.11	.78	.05	.96	0.26
AM	.01	.99	.44	.02	.43	.02	5.20*
EM	.03	.92	.34	.18	.37	.12	2.61
IM	.08	.89	.28	.20	.36	.07	2.94
SPPC	.08	.89	.21	.41	.13	.71	0.92

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

When examining the level of participation (Table 16), there were significant differences in task, competitive trait anxiety, extrinsic motivation, intrinsic motivation and perceived sport competence. With more intense participation in sport activities, students scored significantly higher in motivational orientations (task goal orientation $F_{2,231} = 4.37$, $p < .05$; extrinsic motivation $F_{2,231} = 27.33$, $p < .01$; intrinsic motivation $F_{2,231} = 16.72$, $p < .01$) and perceived sport competence ($F_{2,220} = 15.83$, $p < .01$), and significantly lower in competitive trait anxiety ($F_{2,231} = 5.22$, $p < .01$) than the less active participants. By using the Scheffe Post hoc analysis, it was observed that significant effects occurred between the 'seldom' sample and the other two samples ('recreation' and 'training') (Table 17), while no significant differences were found between 'recreation' and 'training' samples for any other measures.

Table 16

Comparisons of Motivational Variables between Levels of Sport Participation in the Pilot Study

	Seldom (n = 119)		Recreation (n = 61)		Training (n = 54)		F-Ratio
	Mean	SD	Mean	SD	Mean	SD	
TASK	3.93 ^a	0.56	3.99	0.60	4.20 ^a	0.47	4.37*
EGO	3.63	0.70	3.60	0.74	3.73	0.76	0.53
CTA	22.54 ^{a,b}	3.83	20.70 ^a	4.83	20.76 ^b	4.55	5.22**
AM	3.68	1.10	3.56	1.01	3.37	1.08	1.63
EM	3.88 ^{a,b}	0.98	4.54 ^a	0.94	4.97 ^b	0.88	27.33**
IM	4.55 ^{a,b}	1.00	5.01 ^a	0.84	5.41 ^b	0.90	16.72**
SPPC	2.29 ^{a,b}	0.39	2.51 ^a	0.31	2.61 ^b	0.37	15.83**

Note. ^{aa, bb} Significant difference by Scheffe Post hoc analysis

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

Table 17

Post Hoc Test Level of Significance (p) and Effect Size (d) for Levels of Sport Participation in the Pilot Study

	S - R		S - T		R - T		F-ratio
	d	p	d	p	d	p	
TASK	.11	.79	.48	.05	.38	.14	4.37*
EGO	.04	.97	.14	.69	.18	.62	.53
CTA	.42	.03	.41	.04	.01	.99	5.22**
AM	.11	.77	.29	.20	.18	.63	1.63
EM	.63	.00	1.05	.00	.41	.06	27.33**
IM	.46	.01	.87	.00	.40	.08	16.72**
SPPC	.56	.00	.82	.00	.26	.36	15.83**

Note. S - seldom R - recreation T - training

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

To examine the interaction effect of the independent variables of gender, educational level and level of participation, multivariate analysis of variance (MANOVA) was performed. The MANOVA procedure revealed that there were no significant interaction for educational level by gender (Wilks' Lambda = .90; F(14, 398) = 1.51; $p = .10$), educational level by level of participation (Wilks' Lambda = .84; F(28, 718.93) = 1.28; $p = .15$), gender by level of participation (Wilks' Lambda = .95; F(14, 398) = .70; $p = .78$), or for the joint interaction of educational level, gender and level of participation (Wilks' Lambda = .92; F(21, 571.97) = .77; $p = .75$).

Relationships between perceived sport competence, motivational orientation, goal orientation and competitive trait anxiety

Correlation analyses were performed both with the total sample and with different sub-groups to determine their relationships with the relevant subscales. Findings are reported below based on both major sets of analyses. Whilst there are several ways to interpret the data from the correlation analyses, the following section includes highlights of the findings deemed most relevant and appropriate for this programme of studies.

Total Sample

The results of the total sample analysis revealed that there were significant, modest, positive relationships between perceived sport competence and intrinsic and extrinsic motivations, task goal orientation and a small significant negative relationship with amotivation (Table 18). Intrinsic motivation and extrinsic motivation explained 8% and 11% of the variance in perceived competence, respectively, while amotivation explained 3% of the variance in perceived competence. Task goal orientation predicted 4% of the variance of perceived sport competence. The relationship between perceived sport competence and competitive trait anxiety was negative and non significant ($r = -.12$) and there was no relationship between ego goal orientation and perceived sport competence (Table 18).

A strong relationship existed between intrinsic and extrinsic motivations ($r = .73$), whereas, significant but modest relationships were found between task goal orientation and ego goal orientation ($r = .33$), task goal orientation and intrinsic motivation ($r = .49$), and task goal orientation with extrinsic motivation ($r = .33$) (Table 18).

Table 18

Relationships between Different Subscales for the Total Sample in the Pilot Study (N = 237)

	EGO	AM	EM	IM	CTA	SPPC
TASK	.33**	-.07	.33**	.49**	.08	.20**
EGO		.04	.11	.18**	.21**	.01
AM			.16*	.08	.22**	-.17*
EM				.73**	-.12	.33**
IM					-.01	.29**
CTA						-.12

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

Different gender

Analyses with gender sub-groups revealed similar findings to those of the total sample (Table 19). In particular, relationships tended to be stronger for males than females. Significant, positive relationships existed for males for perceived sport competence and intrinsic motivation ($r = .29$), and for perceived sport competence and task goal orientation ($r = .28$), but not for females. In contrast, a significant negative relationship was found for females only with regard to perceived sport competence and amotivation ($r = -.24$). Also, significant positive relationships were found for male participants for ego goal orientation and extrinsic motivation ($r = .24$), and between ego goal orientation and intrinsic motivation ($r = .33$), but not for females. Findings for the female participants demonstrated significant positive relationships between competitive trait anxiety and ego goal orientation ($r = .25$), and between competitive trait anxiety and amotivation ($r = .35$), which was not found for males.

Table 19

Relationships between Different Subscales across Genders in the Pilot Study

GENDER		EGO	AM	EM	IM	CTA	SPPC
MALE (n = 123)	TASK	.50**	-.13	.35**	.51**	.11	.28**
	EGO		.00	.24**	.33**	.16	.16
	AM			.11	.01	.14	-.09
	EM				.70**	.02	.23*
	IM					.07	.29**
	CTA						.04
FEMALE (n = 113)	TASK	.08	.03	.31**	.46**	.08	.08
	EGO		.10	.01	.03	.25**	-.12
	AM			.24*	.19*	.35**	-.24*
	EM				.72**	-.10	.28**
	IM					.01	.17
	CTA						-.15

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

Different educational levels

In the correlation analyses for educational levels (Table 20), it was found that for students in Secondary 1 and 3, perceived sport competence were significantly related with extrinsic motivation ($r = .44$ and $.32$, respectively), intrinsic motivation ($r = .41$ and $.24$, respectively) and task goal orientation ($r = .35$ and $.24$, respectively); however, this was not found for Secondary 2 students. Also, the significant relationships between task goal orientation and extrinsic motivation found in Secondary 1 and 3 groups ($r = .39$ and $.45$,

respectively) were not found for Secondary 2 students. Secondary 3 students differed from individuals in the other two educational levels in that significant relationships were only found in the former cohort for ego goal orientation and extrinsic motivation ($r = .29$), and also ego goal orientation and intrinsic motivation ($r = .33$). The significant relationships between task goal orientation and ego goal orientation that were found for Secondary 2 and 3 groups ($r = .40$ and $.42$, respectively) were not found in Secondary 1. Significant strong positive relationships were found between intrinsic and extrinsic motivation across all three class levels ($r = .72$, $.72$ and $.73$, respectively) (Table 20).

Table 20

*Relationships between Different Subscales across Different Educational Levels
in the Pilot Study*

EDUCATIONAL LEVEL		EGO	AM	EM	IM	CTA	SPPC
ONE (n = 78)	TASK	.19	-.22	.39**	.58**	-.03	.35**
	EGO		-.04	.09	.14	.23*	.17
	AM			.11	-.03	.19	-.13
	EM				.72**	-.18	.44**
	IM					-.18	.41**
	CTA						-.27*
TWO (n = 78)	TASK	.40**	-.15	.17	.26*	.07	-.03
	EGO		-.18	-.07	.06	.21	-.08
	AM			.02	.02	.25*	-.16
	EM				.72**	-.16	.20
	IM					-.02	.13
	CTA						.11
THREE (n = 81)	TASK	.42**	.19	.45**	.65**	.28*	.24*
	EGO		.27*	.29**	.33**	.18	-.07
	AM			.27*	.17	.23*	-.18
	EM				.73**	-.01	.32**
	IM					.21	.28*
	CTA						-.13

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

Different levels of sport participation

In the analyses between levels of sport participation in sport activities (Table 21), significant positive relationships were found between intrinsic motivation and extrinsic motivation ($r = .68, .62$ and $.77$ for ‘seldom’, ‘recreation’ and ‘training’ groups, respectively), and also for task goal orientation ($r = .51, .36$ and $.51$, respectively) across all three levels of sport participation. Significant relationships for perceived sport competence occurred in the ‘seldom’ and ‘recreation’ groups in extrinsic motivation ($r = .26$ and $.27$, respectively), and in the ‘recreation’ group between amotivation ($r = -.36$) and intrinsic motivation ($r = .31$). The ‘training’ group did not demonstrate any significant relationships for perceived sport competence and other motivational variables. The ‘seldom’ group demonstrated significant relationships between competitive trait anxiety and ego goal orientation ($r = .30$), as well as amotivation ($r = .26$); and for this group, extrinsic motivation and amotivation were also significantly related ($r = .35$). The ‘recreation’ group was different from the other two groups in that a significant negative relationship was found between task goal orientation and amotivation ($r = -.33$); however the significant relationships between task goal orientation and extrinsic motivation in the other two groups ($r = .30$ for “seldom; $.40$ for ‘training’) were not found in the ‘recreation’ group. Finally, the significant relationship between task and ego goal orientation was found in the ‘seldom’ ($r = .20$) and recreation group ($r = .57$) but not in the training group (Table 21).

Table 21

Relationships between Different Subscales for Different Levels of Sport Participation in the Pilot Study

LEVEL OF SPORT PARTICIPATION		EGO	AM	EM	IM	CTA	SPPC
SELDOM (n = 119)	TASK	.20*	.03	.30**	.51**	.15	.12
	EGO		.05	.04	.17	.30**	.04
	AM			.35**	.23*	.26**	-.10
	EM				.68**	-.01	.26**
	IM					.08	.16
	CTA						-.03
RECREATION (n = 61)	TASK	.57**	-.33*	.19	.36**	.01	.21
	EGO		-.13	.12	.19	.10	.09
	AM			.06	-.03	.13	-.36**
	EM				.62**	-.12	.27*
	IM					-.09	.31*
	CTA						-.16
TRAINING (n = 54)	TASK	.24	.16	.40**	.51**	.22	.19
	EGO		.27	.20	.17	.23	-.16
	AM			.11	.07	.23	-.01
	EM				.77**	.02	.03
	IM					.20	.13
	CTA						-.07

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

Prediction of perceived sport competence by motivational variables of intrinsic/extrinsic motivation, amotivation, task/ego goal orientation and competitive trait anxiety

A model (M_h) (Figure 3, p.75) was built upon the hypothesis that task goal orientation, ego goal orientation, intrinsic motivation and extrinsic motivation positively predicted perceived sport competence; while amotivation and competitive trait anxiety negatively affected perceived sport competence. The data from the Pilot Study was used to test the hypothesised model. Goodness of fit was assessed by examining the comparative fit index (CFI) and standardised root mean squared residual (SRMR).

The fit indices that emerged from the analyses indicated a poor model fit with the data ($CFI = .76$, $SRMR = .13$) which were beyond the cutoff criteria for fit index (Hu & Bentler, 1999). The Lagrange Multiplier (LM) test suggested that paths should be added between task goal orientation and intrinsic motivation, task goal orientation and extrinsic motivation, ego goal orientation and competitive trait anxiety, amotivation and extrinsic motivation.

The modified model (M_p) was tested again with the Pilot Study sample and yielded a good fit index ($CFI = .96$, $SRMR = .06$) (Figure 4). The analysis also revealed that 17% of the variance of perceived sport competence could be explained by the combination of the tested motivational variables (Appendix XV).

Extrinsic motivation showed a moderate effect on perceived sport competence (causal path coefficient = .30), amotivation also showed a moderate negative effect (causal path coefficient = .20). The other motivational variables demonstrated weak relationships (causal path coefficients ranged from .03 to .08). Ego goal orientation yielded a weak negative relationship with perceived sport competence which was not as predicted. Moderate relationships were also found in the relationships between task

goal orientation and intrinsic motivation (causal path coefficient = .46), and extrinsic motivation (causal path coefficient = .32).

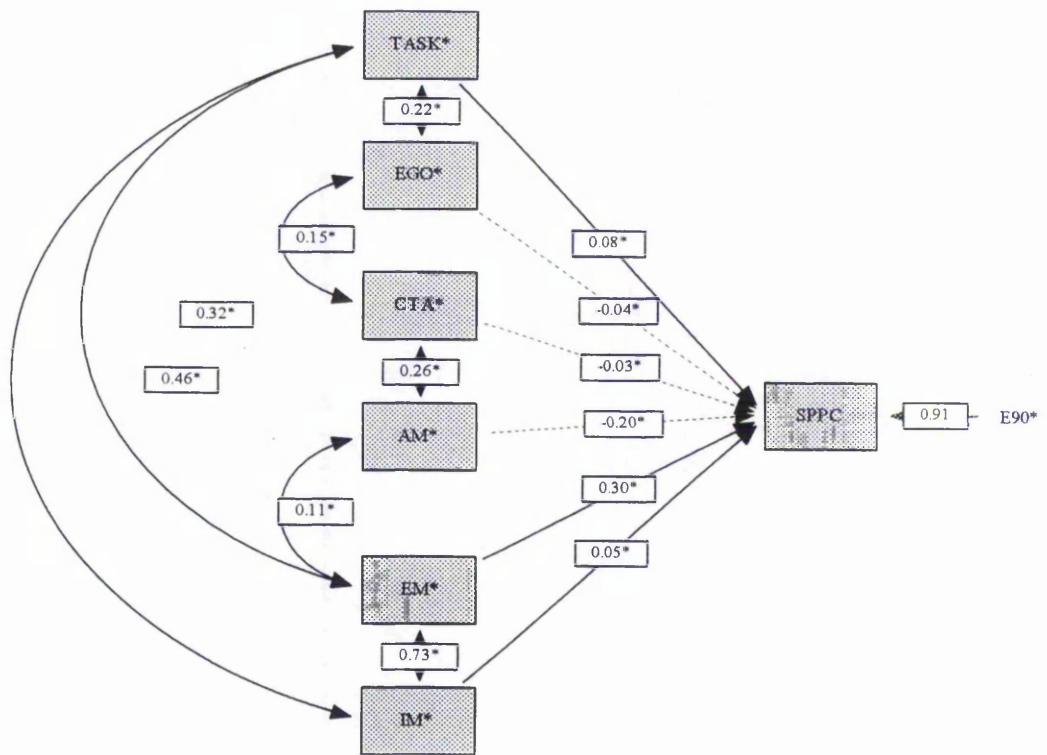


Figure 4. Multiple Regression Modified Path Model (M_p) tested with Pilot Study Sample ($N = 237$) ($CFI = .96$; $SRMR = .06$)

Note. Continuous lines indicate positive relationship; discontinuous lines indicate negative relationship

A summary of fit indices for the null model (M_o), hypothesised model (M_h) and the modified model (M_p) is presented in Table 22.

Table 22

Summary of Fit indices for the Structural Equation Model for the Prediction of Perceived Sport Competence in the Pilot Study (N = 237)

Model	χ^2	Df	NNFI	CFI	AGFI	SRMR	RMSEA
M_o	345.70	21					
M_h	91.05	12	.57	.76	.79	.13	.17
M_p	23.04	9	.90	.96	.91	.06	.08

Note. (M_o) = null model; (M_h) = hypothesized model; (M_p) = modified model. NNFI = non-normed fit index; CFI = comparative fit index; AGFI = adjusted goodness of fit index; SRMR = standardized root mean squared residual; RMSEA = root mean squared error of approximation.

DISCUSSION

Validation of measuring instruments

Psychometric properties of SPPC-Chi, SMS-Chi, TEOSQ-Chi and SCAT-Chi were clarified in this study. Findings confirmed the above adapted measuring instruments were valid. Confirmatory factor analysis of the 3-Tier model for SPPC-Chi yielded a fit indices (CFI = .94, SRMR = .08) close to the strict criteria recommended by Hu and Bentler (1999) (i.e., CFI \geq .95, SRMR \leq .08). Thus, the SPPC-Chi can be accepted as adequate; however, in view of its complexity, attention has to be drawn on the administration of the test.

The data fitted the simplex 3-factor model of SMS-Chi (intrinsic motivation,

extrinsic motivation, amotivation) well, hence it was further confirmed that only the three subscales would be used for future analyses in the Main Study.

Similar to Validation Study 1, the task and ego goal orientations were found to be significantly correlated. As mentioned previously (p. 59), although this finding was not in line with studies conducted in other countries (see Duda & Whitehead, 1998 for a review of studies that used the TEOSQ), similar findings emerged in some Eastern studies (Kim & Gill, 1995; Li et al., 1996) and also in Validation Study 1 of this research. According to the latter findings, it further supports that judgment of success in sports can be based both on personal improvement and also on the demonstration of superiority. In light of previous and current findings, the need for future cross-cultural studies in this aspect is supported.

The SCAT-Chi also demonstrated a clear factor structure; thus, it can be confidently used to assess for competitive trait anxiety in the Main Study.

The internal consistency of the translated questionnaires showed a generally acceptable internal reliability as demonstrated by the calculation of Cronbach alphas. The calculated alpha values were close to the reported values, whereby values for task and ego subscales were .78 and .79, respectively, in comparison to the originally reported values of .79 and .81 (Duda & Nicholls, 1989). The alpha value for the SCAT-Chi was the same as the originally reported value of .82 (Martens et al., 1990).

The translated SMS-Chi in this study has a mean alpha value of .75, which falls in between the values (.69 and .82) reported in two studies by Pelletier et al. (1995). The subscales of intrinsic motivation (.88) and extrinsic motivation (.87) also proved adequate. However, the amotivation subscale reported a low alpha value of .50 against that which was originally reported .75, which is unacceptable.

The calculated alpha value for SPPC-Chi of .68 demonstrated a marginal internal consistency as compared with the reported value of .71 to .86. The low reliability of

the SPPC-Chi was attributed to two logistic factors rather than to semantic problems with the translation.

The first and most important factor is the complexity of the SPPC-Chi that requires detailed explanation to respondents for proper completion. This problem was identified in Validation Study 1 and detailed verbal instructions were given in subsequent studies.

The second factor is that the SPPC-Chi was the most complicated of the four questionnaires and hence required the greatest amount of attention on the respondents' behalf. In this Pilot Study, the SPPC-Chi was presented as the fourth and final questionnaire. Thus, the students may have been mentally fatigued, or forgotten the instructions regarding completion that were given at the start of the test. As a result, there were erroneous completion of the SPPC-Chi by some students which could be evidenced by the missing data ($n = 11$) of SPPC-Chi for this Pilot Study. This problem was not present for Validation Study 2, as the participants had to complete only the SPPC-Chi questionnaire.

Opinions were also sought from participants after the data collection for the Pilot Study. Students reflected that the questionnaires were not too complicated, but that the administration of the SPPC needed more attention. Importantly, feedback indicated that they prefer to complete the SPPC at the beginning before moving onto other sets of questions. Therefore, it was decided that in the Main Study, the SPPC would be presented as the first (in order) of the four questionnaires, and that a more detailed explanation regarding its completion would be verbally provided to students in addition to the instructions typed on the form.

The low alpha value for the amotivation subscale for the SMS-Chi also required further consideration. In addition to the issues related to brief or short scales (only 4 items) identified in earlier studies (Smith et al., 1995; Vallerand et al., 1997), the four

amotivation subscale items were also, notably, different from the other 24 items in the questionnaire. In response to the stem question, 'why do you practise your sport?', the four amotivation items did not give a reason but instead made a response (e.g. 3. 'I used to have good reason for doing sport, but now I am asking myself if I should continue doing it.'). This might have confused the participants when making responses and, hence, could have affected the reliability of the questions. In consideration of the results from the confirmatory factor analysis, and to avoid affecting the overall psychometric properties of the SMS-Chi, it was decided that no further changes would be made, but the amotivation subscale would be abandoned for further analysis if the Cronbach alpha value was consistently low in the Main Study.

From the validation analyses of the Pilot Study, Hypothesis 3.1 (p.67) was supported, and additional recommendations were made for the data collection in the Main Study.

Significant differences between sub-groups

In this Pilot Study, significant gender differences were found in extrinsic motivation, intrinsic motivation and perceived sport competence with males significantly higher; on the other hand, females were significantly higher in competitive trait anxiety. Some of the findings were in accordance with previous studies; for example, males have been found to score higher in perceived sport competence (Kim et al., 2003), and extrinsic motivation (Petherick & Weigand, 2002) but lower in competitive trait anxiety (Wiggins, 2001) compared to females. In contrast with the study by Fortier et al. (1995), males in this Pilot Study also scored higher in intrinsic motivation than females.

The gender differences for task and ego goal orientations found in previous studies by Duda (1989, 1992) did not emerge in the current study. However,

participants in the previous (Duda, 1989, 1992) studies were athletes. While participants in this Pilot Study were average school children, appropriate comparisons are difficult to make. This issue was further examined in the Main Study.

It is apparent that male students in the current sample perceived themselves as more competent than females in sport and were more motivated to participate in sporting activities. Males also felt less anxious about the thought of competition in contrast to their female colleagues. As suggested in previous studies (Caroll & Loumidis, 2001; Cox, 1986; Fox et al., 1994; Vlachopoulos et al., 2000), individuals who are more task goal-orientated, higher in intrinsic and extrinsic motivations, as well as perceived sport competence, and also lower in competitive trait anxiety and amotivation tend to be more likely to participate in sport activities. Therefore, males from this population sample were in a much more favourable status towards participation in sport activities. The above findings of this Pilot Study were consistent with Fox (1994) according to his study with school children.

The age of the students did not make a significant difference as inferred from the educational levels. Overall, the sample included school children from junior secondary one to three and the age range was minimal (age 11 – 16). However, one noteworthy significant difference was found in regard to amotivation. Findings implied that as children develop towards adolescence desires to discontinue participation in sport emerge, as reflected from the significant difference in the drastic rise of amotivation for the Secondary 3 students. Similar results exist in the literature (Orlick, 1974; Sapp & Haubenstricker, 1978; White & Coakley, 1986). Although not significant, the decrease in perceived sport competence towards higher class level could be a reasonable explanation for this discontinuation.

Significant differences were observed in this Pilot Study for the different levels of sport participation. With the increase in sport participation, as noted from the

'seldom' to 'training' levels, students scored significantly higher in all motivational subscales and perceived sport competence, and significantly lower in competitive trait anxiety. The difference is greatest between the 'seldom' group and the 'recreation' group. These findings support previous reports obtained by Duda et al. (1981) and Caroll and Loumidis (2001).

No significant difference could be found from the analysis on the interaction of gender, educational level and the level of participation which implied that these sub groups were quite independent of each other and did not have any cross-over effect on the motivational variables.

From the analyses for group differences, Hypotheses 3.2, 3.3 and 3.4 (p.68) were partially supported. Significant differences existed in different groups for some motivational variables; however, some of them did not demonstrate significant differences. Further examination with a larger sample in the Main Study was warranted. Hypothesis 3.5 was rejected and it was concluded that interaction of sub-groups did not have a significant influence on the motivational variables.

Relationships between perceived sport competence, intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety

The findings from the analysis of the total sample in the Pilot Study revealed significantly moderate positive relationships between perceived sport competence and extrinsic and intrinsic motivation, task goal orientation, and a significantly weak negative relationship with amotivation. These findings support the perspectives suggested by Harter's (1978, 1981) competence motivation theory, and were in accordance with previous studies exploring the relationship between perceived sport competence and intrinsic motivation (Ferrer-Caja & Weiss, 2000; Klint & Weiss, 1987; Weigand & Broadhurst, 1998) and the relationship between perceived sport

competence and goal orientation (Burton, 1989; Duda & Chi, 1992; Duda et al., 1995; Duda & Nicholls, 1992; Dunn, 2000; Williams & Gill, 1995). However, the relationship between perceived sport competence and competitive trait anxiety still remains unclear. Previous studies have found support for the relationship between competitive trait anxiety and general sport performance and self-esteem, but not domain-specific or sport-specific perceptions of personal competence (Brustad & Weiss, 1987; Passer, 1983), although studies by Ommundsen and colleagues (Ommundsen & Pedersen, 1999; Ommundsen & Vaglum, 1991) supported Harter's theory. Recognising the lack of consistent findings, this area of research requires further investigation.

Significant relationships were also found amongst other motivational variables. The strong positive relationship between intrinsic and extrinsic motivations suggested that participants in the Pilot Study perceived both intrinsic and extrinsic motivations to be important for sport participation, which is consistent with Vlachopoulos et al. (2000). Task goal orientation also demonstrated a moderate positive relationship with ego goal orientation, extrinsic motivation and intrinsic motivation. This indicated that individuals could be high in both achievement goal orientations, and that the adoption of task goals could foster both intrinsic and extrinsic motivation. Thus, the role of task goal orientation and its influence on other motivational constructs should be further examined.

When examining the relationships between perceived sport competence and other motivational variables across sub-groups, it was observed that the relationships occurred mostly with intrinsic and extrinsic motivations except the Secondary 2 group and the training group. Also, significant, moderate, negative relationships with regard to amotivation occurred only in the female group and the recreational group. These findings would be further examined in the Main Study.

Findings from this Pilot Study indicated that Hypotheses 3.6, 3.7, 3.8 (p.69) were supported such that perceived sport competence was significantly, positively related with task goal orientation and intrinsic motivation, and negatively related to amotivation. Hypothesis 3.9 which stated that perceived sport competence was significantly, negatively related with competitive trait anxiety was not supported. Another noteworthy finding was that there emerged a significant, modest, positive relationship between perceived sport competence and extrinsic motivation which was seldom reported in other studies (Markland, 1999; Morris & BongChoi, 1993). This relationship was further investigated in the Main Study.

Prediction of perceived sport competence by motivational variables of intrinsic/extrinsic motivation, amotivation, task/ego goal orientation and competitive trait anxiety

Path analysis was used to examine the interaction of motivational variables of intrinsic motivation, extrinsic motivation, amotivation, task goal orientation, ego goal orientation and competitive trait anxiety with regard to their ability to influence perceived sport competence. The modified model showed that 17% of the variance of perceived sport competence could be explained by the combination of the selected motivational variables. This finding indicated that there were factors other than these motivational variables that affected the perception of sport competence for this population sample. Harter (1978, 1981), in developing the competence motivation theory, also suggested that there were other factors such as the influence of significant others, reward system and skill level of the individuals, that can contribute to influence an individual's perceived sport competence. This study specifically investigated the role of motivational variables, thus it is reasonable to accept that these factors could only have predicted a modest portion of the perceived

sport competence.

Testing the model with data from the Pilot Study supported Hypothesis 3.10 (p.70) in part, as task goal orientation, extrinsic motivation and intrinsic motivation positively affected perceived sport competence; however, ego goal orientation also demonstrated a small negative relationship. Hypothesis 3.11 was also supported, such that amotivation and competitive trait anxiety negatively affected perceived sport competence. However, the path coefficients for task goal orientation, ego goal orientation, competitive trait anxiety and intrinsic motivation were low, demonstrating a weak relationship. Extrinsic motivation was related moderately with perceived sport competence. Findings in this study indicated that participants in this sample perceived extrinsic motivation as the strongest predictor of perceived sport competence, followed by amotivation, also, intrinsic motivation was a weak predictor of perceived sport competence, which was not totally in accordance with previous studies (Ferrer-Caja & Weiss, 2000; Klint & Weiss, 1987; Markland, 1999; Weigand & Broadhurst, 1998). However, data collected in the Pilot Study came from only one school. The attitude of students could be largely affected by the situational factors in their school, such as the way PE lessons were conducted, or how sport programmes were promoted. A study with a larger sample from several schools would be needed before conclusions could be made in this regard.

The role of task goal orientation in the prediction of perceived sport competence has yet to be examined. In contrast to the weak relationship with perceived sport competence, the relationships with intrinsic motivation and extrinsic motivation were found to be moderate. This finding opened up an alternative postulate on the role of task goal orientation on perceived sport competence. Task goal orientation would affect perceived competence through other mediating motivational variables. That was a potential area to be further examined in the Main Study.

Summary

The Pilot Study yielded results with regard to the validity and internal consistency of the instruments. Results confirmed that the translated Chinese instruments were valid for future studies. Additional recommendations were made that should be observed when conducting the data collection for the Main Study.

The current study also provided preliminary results related to different aspects of motivational orientations of perceived sport competence (Harter, 1978, 1981), intrinsic/extrinsic motivation (Deci & Ryan, 1985), ego/task goal orientation (Maehr & Nicholls, 1980) and level of competitive trait anxiety (Martens, 1977) in sport participation among junior secondary school children in Hong Kong. The relationships between these motivational variables were also examined. Analyses of data by using structural equation modelling also provided a preliminary model for subsequent studies to explore the interaction of various motivational variables for the prediction of perceived sport competence.

Findings from the Pilot Study confirmed that there were significant differences among different motivational variables across sub-groups. However, those findings were generated from data collected from one school in Hong Kong and the attitude of the participants would undoubtedly be influenced by that particular school environment. Thus, future research to include representative samples from different areas in Hong Kong was required for further and appropriate generalisations of the data.

Chapter 4

MAIN STUDY

AIM

The aim of this programme of studies was to examine the participation motives of junior secondary school children in Hong Kong towards PE and sport activities. The focus of the current Study was to assess perceived sport competence, as suggested by Harter's (1978, 1981) competence motivation theory. The study also included the analysis of other determinant factors that would affect an individual in perceiving their competence level; such as intrinsic/extrinsic motivational orientation, task/ego goal orientation and level of competitive trait anxiety. By understanding how these factors affect an individual's decision to continue or discontinue participating in PE and sport activities, and how these factors interact with each other, more effective motivational PE and sport programmes may be developed in Hong Kong.

In Validation Studies 1 and 2, the appropriate instruments for the Main Study were chosen and translated into Chinese for use with junior secondary school participants in Hong Kong. The instruments were validated and special administrative procedures in the completion of questionnaires were identified.

A Pilot Study was conducted with a group of junior secondary school children who resembled the targeted participants for this primary investigation. The validity and reliability of the instruments was further tested in the Pilot Study, whereby adjustments were made in regard to specific instructions given to participants for questionnaire completion. In addition, the preliminary results from the previous study allowed the researcher to assess the possible behavioural patterns of different independent variables and the hypothetical existence of relationships between different motivational attributes. Through structural equation modelling, a hypothetical model was also built for studying the association of perceived sport competence with other motivational variables.

Following the validation and pilot studies, the Main Study was conducted to investigate the relationships between gender, age and level of participation in sport and physical activities with perceived sport competence, intrinsic/extrinsic motivation, goal orientation and competitive trait anxiety. Also, the purpose of this Main Study was to explore the relationships between perceived sport competence and intrinsic/extrinsic motivation, motivational orientations of task/ego goals, and low/high competitive trait anxiety. It was hypothesised that there were significant differences in gender, age and level of participation in sport activities towards perceived sport competence, intrinsic/extrinsic motivation orientation, task/ego goal orientation and competitive trait anxiety. In addition, it was predicted that there were significant, positive relationships between perceived sport competence with intrinsic motivation orientation and task goal orientation. Finally, it was predicted that there would be significant, negative relationships between perceived sport competence with amotivation and competitive trait anxiety.

Specifically, the following hypotheses that were examined in the Pilot Study were further tested in this Main Study:

Hypothesis 4.1 There will be a significant ($p < .05$) difference in gender towards perceived sport competence, intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety.

Hypothesis 4.2 There will be a significant ($p < .05$) difference in age towards perceived sport competence, intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety.

Hypothesis 4.3 There will be a significant ($p < .05$) difference in level of participation in sport activities towards perceived sport competence, intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety.

- Hypothesis 4.4* There will be a significant ($p < .05$) difference in the interaction of gender, age and level of participation variables in sport activities towards perceived sport competence, intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety.
- Hypothesis 4.5* There will be a significant ($p < .05$) and positive relationship between perceived sport competence and intrinsic motivation orientation.
- Hypothesis 4.6* There will be a significant ($p < .05$) and positive relationship between perceived sport competence and task goal orientation.
- Hypothesis 4.7* There will be a significant ($p < .05$) and negative relationship between perceived sport competence and amotivation.
- Hypothesis 4.8* There will be a significant ($p < .05$) and negative relationship between perceived sport competence and competitive trait anxiety.
- Hypothesis 4.9* Intrinsic motivation, extrinsic motivation, task goal orientation and ego goal orientation will positively influence perceived sport competence.
- Hypothesis 4.10* Amotivation and competitive trait anxiety will negatively influence perceived sport competence.

METHOD

Participants

Junior secondary (Grade 7 to 9) school children were studied in this investigation. There were two reasons for the selection of this target group. First, young people between 12 and 17 ages are believed to be undergoing a critical period of adolescent development (Sprinthall, 1995; Steinberg, 1999). They face a set of major life changes related to biological, social, and organisational contexts (Simmon & Blyth, 1987), and began to think about themselves and how they relate to others and the broader society (Durkin, 2001). Second, the specified cohort will be directly impacted by the implementation of the New Senior Secondary (NSS) curriculum in September, 2006 in Hong Kong (Curriculum Development Council, 2005). Factors such as perceived competence of junior secondary school children towards participation in sport activities must be understood to nurture students and, specifically, to generate their interest for choosing PE as one of their electives in the senior secondary. Findings would be useful to derive plans to reform the junior secondary PE curriculum and to enhance students' interests towards PE and other sport activities.

A total of 2,202 participants from eleven schools took part in this study. Schools were selected by proportional stratification based on the region which covered all seven Districts⁴ in Hong Kong according to the division made by the Hong Kong Schools Sports Federation (2000). Except Hong Kong Island and Kowloon District, there were approximately 40 schools in each District. Hong Kong Island had 93 schools and Kowloon had 159 schools, in order to make the sample representative, it was decided that two schools would be selected in Hong Kong Island

⁴ The seven Districts are: 1) Hong Kong Island and Kowloon, 2) Tai Po & North District, 3) Shatin & Sai Kung, 4) Yuen Long, 5) Tuen Mun, 6) Tuen Wan & Islands, 7) Kwai Chung.

and three schools would be selected from Kowloon. In total, there were 11 schools that comprised the population sample for this Main Study (Appendix XVI).

Schools that were selected satisfied the following criteria: (a) availability of the minimum standardised sport facilities⁵ and equipment; (b) inclusion of two periods of time-tabled physical education lessons each week/cycle; (c) participation in the inter-school sport competitions in the year 2002-03; and (d) co-education. In each school, a total of six classes - two from Secondary 1 (Grade 7), 2 (Grade 8) and 3 (Grade 9) - were tested, with approximately 38 students in each class. In some schools, class size was smaller with about 30 in each class. Consequently, the proportion of students in each grade was evenly distributed ($S.1 = 735$; $S.2 = 737$; and $S.3 = 728$; 2 did not specify).

Participants had a mean age of 13.55 ($SD = 2.15$ years) ranging from 12 to 17 years, inclusive. There was also a fairly equal distribution of males and females ($n = 1056$ and 1130 , respectively, 16 did not specify). Participants were asked to provide information concerning their level of participation in physical activities. Most respondents indicated 'seldom' ($n = 1077$), which was defined as little participation in physical activities apart from the regular PE lessons. About a quarter of students were in the 'recreation' group ($n = 549$) who participated in physical activities after school for recreational purposes, for example, having games with peers, outdoor activities with family; and approximately a quarter were in the 'training' group ($n = 512$), whereby they were involved in regular trainings such as being a member of a school team, district team. Some participants did not provide information in this regard ($n = 64$).

⁵ Minimum sport facilities for a secondary school in Hong Kong included a basketball court, a covered playground and an indoor hall.

Instruments

The Chinese versions of the Self-Perception Profile for Children (SPPC; Harter, 1985) (Appendix V), Sport Motivation Scale (SMS; Pelletier et al., 1995) (Appendix VI), Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1989) (Appendix VII) and Sport Competition Anxiety Test (CSAT; Martens et al., 1990) (Appendix VIII) which were validated in the previous studies were used for this Main Study. Demographic data that were collected included age, participant's school, gender, present educational level in school (i.e. Secondary 1, 2 or 3), and level of participation in sport activities (i.e., seldom, recreation or training).

In regard to the sequencing of questionnaires, based on experience from the previous studies and suggestions from participants in the Pilot Study, SPPC-Chi, which was the most complicated set of questionnaires, was administered first and was followed by the TEOSQ-Chi, SCAT-Chi and finally the SMS-Chi. A brief introduction of the study and assurance to the participants that information provided would be treated as anonymous was provided.

Procedure

The researcher contacted the targeted schools' physical education teachers. With the verbal support of the teachers, Informed Consent letters (Appendix IX) were sent to respective school principals. Upon approval, questionnaires were delivered to respective schools in six batches with 40 questionnaires in each batch. The physical education teachers, who assisted in the data collection, were briefed on the administrative procedures. Special emphasis was given on the conceptual understanding of the levels of sport participation so students could determine the appropriate category to which they belonged. Also, the scoring of SPPC-Chi was explained by the researcher by referring to the instructions given by Harter (1985) in

the SPPC manual (Appendix XIII). All questionnaires were completed at the beginning of physical education classes. With the researcher present, the physical education teachers began by briefly explaining the purpose of the study, and then the differences in the levels of sport participation from which students were able to choose. Additional explanation was given for completion of the SPPC-Chi as previously specified (p. 72). Also, students were encouraged to ask for clarification in the event that they had any queries. In general, most students completed the set of four questionnaires in approximately fifteen minutes. Each school typically completed their six batches of questionnaires in two weeks. Upon completion, questionnaires were returned to the researcher for processing. The entire data collection process was completed between mid September 2003 and mid October 2003.

Data Analyses

The ratings of the questionnaires were entered into an Excel file rating by rating, which later was imported into a Statistical Package for Social Sciences (Version 12.0) data file for subsequent analyses.

According to the recommendations from the Validation Studies (p. 64, 65), the questionnaire items were reduced to seven subscales: task goal orientation (TASK), ego goal orientation (EGO), competitive trait anxiety (CTA), amotivation (AM), extrinsic motivation (EM), intrinsic motivation (IM) and perceived sport competence (SPPC). Alpha reliability of each subscale was evaluated by calculating Cronbach's alphas for internal consistency.

Frequency distributions were computed for the demographic information provided by the participants (age, gender, educational level and level of participation in sport activities) which provided basic background information for the total sample for subsequent analyses.

Descriptive statistics, including the means and standard deviations of each subscale, were used to summarise the general behavioural profile of the total sample, as well as each subgroup.

Multivariate analysis of variance (MANOVA) was used to assess differences in each dependent variable between each sub-group and to examine the effect of the interaction of different independent variables. Dependent variables included the seven subscales representing the motivational attributes in this study, and the fixed factors in each analysis were gender (male, female), educational levels (S.1, S.2 and S.3) and level of sport participation (seldom, recreation and training). Significant main effects were determined using Wilks' Lambda test to ascertain if differences existed between each subgroup and its extent of variation. Effect sizes (d) for mean differences were also calculated to consider the magnitude of the effect.

The relationships between perceived sport competence and the other motivational attributes were interpreted by calculating the coefficient of correlation. The aim of this study was to examine the ability of intrinsic/extrinsic motivational orientation, task/ego goal orientation and level of competitive trait anxiety to influence an individual's perceived competence. Only the relationships between perceived competence and the main subscales of task goal, ego goal, intrinsic motivation, extrinsic motivation, amotivation and competitive trait anxiety were used for this analysis.

To explore the relationships between the different variables of goal orientation, motivational orientations and anxiety, and test whether these variables were able to influence perceived sport competence, path analysis using structural equation modelling (SEM) was conducted. In the Pilot Study, the data was tested and a modified model (M_p) (Figure 4, p.96) was postulated. The model was then used as the hypothesised model and tested with the data from this Main Study, using the EQS for

Windows 6.1 statistical package (Bentler, 1995). Statistical recommendations from the Lagrange Multiplier (LM) Test and the Wald Test were used for the amendments of the hypothesised model. A cutoff value close to or greater than .95 for comparative fit index (CFI) in combination with a cutoff value close to or smaller than .08 for standardized root mean squared residual (SRMR) were used to evaluate model fit as recommended by Hu and Bentler (1999).

To fully evaluate the model, the total sample was randomly split into two groups by using SPSS for Windows V.12. The first sample was used to test the hypothetical model (M_p). By considering the fitness indexes and recommendations from LM test and Wald test, the model was appropriately revised. The revised model was re-tested using the same sample. In obtaining satisfactory fit of index, the second sample was used to verify the modified model. Finally, both samples were merged and entered into the modified model. Outputs from the analysis were interpreted with reference to the literature.

RESULTS

Findings from the subscale reliability, demographic data, general behavioural patterns, significant differences between sub-groups, relationships between motivational variables and path analysis are provided below. Significant results are all represented at the level of $p < .05$, unless otherwise specified.

Subscale Reliability

Internal consistency of each subscale was evaluated by calculating Cronbach's alpha value. Individual variables ranged from .66 to .90 (Table 23). The internal consistencies of task- and ego-orientation subscales of the TEOSQ-Chi were similar to the reported values of Duda and Whitehead (task .80 vs. .79; ego .78 vs. .81) (1998). For the SCAT-Chi, the Cronbach alpha was the same (.82) with that reported for the originally developed version (Martens et al., 1990).

The overall internal consistency of the SMS-Chi was higher (.73 vs. .70) than that reported from the English version by Pelletier et al. (1995) and also the original French-Canadian version (.69) by Briere et al. (1995). The other alpha values of the subscales of the SMS (amotivation: .73 vs. .58; introjected regulation: .73 vs. .66; identified regulation: .71 vs. .84; IM-to know: .77 vs. .62; IM-accomplishment: .73 vs. .75; IM-stimulation: .75 vs. .66) were quite similar to those previously reported, and also above the recommended value of .70 (Nunnally & Bernstein, 1994). Only the subscale of external regulation demonstrated a low alpha value in contrast to the original reported value (.66 vs. .78). Finally, the internal consistency of the SPPC-Chi (.72 to .73), following appropriate administrative and technical refinements, also fell within the reliability value (.71 to .83) as reported by Harter (1985). Overall, the results of the reliability test offered support for the temporal stability of the Chinese

translated version of the scale and, hence, lent support to the reliability of the instrument used in this Main Study.

Table 23

Reliability Analysis of the TEOSQ-Chi, SCAT-Chi, SMS-Chi and SPPC-Chi in the Main Study

Instrument	Subscales		Alpha values
TEOSQ	Task		.80
	Ego		.78
SCAT			.82
SMS	Amotivation		.73
	Extrinsic Motivation		.86
		EM-external regulation	.66
		EM- introjected regulation	.73
		EM- identified regulation	.71
	Intrinsic Motivation		.90
		IM-to know	.77
		IM- accomplishment	.73
		IM- stimulation	.75
			.73
			.72
	Athletic competence		.73
	Physical appearance		

Demographic Data

School

There were a total of 2,202 junior secondary school participants for the current study. Students came from eleven schools (Appendix XVI) across the seven districts of Hong Kong. The typical class size for Hong Kong was approximately 38 per class. Some schools had smaller class sizes of approximately 30. Numbers of participants from the schools ranged between 151 to 236 (Table 24).

Table 24

Distribution of Students from Participating Schools in the Main Study

	School	District	Number
1.	BTH	So Uk, Kowloon	175
2.	JCC	Yuen Long, New Territories	224
3.	CC	Shatin, New Territories	177
4.	CPU	Tai Po, New Territories	215
5.	LMC	Wah Fu Estate, Hong Kong	151
6.	LCW	Kwai Chung, New Territories	214
7.	HF	Tsuen Wan, New Territories	177
8.	MMW	Kwun Tong, Kowloon	197
9.	PY	West Point, Hong Kong	216
10.	MC	Tuen Mun, New Territories	236
11.	PC	Homantin, Kowloon	220

Educational levels

In Hong Kong, the junior secondary is comprised of Secondary 1, Secondary 2 and

Secondary 3 which is equivalent to Grade 7, Grade 8 and Grade 9 in the United Kingdom. In this study, two classes from each junior secondary were selected to take part. In general, the proportion of participants in each grade was quite evenly distributed with each group comprising approximately one-third of the total sample. The educational level also reflects the typical age of students for Secondary 1 (12.5 years), Secondary 2 (13.5 years) and Secondary 3 (14.5 years) (Table 25).

Table 25

Distribution of Participants in Different educational Levels in the Main Study

Educational Level	Number
S.1	735
S.2	737
S.3	728
Missing Data	2

Gender

At the point when the current study was conducted, the distribution of males and females in Hong Kong schools was fairly evenly distributed. The female participants in this study were only a slight majority ($n = 74$) and thus not a large issue for data analysis (Table 26).

Table 26

Gender Distribution of Participants in the Main Study

Gender	Number
Male	1056
Female	1130
Missing Data	16

Level of sport participation

Participants provided information on their level of participation in sport activities which was categorised according to groups of 'seldom', 'recreation' and 'training'; as specified previously (see p.112). Almost half of the participants were in the 'seldom' group, and the rest were fairly evenly distributed in the 'recreation' and 'training' groups. This distribution pattern was quite similar to that reported in the recent local sports participation survey (Hong Kong Sport Development Board, 2001) (Table 27).

Table 27

Distribution of Participants in Different Levels of Sport Participation in the Main Study

Category	Number
Seldom	1077
Recreational	549
Training	512
Missing Data	64

General behavioural pattern for the total sample

Means and standard deviations were computed for the dependent variables for the total sample. The possible range of mean scores for each of subscales was as follows: Self-Perception Profile for Children (SPPC-Chi) was 1 to 4 (low to high); Sport Motivation Scale (SMS-Chi) was 1 to 7 (low to high); Task and Ego Orientation in Sport Questionnaire (TEOSQ-Chi) was 1 to 5 (low to high); and Sport Competition Anxiety Test (SCAT-Chi) was 10 to 30 (low to high).

The mean score for perceived sport competence in the current Main Study (2.43) was similar to the score in the Pilot Study (2.42). When comparing with range (2.40 to 2.90) reported in previous studies (Allen & Howe, 1998; Black & Weiss, 1992;

Ferrer-Caja & Weiss, 2000; Ommundsen & Pedersen, 1999; William & Gill, 1995) was located closer to the lower range.

The scores for intrinsic (4.73) and extrinsic motivation (4.26) were generally within the range as reported in previous studies using SMS (Doganis, 2000; Pelletier et al., 1995; Petherick & Weigand, 2002), but for amotivation, the sample mean (3.73) was much higher than the range of 2.40 to 2.70.

The means for task goal orientation (3.86) and ego goal orientation (3.46) indicated that the scores were above the mid-point of the subscales. When compared with other studies (Duda & Whitehead, 1998) with school children as reviewed in the previous section (p.81), it was found that task goal orientation was similar to previously reported mean (3.91); while ego goal orientation was much higher (2.69).

Competitive trait anxiety (21.02) was a slightly higher than the previously specified mid-point; and when using the high, medium and low competitive trait anxiety categorisation of Brustad and Weiss (1987) as a reference for interpretation, it was found that both males and females were above the mean (20.26 and 21.74), and in particular the males' scores were close to the mean of high competitive trait group (21.90) (Table 28).

Table 28

General Behavioural Pattern for the Total Sample in the Main Study

	Mean	S.D.	Other studies
TASK	3.86	0.63	Mean = 3.91
EGO	3.46	0.71	Mean = 2.69
CTA	20.26 (boys) 21.74 (girls)	4.43 4.24	Mean = 17.50 (boys) 19.10 (girls)
AM	3.73	1.15	2.40 to 2.70
EM	4.26	1.03	3.60 to 4.50
IM	4.73	1.10	4.50 to 5.00
SPPC	2.43	0.39	2.40 to 2.90

Gender differences across samples

Previous studies (Duda, 1989; Granleese, Trew, & Turner, 1989; Harter, 1985) suggested that differences existed in the motivational attributes between males and females, and in the Pilot Study (p. 84) gender differences emerged in several variables. Therefore, in this current study, multivariate analysis of variance (MANOVA) and examination of effect size (d) was conducted for gender across all the subscales to determine if males and females differed in their motivational orientations, anxiety level and perceived competence. Results indicated a significant main effect for gender (Wilks' Lambda = .926; $F(12, 2091) = 13.99, p < .001$). Further examination showed that significant differences were found in all subscales except amotivation. It was found that males scored significantly higher in intrinsic motivation, extrinsic motivations, and perceived sport competence, while females scored significantly higher in both goal orientation and trait anxiety. By examining the effect size, the

significant differences in perceived sport competence, intrinsic motivation, extrinsic motivation and competitive trait anxiety were between small and medium ($d = .31$ to $.34$) representing about 22% nonoverlap (Table 29).

Thus, Hypothesis 4.1 (p.109) was partially supported. Significant gender differences were found in most of the motivational variables, apart from amotivation.

Table 29

Comparisons of Motivational Variables between Genders in the Main Study

	Male ($n = 1,056$)		Female ($n = 1,130$)		Effect size (d)	F-Ratio
	Mean	SD	Mean	SD		
TASK	3.84	0.70	3.89	0.55	.08	9.42**
EGO	3.44	0.73	3.48	0.69	.06	4.70*
CTA	20.26	4.43	21.74	4.24	.34	51.09**
AM	3.77	1.22	3.69	1.09	.07	3.53
EM	4.44	1.04	4.09	0.98	.30	35.40**
IM	4.92	1.13	4.56	1.05	.33	30.30**
SPPC	2.49	0.37	2.37	0.39	.31	30.26**

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

Differences by educational level across samples

Multivariate analysis of variance (MANOVA) was conducted for three educational levels of Secondary 1, 2 and 3 using all the subscales to determine if different educational levels differed in their motivational orientations, anxiety levels and perceptions of competence. In the Pilot Study (p. 85), the results revealed little significant difference between different educational levels. In this study with the larger sample, significant differences emerged (Wilks' Lambda = .949; F(24, 4182) = 4.59, p

< .001). Significant differences were found in most subscales except ego goal orientation and amotivation. By using the Scheffe Post hoc analysis to observe the level of significance (p) and examination of effect size (d) (Table 31), it was found that most of the significant differences were between Secondary 1 students and both Secondary 2 and Secondary 3 students. Significant differences between Secondary 2 and Secondary 3 occurred in perceived sport competence; however, all significant differences were minor ($d = .15$ to $.36$).

There was a general trend that scores decreased from Secondary 1 towards Secondary 3 in perceived sport competence, intrinsic motivation, extrinsic motivation, and task goal orientation. Also, competitive trait anxiety and amotivation increased from Secondary 1 (i.e., the lowest scoring group) to Secondary 2 (i.e., the highest scoring group) (Table 30).

Thus, Hypothesis 4.2 (p.109) was partially supported that significant age differences as inferred from educational level were found in perceived sport competence, task goal orientation, intrinsic and extrinsic motivation and competitive trait anxiety; but not in ego goal orientation and amotivation. Also, the differences mainly existed between Secondary 1 with the other two levels.

Table 30

Comparisons of Motivational Variables between Educational Levels in the Main Study

	S.1 (<i>n</i> = 735)		S.2 (<i>n</i> = 737)		S.3 (<i>n</i> = 728)		F-Ratio
	Mean	SD	Mean	SD	Mean	SD	
TASK	3.96 ^{a,b}	0.60	3.82 ^a	0.65	3.80 ^b	0.63	9.81**
EGO	3.47	0.72	3.42	0.70	3.48	0.71	1.90
CTA	20.67	4.39	21.21	4.31	21.19	4.43	4.79*
AM	3.65	1.18	3.78	1.17	3.75	1.11	2.04
EM	4.39 ^{a,b}	0.99	4.24 ^a	1.05	4.13 ^b	1.02	9.39**
IM	4.91 ^{a,b}	1.07	4.64 ^a	1.11	4.64 ^b	1.11	15.12**
SPPC	2.50 ^{a,b}	0.40	2.43 ^{a,c}	0.36	2.36 ^{b,c}	0.40	17.62**

Note. ^{aa, bb, cc} Significant difference by Scheffe Post hoc analysis**p*<.05, ***p*<.01

Table 31

*Post Hoc Test Level of Significance (*p*) and Effect Size (*d*) for Educational Level in the Main Study*

	S.1-S.2		S.1-S.3		S.2-S.3		F-ratio
	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	
TASK	.22	.00	.25	.00	.03	.90	9.81**
EGO	.07	.50	.01	.90	.08	.26	1.90
CTA	.12	.06	.12	.08	.00	.99	4.79*
AM	.11	.12	.09	.23	.03	.94	2.04
EM	.15	.02	.25	.00	.11	.12	9.39**
IM	.25	.00	.25	.00	.00	.99	15.12**
SPPC	.18	.00	.36	.00	.18	.00	17.62**

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

Differences by level of participation in sport activities across samples

Participants were categorized into three groups ‘seldom’, ‘recreation’ and ‘training’ groups as previously noted (p.112). Multivariate analysis of variance (MANOVA) was performed for these three groups to determine if significant differences existed between different levels of sport participation based on motivational attributes. Results indicated a significant main effect for level of participation (Wilks’ Lambda = .769; $F(24, 4182) = 24.39, p < .001$). Significant differences were found in all subscales except competitive trait anxiety. By using the Scheffe Post hoc to observe the level of significance (p) (Table 33), it was found that most of the significant differences were between all three groups. No significant difference existed between the ‘recreation’ and ‘training’ groups in task and ego goal orientation and amotivation. Also, no significant difference existed between the ‘seldom’ group and ‘recreation’ group in ego goal orientation.

By the examination of effect size (d), large differences were found between the ‘seldom’ and ‘training’ groups for extrinsic and intrinsic motivation ($d = .83$ both). Medium differences were also found between these two groups in perceived sport competence and task goal orientation ($d = .59$ and $.49$, respectively), and between the ‘seldom’ and ‘recreation’ groups for perceived sport competence, intrinsic motivation and extrinsic motivation ($d = .41, .61$ and $.51$, respectively). All the other significant differences were small ($d = .37$ to $.13$).

As predicted, scores decreased from the ‘training’ group to the ‘seldom’ group in all of the ‘favourable’ motivational factors (i.e., task goal orientation, intrinsic and extrinsic motivation, and perceived sport competence), and increased in the ‘unfavourable’ motivational factor of amotivation (Table 32).

Thus, Hypothesis 4.3 (p.109) was partially supported in that significant differences were found between different levels of participation in sport activities in

most motivational variables but not in competitive trait anxiety; also, significant differences existed mostly between the 'seldom' group with the other two groups.

Table 32

Comparison of Motivational Variables between Levels of Sport Participation in the Main Study

	Seldom (n = 1,077)		Recreation (n = 549)		Training (n = 512)		F-Ratio
	Mean	SD	Mean	SD	Mean	SD	
TASK	3.73 ^{a,b}	0.61	3.96 ^a	0.59	4.04 ^b	0.63	54.33**
EGO	3.41 ^b	0.70	3.49	0.71	3.53 ^b	0.73	6.80**
CTA	21.35 ^{a,b}	4.35	20.78 ^a	4.39	20.82	4.30	2.06
AM	3.90 ^{a,b}	1.05	3.61 ^a	1.18	3.54 ^b	1.25	23.81**
EM	3.90 ^{a,b}	1.00	4.43 ^{a,c}	0.91	4.76 ^{b,c}	0.93	134.29**
IM	4.33 ^{a,b}	1.06	5.00 ^{a,c}	0.93	5.24 ^{b,c}	1.02	149.55**
SPPC	2.33 ^{a,b}	0.38	2.49 ^{a,c}	0.35	2.56 ^{b,c}	0.39	65.48**

Note. ^{aa, bb, cc} Significant difference by Scheffe Post hoc analysis

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

Table 33

Post Hoc Test Level of Significance (p) and Effect Size (d) for Levels of Sport Participation in the Main Study

	S - R		S - T		R - T		F-ratio
	d	p	d	p	d	p	
TASK	.37	.00	.49	.00	.13	.13	54.33**
EGO	.11	.07	.17	.00	.06	.68	6.80**
CTA	.13	.04	.12	.08	.01	.99	2.06
AM	.25	.00	.31	.00	.06	.64	23.81**
EM	.51	.00	.83	.00	.32	.00	134.29**
IM	.61	.00	.83	.00	.22	.00	149.55**
SPPC	.41	.00	.59	.00	.18	.01	65.48**

Note. Participation S – seldom R – recreation T – training

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

Interaction of independent variables of sub-groups on the effect of motivational dependent variables

Multivariate analysis of variance (MANOVA) was performed to examine the interaction effect of the independent variables of gender, educational level and level of participation on the seven motivational dependent variables. Similar to the Pilot Study (p.87), the MANOVA procedure revealed that there was no significant difference in the interaction of the independent variables. Findings for the current study indicated that there were no significant differences for the interaction of educational level and gender (Wilks' Lambda = .99; $F(14, 4196) = 1.62; p = .07$), educational level and level of participation (Wilks' Lambda = .98; $F(28, 7565.87) = 1.67; p = .06$), gender and level of participation (Wilks' Lambda = .99; $F(14, 4196) = .89; p = .57$), and the joint interaction of educational level, gender and level of participation (Wilks' Lambda = .99; $F(28, 7565.87) = .84; p = .71$). Thus, hypothesis 4.4 (p.110) was not supported.

Relationships between perceived sport competence, motivational orientation, goal orientation and competitive trait anxiety

Correlation analyses were performed both with the total sample and with different sub-groups to determine their relationships with the relevant subscales. Findings are reported below based on both major sets of analyses. Whilst there are several ways to interpret the data from the correlation analyses, the following section includes highlights of the findings deemed most relevant and appropriate for this programme of studies.

Total Sample

Correlation analyses were performed for the total sample to examine the relationships between different motivational attributes. Only the main subscales of perceived sport competence, intrinsic motivation, extrinsic motivation, amotivation, task goal orientation, ego goal orientation and competitive trait anxiety were used to avoid duplication of analysis. Results showed that 1.5% of the variance in perceived sport competence was accounted for task goal orientation, approximately 6% for extrinsic motivation and also approximately 6% for intrinsic motivation. Significant negative relationships were found with amotivation and competitive trait anxiety which explained 2.5% and 6.8% of the variance in perceived sport competence, respectively. A strong relationship existed between intrinsic motivation and extrinsic motivation ($r = .77, p < .01$); while modest relationships were found between task goal orientation and intrinsic motivation ($r = .53, p < .01$), task goal and ego goal orientations ($r = .43, p < .01$), task goal orientation and extrinsic motivation ($r = .38, p < .01$), ego goal orientation and intrinsic motivation ($r = .27, p < .01$), and ego goal orientation and extrinsic motivation ($r = .23, p < .01$). Additional, weaker relationships between other attributes are also reported below (Table 34).

Table 34

Relationships between Different Subscales for the Total Sample in the Main Study

	EGO	AM	EM	IM	CTA	SPPC
TASK	.43**	-.06**	.38**	.53**	.03	.12**
EGO		.10**	.23**	.27**	.08**	.02
AM			.15*	.03	.18**	-.16**
EM				.77**	.00	.24**
IM					.01	.24**
CTA						-.26**

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

Different gender

Relationships between different motivational attributes for gender were also examined by calculating the coefficient of correlation between relevant subscales. The results from the analyses yielded similar patterns to those of the total sample. Gender differences existed in the relationship between perceived sport competence and other motivational attributes. From the observation of the coefficients of correlation, it was found that females demonstrated stronger relationships in most items except competitive trait anxiety. Yet, males had a stronger relationship between task goal and ego goal orientations ($r = .48$ vs. $.37$, $p < .01$) than females. Another notable difference that occurred in regard to the relationship between intrinsic motivation and amotivation was that females had a significant, weak, positive relationship ($r = .06$, $p < .05$), but males had an insignificant, weak, negative relationship ($r = -.01$) (Table 35).

Table 35

Relationships between Different Subscales across Different Gender in the Main Study

GENDER		EGO	AM	EM	IM	CTA	SPPC
MALE (1,056)	TASK	.48**	-.05	.37**	.54**	.03	.11**
	EGO		.09**	.28**	.31**	.07*	.05
	AM			.14**	-.01	.18**	-.17**
	EM				.75**	.05	.22**
	IM					.05	.21**
	CTA						-.26**
FEMALE (1,130)	TASK	.37**	-.06*	.41**	.54**	.01	.16**
	EGO		.10**	.19**	.25**	.09**	.01
	AM			.14**	.06*	.18**	-.18**
	EM				.76**	.01	.23**
	IM					.03	.24**
	CTA						-.24**

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

Different educational levels

Coefficients of correlation were also computed for different educational levels to determine whether there were significant relationships between different motivational attributes. Again, similar patterns emerged as to the total sample. There was little difference for the three educational levels in the relationships between perceived sport competence and other motivational attributes. Differences could be observed in the relationship between task goal and ego goal orientations. The modest relationship decreased from Secondary 3 ($r = .47, p < .01$) towards Secondary 1 ($r = .37, p < .01$).

The same phenomenon occurred in the relationship between task goal orientation and extrinsic motivation. Also, the modest relationship decreased from Secondary 3 ($r = .42, p < .01$) to Secondary 1 ($r = .31, p < .01$). Secondary 1 was different from the other two levels, in that a significant, weak, negative relationship between task goal orientation and amotivation ($r = -.12, p < .01$) was found; also, there was no significant relationship between ego goal orientation and amotivation ($r = .07$) while significant relationships were detected in Secondary 2 ($r = .12, p < .01$) and Secondary 3 ($r = .10, p < .01$). Another notable difference could be found in the relationship between intrinsic motivation and amotivation, whereby Secondary 2 yielded a significant positive relationship ($r = .12, p < .01$) while insignificant relationships were found in Secondary 1 and 3. Also, Secondary 2 demonstrated an insignificant relationship between ego goal orientation and competitive trait anxiety ($r = .05$), but Secondary 1 ($r = .09, p < .05$) and Secondary 3 ($r = .10, p < .01$) showed significant relationships (Table 36).

Table 36

Relationships between Different Subscales across Different Educational Levels in the Main Study

EDUCATIONAL LEVEL		EGO	AM	EM	IM	CTA	SPPC
ONE (n = 735)	TASK	.37**	-.12**	.31**	.49**	.03	.11**
	EGO		.07	.23**	.28**	.09*	.02
	AM			.12**	-.07	.18**	-.12**
	EM				.77**	-.01	.22**
	IM					-.02	.25**
	CTA						-.27**
TWO (n = 737)	TASK	.46**	-.04	.39**	.49**	.03	.08*
	EGO		.12**	.24**	.26**	.05	-.01
	AM			.22**	.12**	.19**	-.15**
	EM				.80**	.02	.19**
	IM					.06	.18**
	CTA						-.23**
THREE (n = 728)	TASK	.47**	.01	.42**	.58**	.04	.14**
	EGO		.10**	.23**	.28**	.10**	.07
	AM			.12**	.06	.17**	-.22**
	EM				.78**	.01	.28**
	IM					.01	.27**
	CTA						-.27**

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

Different levels of sport participation

The relationships between different motivational attributes were also studied among different levels of sport participation. Generally, findings followed similar patterns to the total sample, however, some notable differences could be found. In the relationships between perceived sport competence with extrinsic and intrinsic motivations, significant relationships were observed in the 'seldom' group, ($r = .20$ and $.16, p < .01$, respectively) and the 'training' group ($r = .21$ and $.23, p < .01$, respectively), but no such significant relationship could be found for the 'recreation' group ($r = .00$ and $.05$, respectively). Differences were also found in amotivation, whereby there were decreases from the 'seldom' group towards the 'training' group, in the relationships between amotivation and task goal orientation, ego goal orientation, extrinsic motivation and intrinsic motivation. Similarly, the same phenomenon was also found with higher value in 'seldom' group and decreased towards the 'training' group in the relationships between competitive trait anxiety and task goal orientation, ego goal orientation and intrinsic motivation (Table 37).

Table 37

Relationships between Different Subscales across Different Levels of Sport Participation in the Main Study

LEVEL OF SPORT PARTICIPATION		EGO	AM	EM	IM	CTA	SPPC
SELDOM (n = 1,077)	TASK	.44**	.08**	.36**	.54**	.09**	.05
	EGO		.19**	.21**	.28**	.10**	-.02
	AM			.26**	.23**	.18**	-.09**
	EM				.76**	.04	.20**
	IM					.08**	.16**
	CTA						-.25**
RECREATION (n = 549)	TASK	.37**	-.04	.29**	.45**	-.00	.06
	EGO		.11*	.18**	.23**	.08	-.04
	AM			.25**	.02	.19**	-.20**
	EM				.66**	.05	.00
	IM					.02	.05
	CTA						-.29**
TRAINING (n = 512)	TASK	.44**	-.16**	.29**	.41**	.00	.10*
	EGO		.00	.26**	.23**	.06	.08
	AM			.14**	-.05	.14**	-.15**
	EM				.74**	.01	.21**
	IM					-.04	.23**
	CTA						-.23**

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

Thus, Hypotheses 4.5, 4.6, 4.7 and 4.8 (p.110) were supported whereby significant positive relationships were found between perceived sport competence and task goal orientation, and intrinsic motivation; and significant negative relationships were found between perceived sport competence and amotivation, and competitive trait anxiety. In addition, the correlation analysis revealed a significant positive relationship between perceived sport competence and extrinsic motivation that was not hypothesised.

Prediction of perceived sport competence by motivational variables of intrinsic/extrinsic motivation, amotivation, task/ego goal orientation and competitive trait anxiety

Path analysis by using structural equation modelling was used to test the modified model that emerged from the Pilot Study (Figure 4, p.96). In order to verify the fitness of the model, the total sample was randomly split into two groups via the use of SPSS for Windows V. 12.0. Sample 1 ($n = 1,101$) was used to test the hypothesised structural model. Goodness of fit was assessed by examining the Comparative Fit Index (CFI) and standardized root mean squared residual (SRMR).

The fit indices that emerged from the analyses (CFI = .95; SRMR = .08) met the recommended cutoff criteria for fit index (Hu & Bentler, 1999) (Figure 5).

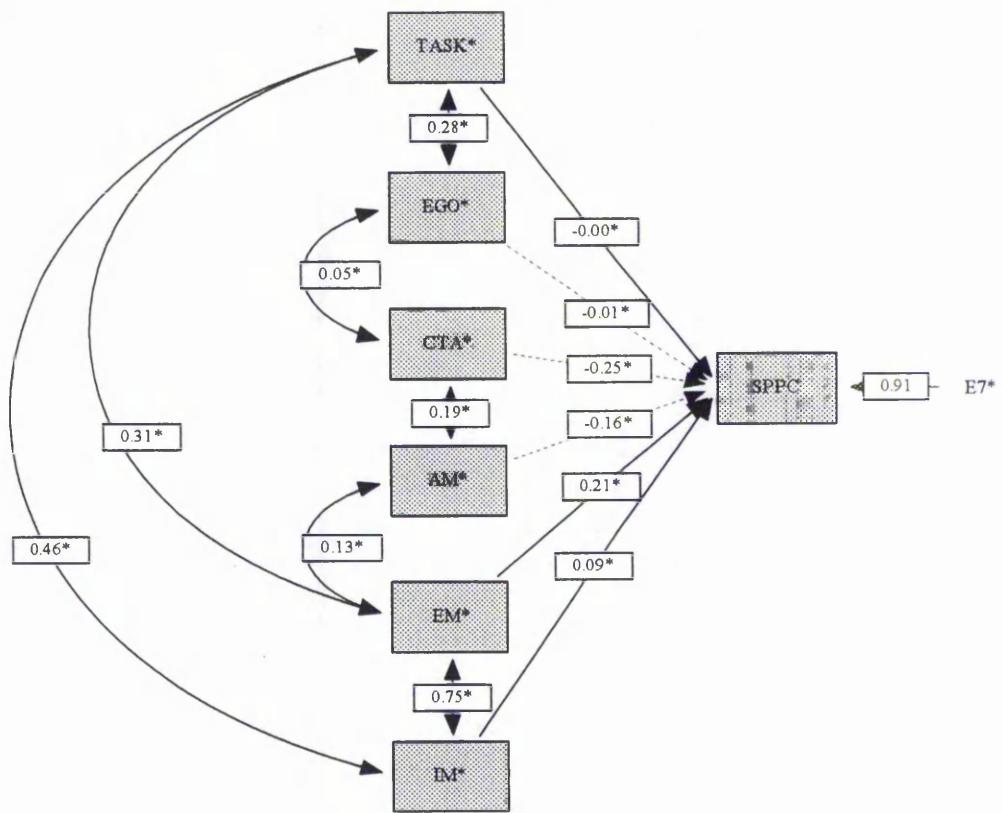


Figure 5. Multiple Regression Hypothesised Path Model (M_p) tested with Sample 1 ($n = 1,101$) in the Main Study ($CFI = .95$; $SRMR = .08$)

Note. Continuous lines indicate positive relationship; discontinuous lines indicate negative relationship

However, it was noted that the path coefficients from task goal orientation and ego goal orientation to perceived sport competence were low. Further examination was conducted by using the Wald test (Appendix XVII), and findings revealed that the paths connecting the task goal and ego goal orientations with perceived sport competence should be dropped. When examining the relationships between the different motivational variables with perceived sport competence in the previous section, the coefficient of correlation that yielded from the Pearson Product Moment Method (Table 34, p.131) also indicated quite a low relationship between these constructs. Therefore, dropping the two specified paths would result in a more parsimonious model.

In consideration of the weak relationship between task goal orientation and perceived sport competence, yet modest relationships between task goal orientation and intrinsic and extrinsic motivations, it is logical to hypothesise that task goal orientation was able to influence perceived sport competence only through the moderators of intrinsic motivation and extrinsic motivation. Also, the significant relationship between intrinsic motivation and extrinsic motivation (Table 34, p.131) suggested that the intervening variable (task goal orientation) did not fully explain the co-variation between the two variances of intrinsic motivation and extrinsic motivation. Considering the nature of intrinsic motivation and extrinsic motivation, there should be some common factors (such as enjoyment, satisfaction) that might explain this co-variation, so the estimation of the correlation between the residual variance of intrinsic motivation and residual variance of extrinsic motivation was maintained in the modified model (Figure 6). The modified model was tested again with the Sample 1 and yielded very good fit indices ($CFI = .97$; $SRMR = .04$) (Appendix XVIII).

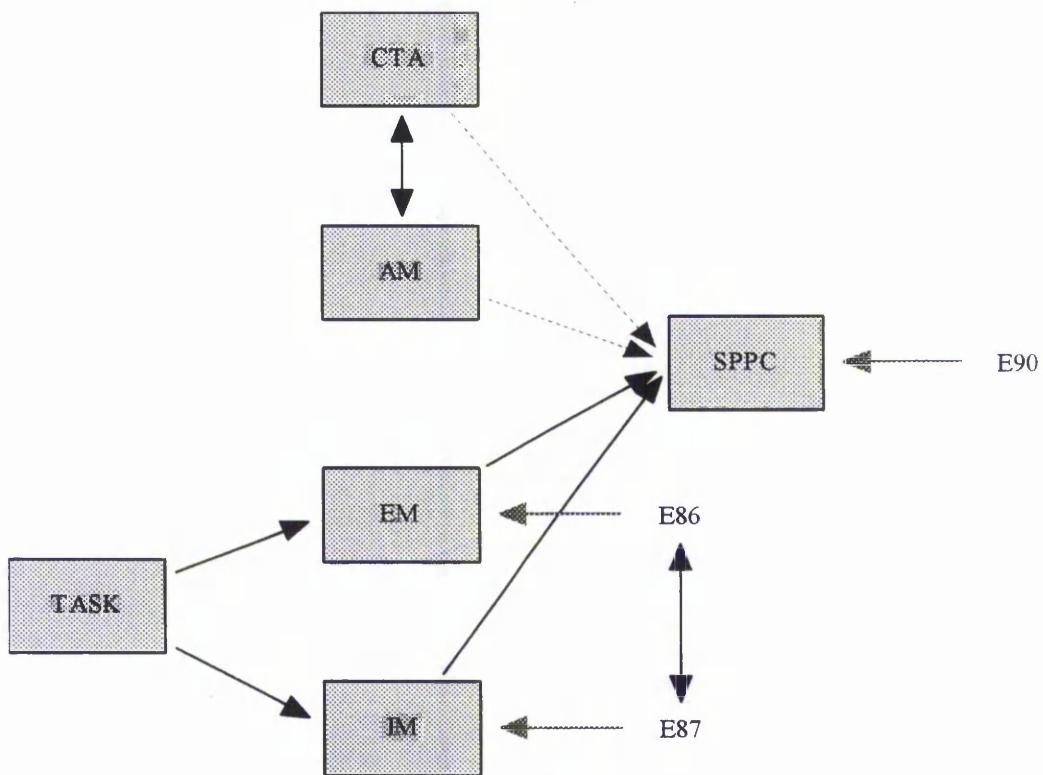


Figure 6. Multiple Regression Hypothesised Path Model for the Main Study

Note. Continuous lines indicate positive relationship; discontinuous lines indicate negative relationship

To verify the validity of the model, Sample 2 ($n = 1,101$) was tested with the modified model as recommended for structural equation modelling analyses (Tabachnick & Fidell, 1996). Again, the fit indices that emerged indicated a very good fit ($CFI = .97$; $SRMR = .04$) (Appendix XIX). Multi-group analysis testing invariance of path coefficients and residual variances across the two samples supported equality of all estimated parameters.

Following the results of the multi-group analysis, the two samples were combined ($N = 2,202$) and the revised model was tested. As expected, the fit indexes were very good ($CFI = .97$; $SRMR = .04$) (Figure 7) (Appendix XX). In support of the Hypothesis 4.9 and 4.10 (p.110), the paths connecting perceived sport competence with competitive trait anxiety (path coefficient = $-.24$) and amotivation (path coefficient = $-.15$) were negative and significant. The relationships between perceived

sport competence and extrinsic motivation (path coefficient = .18) and intrinsic motivation (path coefficient = .11) were both positive and significant. Task goal orientation did not demonstrate a strong relationship directly with perceived sport competence, but strong relationships were found between task goal orientation with intrinsic motivation (path coefficient = .53) and extrinsic motivation (path coefficient = .38). Through the moderators of intrinsic motivation and extrinsic motivation, task goal orientation affected perceived sport competence. Overall, 16.4% of the variance in perceived sport competence was explained by competitive trait anxiety, amotivation, extrinsic motivation, intrinsic motivation and task goal orientation (Appendix XX).

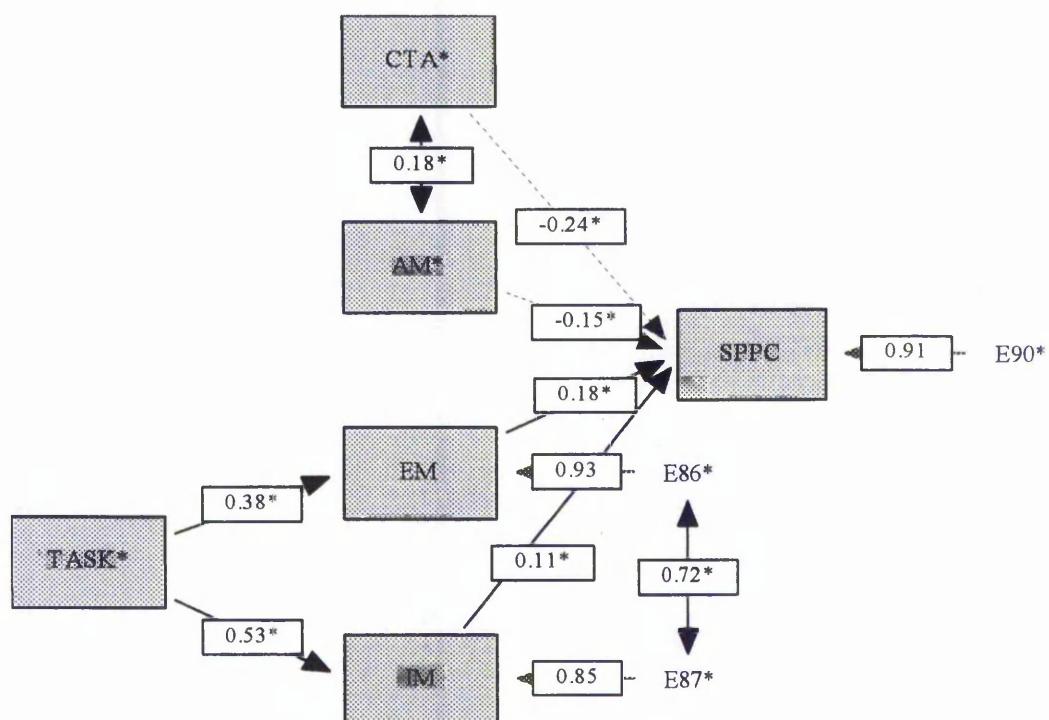


Figure 7. Multiple Regression Path Model for the Total Sample in the Main Study ($N = 2,202$) (CFI = .97; SRMR = .04).

Note. Continuous lines indicate positive relationship; discontinuous lines indicate negative relationship
All paths were significant ($p < .01$)

Further analysis was done by splitting the sample into males ($n = 1,056$) and females ($n = 1,130$). Similar models were used and yielded very good fit indexes for

both males ($CFI = .96$; $SRMR = .04$) (Figure 8), and females ($CFI = .98$; $SRMR = .04$) (Figure 9). One major difference was observed at the paths between intrinsic motivation and perceived competence, and between extrinsic motivation and perceived competence. The relationship between extrinsic motivation and perceived competence for males was higher (path coefficient = .21) than females (path coefficient = .13); while the relationship between intrinsic motivation and perceived competence was lower for males (path coefficient = .04) than females (path coefficient = .16).

Thus, Hypothesis 4.9 (p.110) was partially supported in that intrinsic motivation and extrinsic motivation positively influenced perceived sport competence; task goal orientation influenced perceived sport competence through the mediators of intrinsic and extrinsic motivations; and the effect of ego goal orientation on perceived sport competence was not significant. Hypothesis 4.10 was supported whereby amotivation and competitive trait anxiety negatively influenced perceived sport competence.

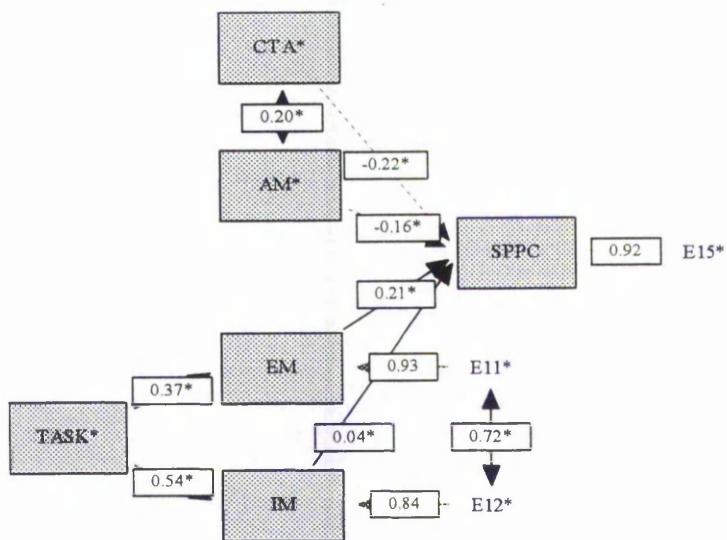


Figure 8. Multiple Regression Path Model for Male Sample in the Main Study ($n = 1,056$; CFI = .96; SRMR = .04)

Note. Continuous lines indicate positive relationship; discontinuous lines indicate negative relationship

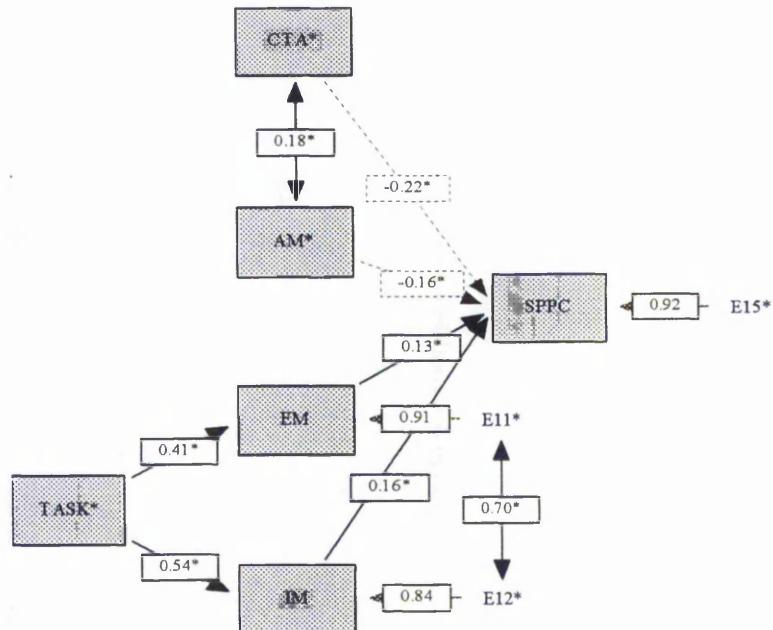


Figure 9. Multiple Regression Path Model for Female Sample in the Main Study ($n = 1,130$; CFI = .98; SRMR = .04)

Note. Continuous lines indicate positive relationship; discontinuous lines indicate negative relationship

DISCUSSION

The purpose of this programme of studies was to examine the participatory motivation of junior secondary school children in PE and sport activities in several Hong Kong schools with reference to perceived sport competence as suggested in Harter's (1978, 1981) competence motivation theory. In addition, analyses of determinant factors of intrinsic/extrinsic motivational orientation, task/ego goal orientation, and level of competitive trait anxiety were also included. Discussions are presented below in relation to the postulated hypotheses of this research investigation.

General behavioural pattern of the total sample

The results provided a general motivational pattern of junior secondary school students in Hong Kong when participating in PE and sport activities. Based on the high mean score for ego goal orientation and relatively average mean score in task goal orientation, intrinsic and extrinsic motivations, the findings indicate that students valued the outcomes from participation in physical activities to be more important than the enjoyment of participation. In a similar vein, a Korean study concluded that students in Korea tended to be more serious when participating in sport, rather than focusing on its enjoyment (Kim & Gill, 1997). The Eastern culture may develop multiple criteria for the judgment of success in sports that includes both personal improvement and demonstration of superiority. Therefore, while the findings from the current study and previous relevant research were not consistent with other mainstream studies from the West (e.g., Duda, 1992; Duda & Nicholls, 1992); these differences in results are important because they reflected a behavioural pattern that is unique to the Eastern culture.

The high scores in ego goal orientation, competitive trait anxiety and

amotivation reflected the high competitiveness of the Hong Kong society, whereby students often strive for superiority and may feel intimidated in some achievement situations, and lack an intent to do well in highly unfavourable conditions.

Attention should also be drawn to the relatively low mean score in perceived sport competence and above average mean score in competitive trait anxiety. The findings reflected that the participants did not perceive themselves competent in sport and suffered a certain degree of anxiety towards sport participation. Similar findings have been reported in a previous study by Lindner (1997) in Hong Kong.

His study included 4,686 school children and youths, where participants were asked to rate their own physical abilities; however, just 8.2% of the respondents rated themselves as 'above average', and 18.1% indicated 'below average'. Further analysis of data indicated that the children's motives for participating in physical activities predominantly included fun, fitness and learning of skills, while competence motives were cited only by a minority of participants. There was a general consensus from sport administrators that participation in physical activities for the three intrinsic reasons cited above would increase or sustain participation; however, the feeling of competence in achievement situations also determined an individual's decision on future sport and activity participation (Lindner, 1997).

Behavioural patterns of different genders

The behavioural patterns of both genders appeared similar to those of the total sample. There were some differences between males and females that supported previous studies (Fox et al., 1994; Kim, William & Gill, 2003; Petherick & Weigand, 2002), but also refuted previous studies (Duda, 1989; Fortier, Vallerand, Briere & Provencher, 1995; Granleese et al., 1989; Harter, 1985).

In the current study, it was found that females scored significantly higher than

males in both task goal and ego goal orientations. Similar to Duda's (1989) findings, females were shown to be more task oriented; however, in the current study females also scored higher than males for ego goal orientation. This distinction could be attributed to the difference in samples, as participants in Duda's (1989) study were varsity interscholastic athletes. From a developmental perspective, females tend to be more mature in early adolescence (Simmon & Blyth, 1987) and may adopt a more dominant role than their counterparts. This is particularly true in the Orient (Li, Chow & Yeung, 1995), as girls tend to mature earlier. The higher mean scores in both task goal and ego goal orientations for females in this study implied that they valued the goals of participation as more important than males.

Males scored significantly higher for intrinsic motivation and extrinsic motivation, also a significantly lower score in competitive trait anxiety (20.26 vs. 21.74). These findings were similar to those found in the Pilot Study. It was apparent that males had greater enjoyment when participating in sport activities which stemmed from a fulfilment of pleasure and satisfaction, and also in enjoying the prestige they gained from sport participation. They also perceived the environment to be less threatening in competitive situations. The findings can be considered in light of the recent local sport participation survey (Hong Kong Sports Development Board, 2001) recognising that boys had a participation rate of 68% compared with 63% of the girls.

Males also scored significantly higher than females in perceived sport competence which was consistent with other studies (Eccles, Barber, Jozefowicz, Malenchuk, & Vida, 1999; Feltz & Petlichkoff, 1983; Weiss, 1986). Also, Harter (1983) indicated that boys traditionally perceived competence in the physical domain as more important whilst they developed from middle school years towards adolescence. Eccles et al. (1999) found larger gender differences in perceptions of competence in the sport domain than in other domains; and these gender differences in

perceptions were much larger than the gender differences in actual sport-related skills. According to Carroll and Loumidis (2001), the lower perception of ability in females also contributed to their less enjoyable behaviour towards sport activities as shown in their lower scores in both intrinsic and extrinsic motivations.

Although males scored higher than females in amotivation, the difference was not significant. This finding could be interpreted to mean that gender diversity was not prominent for children at this developmental stage (12 to 14) with regard to compulsory physical education lessons.

High ego goal orientation accompanied with a low perceived sport competence in females is worthy of additional attention. As suggested in other studies (Baric, Erpic & Babic, 2002; Walsh, Crocker & Bouffard, 1992), high ego orientation would increase the pressure and tension of individuals and would be further amplified by low perceived sport competence, which would eventually hamper adherence or participation in sport. This may explain the high drop-out rate of females in sport participation especially during adolescence which coincides with upper secondary (Grade 10 to 12).

Behavioural patterns of different educational levels

The level of education in this study was important in the sense that it reflected the chronological age of students. In Hong Kong, students in Secondary 1 are mostly between the ages of 12 and 13; Secondary 2 students range from 13 to 14; and Secondary 3 includes the ages of 14 to 15. In the current study, interesting findings emerged across age groups. Research has shown that 'favourable' factors such as intrinsic motivation, extrinsic motivation, task goal orientation, ego goal orientation and perceived sport competence are factors that are positively associated with participation in sport activities (Caroll & Loumidis, 2001; Duda et al., 1992; Wankel

& Kreisel, 1985); while ‘unfavourable factors’ such as competitive trait anxiety and amotivation have been identified as factors that are negatively associated with sport participation (Cox, 1986; Abramson et al., 1978). Therefore, findings indicated that younger participants (i.e., Secondary 1) scored higher in the more ‘favourable’ factors, and lower in the ‘unfavourable’ factors. In contrast, the opposite pattern emerged for the older participants (i.e., Secondary 3) who scored lower in the factors associated with having a positive impact on sport participation; and students in Secondary 2 scored higher in competitive trait anxiety and amotivation.

The findings were consistent with Nicholls’ (1989) developmental predictions, and also with results from previous studies (Chase, 2001; Digelidis & Papaionannou, 1999; Kim, Williams & Gill, 2003). In particular, previous researchers have noted that children developed a more mature conception of ability with age, and which results in a decrease in task goal orientation and an increase in ego goal orientation as they move towards higher educational levels (Digelidis & Papaionannou, 1999; Kim, Williams & Gill, 2003). Also, as the educational level increases, children’s intrinsic motivation and extrinsic motivation tends to decrease (Weiss et al., 1986), which could imply that enjoyment and interest towards participating in sport activities decreases as children grow older. Finally, children perceive themselves to be less competent in sport and the feeling of anxiety increases as they enter into competitive sport situation (Ommundsen & Pedersen, 1999). Consequently, they are less motivated to participate in sport activities. These psychological and behavioural changes in sport motivation and performance require considerable attention if we consider that the junior secondary stage is a critical stage affecting children’s subsequent attitudes towards sport participation. The social factors of the school environment and physical education curriculum are areas that need to be evaluated.

Behavioural patterns of different experiences in sport participation

Experiences in sport participation were reflected by their level of participation in sport activities. The 'seldom' group comprised half of the sample, whereby students had little involvement in sport activities other than the school P.E. lessons. The 'recreation' group comprised about a quarter of the sample who participated in additional sport activities, and the 'training' group was the final portion of the sample who was involved in sport teams and training in addition to school P.E. lessons. As predicted, and consistent with previous research with university students in Hong Kong (Lindner & Speak, 1995), children with higher levels of involvement demonstrated higher scores in all favourable sport participation factors. Respondents scored significantly higher in task goal orientation, ego goal orientation, extrinsic motivation, intrinsic motivation and perceived sport competence. They also scored significantly lower in the unfavourable factor of amotivation. However, the difference in competitive trait anxiety was not significant. The findings were consistent with previous reports in regard to levels of enjoyment (Duda et al., 1981; Feltz & Petlichkoff, 1983; White & Duda, 1994). For example, White and Duda (1994) found that elite athletes were more ego-goal orientated than those who participated in sport at lower levels. In addition, Williams and Gill (1995) found that intrinsic interest and perceived competence were related to the amount of effort exhibited.

However, one notable finding was that significant differences existed mostly between the 'seldom' group and the other two groups. This lends support to the claim that it was more important that children should have regular involvement in sport activities rather than emphasising the intensity of involvement in sport activities. Research by Carroll and Loumidis (2001) also indicated that the amount of time spent on physical education was not directly related to enjoyment.

Also, contrary to what was predicted, the current study did not reveal significant

differences between different levels of sport participation in competitive trait anxiety. It can be speculated that those students in the 'seldom' group had little opportunity to participate in competitive situations and, hence, did not experience high competitive trait anxiety.

Relationships between perceived sport competence and intrinsic/extrinsic motivation

In the current study, significant positive relationships were found between perceived sport competence and intrinsic motivation, and extrinsic motivation. About 6% of perceived competence was explained by both intrinsic and extrinsic motivation. A significant negative relationship was also found between perceived sport competence and amotivation. Similar relationships emerged in the sub-groups of males and females, different educational levels, and different levels of sport participation. The findings from this study lent partial support for Harter's competence motivation theory (1978, 1981) and for results obtained from previous studies (Ferrer-Caja & Weiss, 2000; Klint & Weiss, 1987; Markland, 1999; Weigand & Broadhurst, 1998; Williams & Gill, 1995). The significant positive relationship between perceived sport competence and intrinsic motivation was supported in this study; however, there were also some key issues to consider. The significant positive relationship found between perceived sport competence and extrinsic motivation deflated the importance of intrinsic motivation for the prediction of perceived sport competence. This finding indicated that participation in sport activities either for personal interest or for the purpose of obtaining some kind of reward would similarly heighten perceived sport competence.

The absence of such a relationship in the 'recreation' group denoted that participation in recreational sport activities tended not to depend as much on whether

one was competent or not, and their enjoyment from sport participation was not affected by their perceived sport competence.

The significant relationship between perceived sport competence and intrinsic/extrinsic motivation implied that in order to foster the perceived sport competence of children, P.E. teachers and sport administrators need to promote the fun, enjoyment and reward elements of sport programmes to motivate children both intrinsically and extrinsically toward sport participation.

Relationships between perceived sport competence and goal orientation

In examining the relationship between perceived sport competence and goal orientation, there existed a significant yet weak relationship between perceived sport competence and task goal orientation, and the relationship with ego goal orientation was not significant. Similar relationship patterns were found in both males and females, and different educational levels. However, a different pattern was found in different levels of participation. A significant relationship was found in the 'training' group, but not in the 'seldom' and 'recreation' groups. Also, while not significant, there emerged a slight negative relationship between perceived sport competence and ego goal orientation in both the 'seldom' and 'recreation' group.

The findings were generally consistent with previous studies (Burton, 1989; Duda & Chi, 1989; Duda, & Chi, 1992; Duda et al., 1995; Duda & Nicholls, 1992; Hall, 1990; Dunn, 2000; Seifriz et al., 1992; Williams & Gill, 1995) and supported the hypothesis that there was a significant positive relationship between perceived sport competence and task goal orientation. This finding reinforced the contention that task-orientated individuals perceive themselves as trying hard and persisting in sport activities. Also, task goal orientation rather than ego goal orientation is a more salient construct when children evaluate their perceived sport competence (Duda & Nicholls,

1992; Seifriz et al., 1992). Consequently, children adopt the belief that demonstration of ability through learning and mastery of skills is more important than outperforming others and that fortifies their perception of competence in sport (Burton, 1989; Dunn, 2000). This finding occurred more specifically among children that were actively involved in sport activities for this study. Ego goal orientation was not related with perceived sport competence and findings moderately suggested a negative relationship in 'seldom' and 'recreation' groups, which may mean that emphasising winning and outperforming others does not strengthen individuals' perceived competence. Thus, P.E. teachers and sport administrators should help children to view competence as a function of effort and process rather than outcome when conducting sport activities to develop task goal orientation among participants.

It was also observed that the magnitude of the relationship between perceived sport competence and intrinsic/extrinsic motivation was greater than the relationship between perceived sport competence and goal orientations. This stronger relationship highlighted the importance of the role of intrinsic and extrinsic motivation as stronger predictors than goal orientations for the development of perceived sport competence.

Relationships between perceived sport competence and competitive trait anxiety

In the Pilot Study, the relationship between perceived sport competence and competitive trait anxiety was not clear. In this study, a significant negative relationship was revealed as competitive trait anxiety predicted almost 7% of perceived sport competence, and this relationship was consistent across all samples of males and females, different educational levels, and different experiences of sport participation. The findings from this study provided support for the competence motivation theory such that negative affect in the form of anxiety would attenuate the competence

motive.

This result was not found in some previous research (Brustad, 1988; Brustad & Weiss, 1987; Passer, 1983) which may be due to the difference in population samples that were utilised in other studies. In those studies, participants were members of sport teams whereby their sport participation was largely voluntary and, importantly, experiencing some anxiety within the game context was more likely to occur for seasoned athletes. Studies also noted that the amount of fun experienced during competitive sport may buffer the post-competition anxiety, even in the case of defeat (Scanlan & Lewthwaite, 1984; Scanlan & Passer, 1978).

In the current study, participants were school children and it was compulsory for them to take part and be evaluated in school P. E. programs, regardless of their feelings of competence. Thus, it was reasonable to predict that children with low competence would be more anxious during participation and, in turn, the threatening feeling would hamper their perception of competence. Therefore, to encourage sport participation P.E. teachers and sport administrators should revisit current sport and P.E. programmes to minimise those situations that could create the feeling of anxiety among participants. For example, Passer (1983) has pointed out that worry about poor performance and negative evaluation from significant others were the main sources of anxiety. In the recent educational reform in Hong Kong, student assessment has been heavily stressed in all areas, including the domain of physical education. To decrease the occurrence of anxiety, assessment should be minimised and, if deemed necessary, should be conducted in such a way that the threat of evaluation is reduced; for example being tested whilst working in a group rather than being individually assessed.

Other significant relationships between different constructs

Significant and strong relationships were found between extrinsic motivation and intrinsic motivation, between task goal orientation and intrinsic motivation, and between task goal orientation and ego goal orientation. Besides having a direct influence; these motivational attributes sometimes exerted an indirect influence through some kind of mediator, and their effects should not be neglected. For example, in the correlation analysis, task goal orientation was weakly related with perceived sport competence but the relationship with intrinsic motivation was strong; thus, task goal orientation may influence perceived sport competence through the mediation of intrinsic motivation. Path analysis, a kind of structural equation modelling method, was used to further analyse the data to verify the interaction of these relationships with regard to their ability to influence perceived sport competence.

Path analysis on the prediction of perceived sport competence by motivational variables of intrinsic/extrinsic motivation, amotivation, task/ego goal orientation and competitive trait anxiety

A proposed model was built and tested with the data collected from the current study to investigate the relationships among different factors of intrinsic and extrinsic motivation, amotivation, goal orientation and anxiety, and examined their predictive ability with regard to perceived sport competence. The proposed model showed that over 16% of the variance in perceived competence was accounted for by the factors of types of motivations, goal orientations and anxiety. This was a modest prediction given the likelihood that much less variance in perceived sport competence would be predicted from such a model. Nevertheless, given the importance of sport participation for young people in this current society where health is a main concern, this 16% is certainly meaningful if teachers are able to increase their students' sport involvement

by equivalent amounts. With regard to the source of perceived sport competence, intrinsic motivation and extrinsic motivation played a positive role that might enhance the feeling of competency; while anxiety and amotivation played a negative role that might deter perceived sport competence.

One major finding of the path analysis confirmed the influence of competitive trait anxiety on perceived sport competence. Among the different variables, competitive trait anxiety served as the strongest predictor which was able to explain 6% of the variance of perceived sport competence. This finding clarified the role of competitive trait anxiety in perceived competence that was not clear in some of the previous studies (Brustad, 1988; Brustad & Weiss, 1987; Passer, 1983). Furthermore, the finding was in accordance with the Harter's competence motivation theory which states that affective experiences in sport, such as anxiety, are directly related to underlying perceptions of self-worth, personal ability, and internal control over outcomes, and that these are the fundamentals of an individual's perception of competence.

In order to maintain or enhance an individual's feeling of competence, the environment should be controlled such that perceptions of threats and/or thoughts that signify some kind of threat must be minimised. In school physical education classes, this kind of threatening feeling most likely arose when the students felt that they were being assessed by their teachers or judged by their peers. This finding alerts educationalists and school administrators that over-assessment or assessment-centred curriculum can have an adverse effect on students' intentions for sport participation.

Results also revealed that anxiety and amotivation were inter related, or that there existed a reciprocal effect between the two variables. Anxiety could have decreased children's desires to participate and, essentially lead to their amotivation. Also, students that had a lack of intent to engage in sport activities would have been more

likely to generate anxious feelings when they were required to take part in physical activities. Both amotivation and competitive trait anxiety tended to lower an individual's perceived competence. This finding once again emphasised the importance of providing fun and opportunities of success for students by selecting appropriate and meaningful activities during physical activity sessions.

Both extrinsic motivation and intrinsic motivation were significant predictors of perceived sport competence. This result is in accordance with previous studies (Ferrer-Caja & Weiss, 2000; Klint & Weiss, 1987; Markland, 1999; Weigand & Broadhurst, 1998; Williams & Gill, 1995). The two types of motivation also served as strong mediating variables in the task goal orientation and perceived sport competence relationship.

Task goal orientation did not demonstrate a direct and positive link with perceived competence as found in previous studies (Duda & Nicholls, 1992; Seifriz et al., 1992), but findings were in agreement with other studies (Duda et al., 1992; Duda et al., 1995) whereby strong relationships were found with intrinsic motivation and extrinsic motivation. This implied that adopting a task goal orientation would not directly enhance perceived competence. However, through adopting a task goal orientation, the level of intrinsic and extrinsic motivation could effectively be heightened. Through the mediators of intrinsic and extrinsic motivations, perceived sport competence could be enhanced. In view of this, P.E. teachers and sport administrators should work towards installing self-referenced criteria for defining competence among students and young athletes when designing the P.E. curriculum or selection of sport activities. Also, it is important to empower young people to consider that ability is an acquirable skill as this can result in enhanced perceptions of self-efficacy as noted by Jourden et al. (1991).

In the current study, ego goal orientation did not show a significant facilitating

effect on perceived competence which was congruent with previous research (Duda et al., 1995; Seifriz et al., 1992). This finding implied that when participating in sport activities, individuals who always intend to outperform others and appraise their ability with reference to others' performances are not likely to foster their perceived competence. Consequently, teachers and sport administrators should avoid emphasising comparison with others during P.E. lessons and sport activities.

In comparing the models between males and females, one notable difference could be observed. The relationship between perceived competence and extrinsic motivation was higher in males than females; on the other hand, the relationship between perceived sport competence and intrinsic motivation was higher for females. This difference implied that males developed their perceptions of competence based on extrinsic motivators; that is, when they received praise or tangible rewards, their impact of these rewards would be more likely to make them feel competent than the same would for females. In contrast, having joy and satisfaction when participating in physical activities, would be more likely to heighten females' perceptions of competency.

Whilst previous research has assessed the relationship of gender differences toward intrinsic and extrinsic motivation, results have indicated that gender differences were not prominent (Fortier et al., 1995; Petherick & Weigand, 2002). This finding was not observed when analysing the descriptive data in the current study, as males scored higher in both intrinsic and extrinsic motivations; however, the correlation results revealed that females demonstrated higher coefficients in both relationships from the path analysis. The finding implied that when organising sport activities for female students, P.E. teachers and sport administrators should concentrate on the interest of the activity itself; while for males, in addition to the activity, educators should be ready to provide some kind of praise or tangible reward

to foster feelings of competence.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

SUMMARY OF RESEARCH PROGRAMME

The purpose of the present investigation was to explore the relationships between perceived sport competence and other motivational constructs of intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety for junior secondary school children in Hong Kong, in light of Harter's competence motivation theory (1978, 1981). Besides, the effects of gender, educational level (age) and level of participation were also examined. The investigation was guided by the following two questions:

1. How do differences in gender, age and level of participation in sport and physical activities relate to perceived sport competence, intrinsic/extrinsic motivation, goal orientation and competitive trait anxiety?
2. What are the relationships between perceived sport competence and intrinsic/extrinsic/amotivation, motivational orientations of task/ego goals, and low/high competitive trait anxiety?

Two studies were conducted for the validation of measuring instruments that were used in the Main Study. The research has successfully developed and validated several measuring instruments for use in the Chinese population; specifically they are: the Chinese version of Self-Perception Profile for Children (SPPC-Chi), the Chinese version of Sport Motivation Scale (SMS-Chi), the Chinese version of Task and Ego Orientation in Sport Questionnaire (TEOSQ-Chi) and the Chinese version of Sport Competition Anxiety Test (SCAT-Chi).

A Pilot Study was conducted to further verify the measuring instruments and to assess the feasibility of the large scale Main Study by examining the different aspects

of motivational orientations to be studied. Analyses of data from the Pilot Study also provided a preliminary model to explore the interaction of various motivational variables for the prediction of perceived sport competence in the Main Study.

The results from the Main Study suggested that participants in the study adopted a positive attitude towards participation in sport and physical activities that was characterised by higher scores in task goal orientation over ego goal orientation, and intrinsic motivation over extrinsic motivation. Yet, they did not perceive themselves fully competent in sport skills, suffered considerable anxiety in sport participation and sometimes had the feeling of not being motivated to participate in sport and physical activities.

Gender differences were apparent whereby females valued the goal of participation to be more important than males, while the latter cohort valued enjoyment more when participating in sport and physical activities. Also, males perceived themselves to be more competent in sport skills, while females were more anxious in sport participation. In turn, this led to the notion of predictably higher attrition rates for females than males in sport and physical activities. Another important finding from the path analysis concerning gender differences was that males tended to establish their perceptions of competence based on extrinsic motivators, while females were more reliant upon intrinsic motivators.

In the examination of age differences, it was found that as children grew older, they were less motivated to participate in sport and physical activities. This result was reflected by their lower scores in intrinsic/extrinsic motivation and goal orientations, and also the relatively higher scores in amotivation and anxiety when they moved to higher educational level.

In comparing levels of participation in sport and physical activities, more participation (i.e., individuals in the 'training' and 'recreation' groups) was associated

with the presence of greater perceived sport competence, intrinsic/extrinsic motivation and task/ego goal orientations, and also lower levels of amotivation and competitive trait anxiety. However, the notable finding was that high levels of participation - such as that for the 'training' group – were not required to attain positive findings as above; rather that some kind of participation – such as that for the 'recreation' group in this sample – indicated the greatest benefits, as seen from their significantly higher scores in all 'favourable' factors and lower scores in 'unfavourable' factors towards sport participation.

In the examination of the relationships between perceived sport competence with the other motivational constructs, among the different constructs it was found that competitive trait anxiety had the strongest (albeit negative) influence on perceived sport competence. Intrinsic motivation and extrinsic motivation, on the other hand, played a facilitative role by demonstrating a significant positive relationship with perceived sport competence. Similar to competitive trait anxiety amotivation demonstrated a debilitative effect. Ego orientation was shown not to be related with perceived sport competence, and the support for the hypothesised relationship between task goal orientation and perceived sport competence was significant but weak. Further investigation with the path analysis indicated that the effect of task goal orientation on perceived sport competence was mediated through intrinsic and extrinsic motivation.

PRACTICAL IMPLICATIONS

In light of Harter's competence motivation theory (1978, 1981), and based on results from this study, there are several practical implications that can be highlighted. Whilst recognising the important role of perceived sport competence in the participation of sport and physical activities, sport educators, teachers and administrators should take appropriate measures to nurture perceptions of competency for children in the domain of sport and physical activity participation.

In light of the findings from this programme of studies, the following recommendations are made in regard to physical education settings for Hong Kong school children. Intrinsic and extrinsic motivation should be promoted to foster children's feeling of competence; minimise anxious feelings during participation; prevent amotivation in sport and physical activity participation; and emphasise task goals which can heighten both intrinsic and extrinsic motivation and, subsequently, contribute to children's perceptions of competence.

It is recommended, therefore, that children should be provided with several opportunities to be involved in physical activities. Special attention should be given not only to the opportunities, but more importantly to the enjoyable and successful experiences of children in sport and physical activity contexts. Enjoyment and positive affect can contribute to both the intrinsic and extrinsic motivation of children (Vlachopoulos et al., 2000); while success is essential to inoculate against amotivation (Harlick & McKenzie, 2000).

It is essential to define success in terms of improvement, effort or skill development so that children learn to widen their scope in terms of how to perceive their own physical capabilities and ability to embrace the joy of success. Use of positive encouragement combined with instructional reinforcement will also increase

opportunities for success, as well as increase children's enjoyment in sport activity (Hu, 2001).

In general, the wide-ranging individual differences among students should be considered. Some students may be good at certain activities but not in other activities. Therefore, choices should be given to schoolchildren so that they can take part in activities that suit their interests and abilities, and school PE programmes should be individualised to a great extent. Logistically, in most circumstances it is not easy for regular PE lessons to provide several choices for schoolchildren due to resource constraints (Curriculum Development Council, 2000). Therefore, as recommended in other studies (Harrison, 2003; Mokgwathi, 2005), extra-curricular sport and physical activities can offer greater flexibility and can be developed and conducted to supplement regular PE lessons. By participating in extra-curricular activities due to personal choice, children can pursue excellence in certain sport and physical activities for which they are interested. This process will in turn develop their feelings of success and perceptions of competence.

To reduce the level of anxiety for children when participating in sport and physical activities, PE teachers and sport administrators should provide support for children. Activities should be appropriate to the level of students and provide choices for them when there are challenging tasks. Also, assessment should be reduced or structured in such a way to minimise anxiety; for instance, group assessment with peer support. Instead of being aimed at providing a grading, assessment should help students to learn and heighten their feelings of competence, to further encourage and sustain their participation. In the context of sport and PE, there are many activities and skills such that it is not feasible for students to be expected to be competent in all areas. If they have to be assessed in areas for which they are not interested and/or not competent, then they will unavoidably have the feeling of high anxiety which will

hamper their motivation for further participation. Thus, good practice that is exercised in some schools (Hong Kong sports Development Board, 2001; Wong, 1999) includes allowing students to select the kind of activity that they are interested in and competent at for assessment purposes. Students can be relieved of their anxiety toward assessment and, in turn, this process can nurture a feeling of competence towards sports participation.

In line with previous research (Brunel, 1999), the findings of this current study suggested that adopting a task goal orientation can effectively enhance both intrinsic and extrinsic motivation and, in turn, contribute to perceived sport competence. In school PE programmes, it is most ideal to develop both task and ego goal orientations as suggested by Fox (1994); however, in actual circumstances, social comparisons are common in sport and physical activity scenarios. For example, it is a common practice in Hong Kong that after teaching running skills, students are often asked to compete against each other. The judgement of their competence is often based on the win-loss results. Also, quite often only those students who are outstanding are honoured.

Physical educators should take steps to change this situation.

For example, physical educators and sport administrators can convey the idea that PE and sport activity is concerned with self-challenges and improvements. In the implementation of sport and PE programmes, the emphasis can be on development of individual team skills, setting personal goals, encouragement of cooperative efforts and emphasis of mastery of tasks (Duda, 1992; Fox, 1994).

Assessment should also be designed in line with this suggestion. Hence, use of criteria-referenced evaluation which is based on personal performance would be preferred to norm-referenced evaluation where comparison with others is made. Also, checklists for skill accomplishment can be used and awards given according to prescribed criteria rather than based on social comparison.

At present, the school PE curriculum is dominated by competitive sport activities such as athletics and major ball games which have special emphasis on formal competitions. Devereux (1976) has indicated that children may be robbed of valuable learning experiences because formal competition undermines informal games and the ability to organise and run games themselves. School physical educators can strive to help school children to recognise their personal improvement in these formal competitive activities, and it is also recommended that informal non-competitive physical activities such as Tai Chi, challenge courses, gymnastics and jazz be included in the curriculum.

According to the Hong Kong Sport Participation Survey (Hong Kong Sports Development Board, 2001), over the 3-year survey period (1999 to 2001) the percentage of young females actively involved in sport increased by 14 points (from 49% to 63%), in contrast with young males who increased by only 4 points (from 64% to 68%). This has been an enlightening trend in terms of female participation in physical activities. However, this study revealed that males were essentially more active in participating in sport and physical activities. Males in this study tended to enjoy and perceive themselves more competent when participating in sport and physical activities.

When considering the trend of PE lessons in Hong Kong, there also exist favourable and unfavourable conditions for encouraging females to participate in sport and physical activities. Favourably, there have been a growing amount of activities that are being incorporated in the school PE curriculum, that cater for the interest of female students such as rhythmic activities, aerobic classes, netball and outdoor adventurous activities. However, there has also been a trend to have co-educational classes for physical education where males and females have activities together. In one sense, this can enable cooperation and promote understanding between male and

female students; but when adopting a competence point of view, the physical superiority of males may unavoidably nurture a sense of low competence among females. The effect has yet to be seen, but this is an issue of which PE teachers and sport administrators should be aware.

Another finding that concerned PE teachers and sport administrators in this study was that as students grew older, they were less motivated to participate in sport and physical activities, as reflected by their lower scores in certain types of motivation and higher scores in anxiety and amotivation. This finding raises concerns with the current design of school PE curriculum as to whether students' needs and interests have been addressed, as well as whether opportunities of success and enjoyment were offered during implementation. Again, it is recommended that students' interests be considered in the selection of activities and that those activities be practical and meet the maturity level of students. Recently, the trend of relating body image and developing health-related fitness within the school PE curriculum in Hong Kong (Curriculum Development Council, 2000; Louie & Yuen, 2002) was a practical and constructive move in re-structuring the curriculum, especially when considering that children move into adolescence in their junior secondary years, and they are more aware of their body image. Students believed that regular physical activities promotes health and allows them to have a better body shape, and they can gain satisfaction and enjoyment through participation in physical activities. Thus, this should be the future direction for the promotion of sport and physical activities.

Another issue concerning the curriculum design is the introduction of the new 3-3-4 system in the coming academic year (September, 2006). Under the new academic structure, a New Senior Secondary (NSS) curriculum will be implemented in September, 2009. PE is one of the elective subjects that leads into the Hong Kong Diploma of Secondary Education, and the rationale of the elective subjects is that they

will build a foundation for post secondary education. Therefore, it is fully justified that the curriculum of the PE elective is built on the “scientific functionalism” concept (Siedentop, 1994, pp.62-64) to gain acceptance at university level and thus increase resources for the development of PE. However, it is important to stress that not all students will select PE as an elective. It has been documented in the curriculum guide that in all levels of basic education (Primary 1 to Secondary 6, equivalent to Grade 1 to Grade 12 in U.K.), all students are required to attend general PE class which constitutes at least 5% of the total lesson time. It is the concern of physical educators that this general PE will not be based too much on an academically-oriented study under the influence of the PE elective. The general PE class still has the mission of cultivating a health concept and exercise habit among all students. Thus, content of the general PE should be based on meaningful activities that address the needs of students rather than include mainly academic knowledge.

The finding that some degree of participation was most beneficial to students in terms of motivation towards participation was in line with a previous study conducted in Hong Kong (Fu, Chow, Chung & Louie, 1998). This finding also sets the target for the promotion of sport and physical activities in children. PE teachers and sport administrators should organise and promote regular sport programmes that allow more students to participate and also enable them to maintain their interest rather than just investing in elite athletes for competitions. There are still some schools in Hong Kong that are rooted in the premise that PE classes are the places where Olympic athletes are born (Wong, 1999). This production of a minority of athletes has traditionally been achieved at the expense of the mass of students.

It is not only schools they need to change their perspectives towards sport and physical activities, but also government that needs to re-evaluate their developmental plan for sport. According to a recent study on sport development among Asian

countries (Waters & Smith, 2002), by using the National Sport Development Index (NSDI) which was comprised of three domains representing a nation's sport delivery system, Hong Kong ranked 1st in elite sport, but 6th in mass sport and 7th in educational sport among 14 nations. This reflected the skewing of the national psyche towards elite sport in Hong Kong. In spite of the heavy investment, Hong Kong failed to bid for the 2006 Asian Games, and scarcely had any significant achievements in international sports. The allocation of resources needs to be re-considered, for example, more investment in educational sport and mass sport as suggested in a recent study (Fu, 2002).

The importance of participation in sport and physical activities has been stressed in Hong Kong. Different government departments in Hong Kong, such as the Education and Manpower Bureau, Leisure and Cultural Department, have been working hard and investing money for the achievement of this aim. However, participants' motives towards participation in sport and physical activities need to be further considered in order to develop effective measures and policies for the implementation of sport programme.

FUTURE DIRECTIONS

The current study examined the motivation of junior secondary school students in Hong Kong towards participation in sport and physical activities, in light of Harter's competence motivation theory (1978, 1981). Specific recommendations are made for PE teachers and sport administrators in the planning and implementation of sport programmes and PE school curriculum. This study also provides a basis for future investigations and directions.

Some of the findings in this research are not in line with the main stream studies in the West. For example, participants in this study had a high perception in both task and ego goal orientations. In fact, most of the published research in sport psychology has been conducted with Western participants. There have been critiques in the literature that cite the necessity for ethnic and cultural factors to be incorporated in the research (Duda & Allison, 1990; Markus & Kitayama, 1991; Si, 2000). More cross-cultural studies are required to verify the generalisability of existing theories and to explore variations between different cultures as a means to develop relevant theory and practice that is adapted for the diversity of cultures.

With the establishment of the Hong Kong Society of Sport and Exercise Psychology in 2003, there has been an expansion in research activity in Hong Kong in the area of sport and exercise psychology. With this increase of activity, there has been a growing demand for development of validated measuring instruments in this area. Thus, translation, validation and adoption of existing validated measuring instruments in sport and exercise psychology is an important area of research activity, and this programme of studies can be considered an important step toward achieving this objective for Hong Kong.

Another highlight of Harter's competence motivation theory (1978, 1981) was the role of significant others in shaping children's self-perceptions. Significant adult influence in the form of parents and teachers, and peer group influence that includes support and socialisation can have a detrimental influence on an individual's perception of competence, according to the theory. In consideration of a unique Eastern culture, where the family influence has primary importance, it is worthwhile to investigate how these social factors play a role in influencing children's motive towards participation in sport and physical activities in Hong Kong.

Concerning the methodology of study, children in this research project were asked to fill out paper-and-pencil measures. Responses to paper-and-pencil questionnaires do not necessarily indicate how a person will behave or feel in real world situations. The responses only indicate the individual's attitude to hypothetical situations (Philips, 1993), unlike behaviour which involves real reactions with real consequences. Future studies should include methods to capture children's real behaviours in physical education classes. For example, it would be useful to incorporate qualitative measures such as individual interviews and focus group approaches, as well as systematic observational techniques that examine children's actual behaviours and which relate to competence achievements. Qualitative methods provide children with opportunities to explain their sport experiences and provide additional depth of explanation to that of questionnaires.

As noted by Weiss and Petlichkoff (1989), longitudinal research on children's participation motivation would give us more information on the change of motives across different participatory phases of sport involvement. Petlichkoff (1996) further suggested that this kind of study can be achieved through the pre- and post-participation assessments via youth sport organisations, and can assess the specific programmatic, social, and interpersonal factors that affect participation

motivation in youth sport.

In addition to investigation-based studies, interventions or experimentally-based research is recommended for future studies which can include manipulation of the physical and social context of sport. For example, studies can be conducted with school children to examine the effect on perceived sport competence by promoting a mastery climate within a competitive sport context, and the effect on their behaviour towards sport participation. The results from such studies would offer successful intervention strategies to maintain or increase motivation for further participation.

According to Weiss and Ferrer-Caja (2002), there are many factors, such as the perception of the environment, the feeling of affiliation, that influence the formation of perceptions of ability and likelihood to maintain motivation in sports. Additional research is thus warranted to explore and generate information on other factors that influence children's motivation.

CONCLUSIONS

In conclusion, the purpose of this study was to study children's participation in sport and physical activities by examining the relationships between perceived sport competence and other motivational constructs of intrinsic/extrinsic motivation, task/ego goal orientation and competitive trait anxiety. Other variables of gender, age and level of participation in sport and physical activities were also considered. The findings from this study confirmed the effect of anxiety on perceived sport competence and the direct relationship between intrinsic/extrinsic motivation and perceived competence. Considerable differences were revealed on gender, age and level of participation in sport and physical activities. In addition, this study employed the path analysis technique, through structural equation modelling using EQS, identified the structure of the relationships between intrinsic/extrinsic motivation, task goal orientation, anxiety and perceived competence.

Understanding the variables that influence school children in sport participation and how they interact is important for helping young people to develop a healthy habit of exercise adherence. While previous sport motivational researches have been studied mostly on western culture, the results from this study can supplement to the existing knowledge by incorporating information obtained in Hong Kong. Thus, it is anticipated that research of this kind will prosper when sport administrators realize that the behaviour of the children have to be considered for the development of effective sport and physical activity programmes.

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APPENDIX I

What I Am Like

Name _____ Age _____

Birthday _____ Group _____

Month _____ Day _____

Boy or Girl (circle which)

SAMPLE SENTENCE

(a) Really Sort of

True True
for me for
 me

Sort of Really

True True
for For me
me

- | | | | |
|----|---|---|---|
| 1. | <input type="checkbox"/> <input type="checkbox"/> | <p>Some kids would BUT Other kids would</p> <p>rather play outdoors rather watch T.V.</p> <p>in their spare time</p> | <input type="checkbox"/> <input type="checkbox"/> |
| 2. | <input type="checkbox"/> <input type="checkbox"/> | <p>Some kids feel that BUT Other kids <i>worry</i></p> <p>they are very <i>good</i> about whether they</p> <p>at their school work</p> | <input type="checkbox"/> <input type="checkbox"/> |
| 3. | <input type="checkbox"/> <input type="checkbox"/> | <p>Some kids find it BUT Other kids find it's</p> <p><i>hard</i> to make pretty <i>easy</i> to make</p> <p>friends friends.</p> | <input type="checkbox"/> <input type="checkbox"/> |
| 4. | <input type="checkbox"/> <input type="checkbox"/> | <p>Some kids do very BUT Other kids <i>don't</i></p> <p><i>well</i> at all kinds of feel that they are</p> <p>sports very good when it</p> <p>comes to sports.</p> | <input type="checkbox"/> <input type="checkbox"/> |
| 5. | <input type="checkbox"/> <input type="checkbox"/> | <p>Some kids are BUT Other kids are <i>not</i></p> <p><i>happy</i> with the way happy with the way</p> <p>they look they look.</p> | <input type="checkbox"/> <input type="checkbox"/> |
| 6. | <input type="checkbox"/> <input type="checkbox"/> | <p>Some kids often do BUT Other kids usually</p> <p><i>not</i> like the way <i>like</i> the way they</p> <p>they <i>behave</i> behave.</p> | <input type="checkbox"/> <input type="checkbox"/> |
| 7. | <input type="checkbox"/> <input type="checkbox"/> | <p>Some kids are often BUT Other kids are</p> <p><i>unhappy</i> with pretty <i>pleased</i> with</p> <p>themselves themselves.</p> | <input type="checkbox"/> <input type="checkbox"/> |

	Really True for me	Sort of True for me		Sort of True for me	Really True For me	
8.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids feel like they are <i>just as smart</i> as other kids their age	BUT Other kids aren't so sure and <i>wonder</i> if they are as smart.	<input type="checkbox"/>	<input type="checkbox"/>
9.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids have a <i>lot</i> of friends	BUT Other kids <i>don't</i> have very many friends.	<input type="checkbox"/>	<input type="checkbox"/>
10.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids wish they could be a lot better at sports	BUT Other kids feel they are good enough at sports.	<input type="checkbox"/>	<input type="checkbox"/>
11.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids are <i>happy</i> with their height and weight	BUT Other kids wish their height or weight were <i>different</i> .	<input type="checkbox"/>	<input type="checkbox"/>
12.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids usually do the <i>right</i> thing	BUT Other kids often <i>don't</i> do the right thing.	<input type="checkbox"/>	<input type="checkbox"/>
13.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids <i>don't</i> like the way they are leading their life	BUT Other kids <i>do</i> like the way they are leading their life.	<input type="checkbox"/>	<input type="checkbox"/>
14.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids are pretty <i>slow</i> in finishing their school work	BUT Other kids can do their school work <i>quickly</i> .	<input type="checkbox"/>	<input type="checkbox"/>
15.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids would like to have a lot more friends	BUT Other kids have as many friends as they want.	<input type="checkbox"/>	<input type="checkbox"/>
16.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids think they could do well at just about any new sports activity they haven't tried before	BUT Other kids are afraid they might <i>not</i> do well at sports they haven't ever tried.	<input type="checkbox"/>	<input type="checkbox"/>

	Really True for me	Sort of True for me		Sort of True for me	Really True For me me	
17.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids wish their body was <i>different</i>	BUT Other kids <i>like</i> their body the way it is.	<input type="checkbox"/>	<input type="checkbox"/>
18.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids usually <i>act</i> the way they know they are <i>supposed</i> to	BUT Other kids often <i>don't</i> act the way they are supposed to.	<input type="checkbox"/>	<input type="checkbox"/>
19.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids are <i>happy</i> with themselves as person	BUT Other kids are often <i>not happy</i> with themselves.	<input type="checkbox"/>	<input type="checkbox"/>
20.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids often <i>forgot</i> what they learn	BUT Other kids can remember things <i>easily</i> .	<input type="checkbox"/>	<input type="checkbox"/>
21.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids are always doing things with <i>a lot</i> of kids	BUT Other kids usually do things <i>by themselves</i> .	<input type="checkbox"/>	<input type="checkbox"/>
22.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids feel that they are <i>better</i> than others their age at sports	BUT Other kids <i>don't</i> test they can play as well.	<input type="checkbox"/>	<input type="checkbox"/>
23.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids wish their physical appearance (how they look) was <i>different</i>	BUT Other kids <i>like</i> their physical appearance the way it was.	<input type="checkbox"/>	<input type="checkbox"/>
24.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids usually get in <i>trouble</i> because of things they do	BUT Other kids usually <i>don't</i> do things that get them in trouble.	<input type="checkbox"/>	<input type="checkbox"/>
25.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids like the kinds of <i>person</i> they are	BUT Other kids often wish they were someone else.	<input type="checkbox"/>	<input type="checkbox"/>

	Really True for me	Sort of True for me		Sort of True for me	Really True for me	
26.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids do very well at their classwork	BUT Other kids <i>don't</i> do very well at their classwork.	<input type="checkbox"/>	<input type="checkbox"/>
27.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids wish that more people their age liked them	BUT Other kids feel that most people their age <i>do</i> like them.	<input type="checkbox"/>	<input type="checkbox"/>
28.	<input type="checkbox"/>	<input type="checkbox"/>	In games and sports some kids usually <i>watch</i> instead of <i>play</i>	BUT Other kids usually <i>play</i> rather than just <i>watch</i> .	<input type="checkbox"/>	<input type="checkbox"/>
29.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids wish something about their face or hair looked <i>different</i>	BUT Other kids <i>like</i> their face and hair the way they are.	<input type="checkbox"/>	<input type="checkbox"/>
30.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids do things they know they <i>shouldn't</i> do	BUT Other kids <i>hardly</i> ever do things they know they shouldn't do.	<input type="checkbox"/>	<input type="checkbox"/>
31.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids are very <i>happy</i> being the way they are	BUT Other kids wish they were <i>different</i> .	<input type="checkbox"/>	<input type="checkbox"/>
32.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids have <i>trouble</i> figuring out the answers in school	BUT Other kids almost <i>always</i> can figure out the answers.	<input type="checkbox"/>	<input type="checkbox"/>
33.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids are <i>popular</i> with other their age	BUT Other kids are not <i>very popular</i> .	<input type="checkbox"/>	<input type="checkbox"/>
34.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids <i>don't</i> do well at new outdoor games	BUT Other kids are <i>good</i> at new games right away.	<input type="checkbox"/>	<input type="checkbox"/>

	Really True for me	Sort of True for me		Sort of True for me	Really True For me me	
35.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids think that they are good looking	BUT Other kids think that they are not very good looking.	<input type="checkbox"/>	<input type="checkbox"/>
36.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids behave themselves very well	BUT Other kids often find it hard to behave themselves.	<input type="checkbox"/>	<input type="checkbox"/>
37.	<input type="checkbox"/>	<input type="checkbox"/>	Some kids <i>are</i> not very happy with the way they do a lot of things	BUT Other kids think the way they do things <i>is fine.</i>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX II

Sport Motivation Scale

Why do you practise your sport?

Using the scale below, please indicate to what extent each of the following items correspond to one of the reasons for which you are presently practising your sport.

Does not corresponds at all Corresponds moderately Corresponds exactly

- | | |
|---|---------------|
| 1. For the pleasure I feel in living exciting experiences. | 1 2 3 4 5 6 7 |
| 2. For the pleasure it gives me to know more about the sport that I practice. | 1 2 3 4 5 6 7 |
| 3. I used to have good reasons for doing sport, but now I am asking myself if I should continue doing it. | 1 2 3 4 5 6 7 |
| 4. For the pleasure of discovering new techniques. | 1 2 3 4 5 6 7 |
| 5. I don't know anymore, I have the impression that I am incapable of succeeding in this sport. | 1 2 3 4 5 6 7 |
| 6. Because it allows me to be well regarded by people that I know. | 1 2 3 4 5 6 7 |
| 7. Because, in my opinion, it is one of the best ways to meet people. | 1 2 3 4 5 6 7 |
| 8. Because I feel a lot of satisfaction while mastering certain difficult training techniques. | 1 2 3 4 5 6 7 |
| 9. Because it is absolutely necessary to do sports if one wants to be in shape. | 1 2 3 4 5 6 7 |

10. For the prestige of being an athlete.	1 2 3 4 5 6 7
11. Because it is one of the best ways I have chosen to develop other aspects of myself.	1 2 3 4 5 6 7
12. For the pleasure I feel while improving some of my weak points.	1 2 3 4 5 6 7
13. For the excitement I feel when I am really involved in the activity.	1 2 3 4 5 6 7
14. Because I must do sport to feel good about myself.	1 2 3 4 5 6 7
15. For the satisfaction I experience while I am perfecting my abilities.	1 2 3 4 5 6 7
16. Because people around me think it is important to be in shape.	1 2 3 4 5 6 7
17. Because it is a good way to learn lots of things which could be useful to me in others areas of my life.	1 2 3 4 5 6 7
18. For the intense emotions that I feel while I am doing a sport that I like.	1 2 3 4 5 6 7
19. It is not clear to me anymore; I don't really think my place is in sport.	1 2 3 4 5 6 7
20. For the pleasure that I feel while executing certain difficult movements.	1 2 3 4 5 6 7
21. Because I would feel bad if I was not taking time to do it.	1 2 3 4 5 6 7
22. To show others how good I am at my sport.	1 2 3 4 5 6 7
23. For the pleasure that I feel while learning training techniques that I have never tried before.	1 2 3 4 5 6 7

24. Because it is one of the best ways to maintain good relationships with my friends. 1 2 3 4 5 6 7
25. Because I like the feeling of being totally immersed in the activity. 1 2 3 4 5 6 7
26. Because I must do sports regularly. 1 2 3 4 5 6 7
27. For the pleasure of discovering new performance strategies. 1 2 3 4 5 6 7
28. I often ask myself; I can't seem to achieve the goals that I set for myself. 1 2 3 4 5 6 7

APPENDIX III

Task and Ego Orientation in Sport Questionnaire

	Strongly disagree		Strongly agree
I feel most successful in sport when.....			
I learn a new skill and it makes me want to practise more.	1	2	3
I'm the only one who can do the play or skill.	4	5	
I learn something that is fun to do.	1	2	3
I can do better than my friends.	4	5	
I learn a new skill by trying hard.	1	2	3
The others can't do as well as me.	4	5	
I work really hard.	1	2	3
Others mess up and I don't.	4	5	
Something I learn makes me want to do and practise more.	1	2	3
I score the most points/goals, etc.	4	5	
A skill I learn really feels right.	1	2	3
I'm the best.	4	5	
I do my very best.	1	2	3
	4	5	

APPENDIX IV
Illinois Competition Questionnaire
Form C

Directions: We want to know how you feel about *competition*. You know what competition is. We all compete. We try to do better than our brother or sister or friend at something. We try to score more points in a game. We try to get the best grade in class or win a prize that we want. We all compete in sports and games. Below are some sentences about how boys and girls feel when they compete in sports and games. Read each statement below and decide if *you* HARDLY EVER, or SOMETIMES, or OFTEN feel this way when you compete in sports or games. MARK A if your choice is HARDLY EVER, mark B if you choose SOMETIMES, mark C if you choose OFTEN. There are no right or wrong answers. Do not spend too much time on any one statement. *Remember* to choose the word which describes how you *usually* feel when competing in *sports and games*.

	Hardly Ever	Sometimes	Often
1. Competing against others is fun.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
2. Before I compete I feel uneasy.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
3. Before I compete I worry about not performing well.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
4. I am a good sport when I compete.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
5. When I compete I worry about making mistakes.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
6. Before I compete I am calm.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
7. Setting a goal is important than compete.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
8. Before I compete I get a funny feeling in stomach.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
9. Just before competing I notice my heart beats faster than usual.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
10. I like rough games.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
11. Before I compete I feel relaxed.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
12. Before I compete I feel nervous.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
13. Team sports are more exciting than individual sports.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
14. I get nervous wanting to start the game.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
15. Before I compete I usually get uptight.	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>

APPENDIX V

第五部份：【你是怎樣的人】請細心閱讀下列句子，先考慮左邊一句還是右邊一句較適合用來形容你，再按該句子的正確程度，在適當的英文字母上加橫線(例：[b])。——
你只可以在 a, b, c, d 四個答案中選擇其中一個！

形容我，完全正確

形容我，部份正確

我是一個怎樣的人？

左邊一句還是右邊一句較適合用來形容我？

C01	[a]	[b]	有些同學在各運動項目表現出色	但	其他同學在運動方面並不覺得表現好	[c]	[d]
C02	[a]	[b]	有些同學希望在運動方面大大改善	但	其他同學覺得自己在運動方面已經非常好	[c]	[d]
C03	[a]	[b]	有些同學覺得就算在一些他們從未嘗試過的運動項目，他們也能表現出色	但	其他同學會害怕在一些未嘗試過的運動項目做得不好	[c]	[d]
C04	[a]	[b]	有些同學覺得他們比其他同一年紀的在運動上更出色	但	其他同學不覺得自己在運動上可跟其他人表現得同樣好	[c]	[d]
C05	[a]	[b]	在遊戲或運動時，有些同學通常都是寧願在旁觀看不參與	但	其他同學就通常選擇參與	[c]	[d]
C06	[a]	[b]	有些同學在參加新的戶外遊戲時做得不好	但	其他同學在參與新的遊戲時，立刻表現出色	[c]	[d]
C07	[a]	[b]	有些同學對自己的樣子感覺滿意	但	其他同學不滿意自己的樣子	[c]	[d]
C08	[a]	[b]	有些同學對自己的高度及體重覺得高興	但	其他同學希望能改變自己的高度及體重	[c]	[d]
C09	[a]	[b]	有些同學希望自己的身體跟現在的不同	但	其他同學喜歡他們現在的身體狀況	[c]	[d]
C10	[a]	[b]	有些同學希望自己的身體外貌改變	但	其他同學喜歡他們現時的身體外貌	[c]	[d]
C11	[a]	[b]	有些同學希望自己的面貌和頭髮有些不同	但	其他同學喜歡他們現時的面貌和頭髮	[c]	[d]
C12	[a]	[b]	有些同學覺得自己好看	但	其他同學覺得自己並不太好 看	[c]	[d]

APPENDIX VI

【你參與體育活動的原因】請細心閱讀下列句子：先考慮是否同意，再按同意的程度在適當數字上加橫線(例： [3])。

我參與體育活動是：								完全不適合	完全適合
	1	2	3	4	5	6	7		
M01 因為我能享受刺激的樂趣	1	2	3	4	5	6	7		
M02 因為當我對我所練習的運動項目有更多認識時，我會覺得快樂	1	2	3	4	5	6	7		
M03 我以前有很好的理由參與運動，但我現時開始懷疑自己應否繼續	1	2	3	4	5	6	7		
M04 因為我享受發現新技巧的樂趣	1	2	3	4	5	6	7		
M05 我不知道，我覺得自己不能在這項運動得到成功	1	2	3	4	5	6	7		
M06 因為從參與中，所認識我的人會對我尊敬	1	2	3	4	5	6	7		
M07 因為我認為這是能接觸到其他人的最好方法	1	2	3	4	5	6	7		
M08 因為當我能掌握到一些困難的練習方法後，我會有滿足感	1	2	3	4	5	6	7		
M09 因為如果有好狀態，就一定需要進行體育運動	1	2	3	4	5	6	7		
M10 因為能獲得作為運動員的優越感	1	2	3	4	5	6	7		
M11 因為這是發展我自己其他各方面的最好方法	1	2	3	4	5	6	7		
M12 因為可以在改善自己的弱點時得到快樂	1	2	3	4	5	6	7		
M13 因為在全心投入運動時我會得到刺激	1	2	3	4	5	6	7		
M14 因為我必須要進行運動才覺得舒服	1	2	3	4	5	6	7		
M15 因為在提升自己的能力時，我感到滿足	1	2	3	4	5	6	7		
M16 因為在我四周的人都覺得保持良好狀態很重要	1	2	3	4	5	6	7		
M17 因為這是一個良好機會去學習其他各方面對自己有用的東西	1	2	3	4	5	6	7		
M18 因為在參與一項自己喜愛的運動時，會情緒高漲	1	2	3	4	5	6	7		
M19 我已經不再感覺清楚，我覺得我已經脫離體育圈子了	1	2	3	4	5	6	7		
M20 因為在做出一些困難的動作時，我覺得很快樂	1	2	3	4	5	6	7		
M21 因為如果我不放足夠時間於運動，我會覺得不好受	1	2	3	4	5	6	7		
M22 因為可以讓其他人知道我在這運動的專長	1	2	3	4	5	6	7		
M23 因為在學習到一些以前我從未試過的訓練技巧時，我會感到喜悅	1	2	3	4	5	6	7		
M24 因為這是與我的朋友保持良好關係的最佳方法	1	2	3	4	5	6	7		
M25 因為我喜歡全情投入該活動的感覺	1	2	3	4	5	6	7		
M26 因為我必須定期進行體育活動	1	2	3	4	5	6	7		
M27 因為在發現新的比賽戰術時，我會感到快樂	1	2	3	4	5	6	7		
M28 我經常向自己提出疑問：我好像未能達到我自己所訂立的目標呢！	1	2	3	4	5	6	7		

APPENDIX VII

【你的成功定義】請細心閱讀下列句子：先考慮是否同意，再按同意的程度在適當數字上加橫線
(例：[2])

在參與體育運動時，在以下情況我最會有成功感：	十分 不 同 意	不 同 意	無 意見	同 意	十 分 同 意	
G01 當我掌握一種新技巧而使我更希望多些練習						
G02 當只有我能運用所學的技巧	1	2	3	4	5	
G03 當我學會一些好玩的練習	1	2	3	4	5	
G04 當我比我的朋友做得更好	1	2	3	4	5	
G05 當我在努力學習下，學曉了一種新技巧	1	2	3	4	5	
G06 當其他人沒有我做得那樣好	1	2	3	4	5	
G07 當我的確有認真練習	1	2	3	4	5	
G08 當其他人會弄得一團糟而我不會	1	2	3	4	5	
G09 當新學的一些東西，令我更希望多些練習	1	2	3	4	5	
G10 當我得到最多分	1	2	3	4	5	
G11 當我能夠將所學的技巧，運用自如	1	2	3	4	5	
G12 當我是最好的	1	2	3	4	5	
G13 當我盡力做得最好	1	2	3	4	5	

APPENDIX VIII

【你對比賽的感受】以下句子是一些人對比賽的感受，細閱後，

請選擇你自己在比賽時對這些感受「很少有」、「有時有」或「經常有」，然後在適當數字上加橫線(例： [3])。——

很少有
有時有
經常有

A01 跟其他人比賽很有趣	1	2	3
A02 比賽前我覺得不安	1	2	3
A03 比賽前我擔心表現不好	1	2	3
A04 我比賽時會態度積極	1	2	3
A05 當我比賽時我擔心犯錯	1	2	3
A06 比賽前我很平靜	1	2	3
A07 比賽時訂立目標很重要	1	2	3
A08 比賽前我會覺得肚子異常	1	2	3
A09 賽前我會覺得心跳比平時跳動快	1	2	3
A10 我喜歡粗野遊戲	1	2	3
A11 比賽前我覺得輕鬆	1	2	3
A12 比賽前我覺得緊張	1	2	3
A13 隊際比賽比個人項目更刺激	1	2	3
A14 在等待比賽開始時，我會覺得緊張	1	2	3
A15 比賽前我通常會感覺心情焦躁	1	2	3

APPENDIX IX
Informed Consent Letter

6th September, 2003.

The Principal,

Dear Principal,

Thank you for your consent of allowing me with the help of your P.E. teacher to collect data from your school for the purpose of conducting an educational study. The study investigates the motivation of junior secondary school students towards sport participation in Hong Kong. The sample will involve about 2,400 students from secondary 1 to secondary 3 classes from 12 schools in different areas in Hong Kong. Results collected will be processed and analyzed to generate ideas for the promotion of school sport. This is a purely academic project and results will not be used for any commercial purposes, and any personal data or school names will not be released. All returned questionnaires will be disposed after analysis.

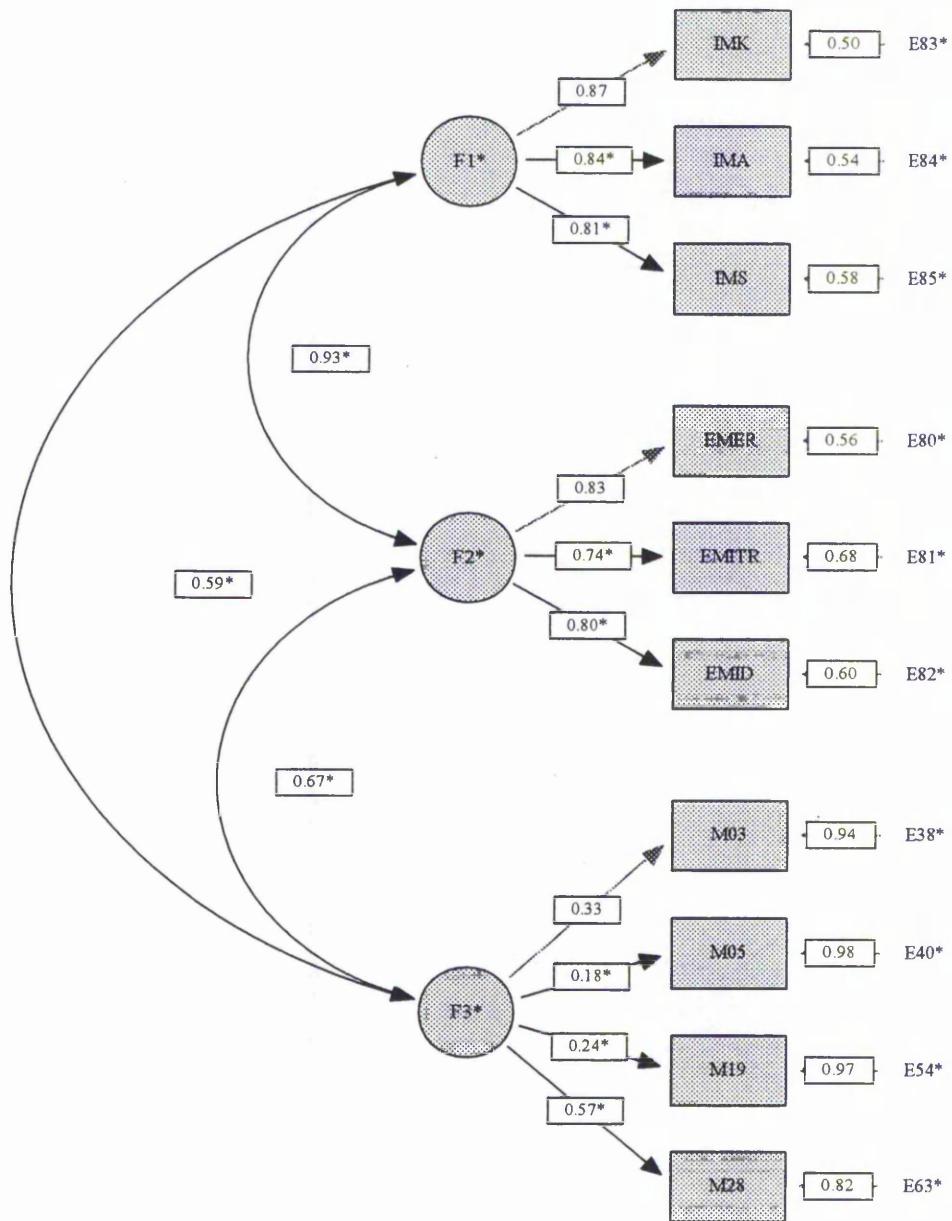
If you are interested in my study and want any additional information, please contact me at 2948 7861. I will be most obliged to supply further information as requested.

Thank you once again for your assistance,

Yours truly,

(TSANG Cheuk-kuen, Eric)
Lecturer,
Department of P.E. & Sports Science,
The Hong Kong Institute of Education.

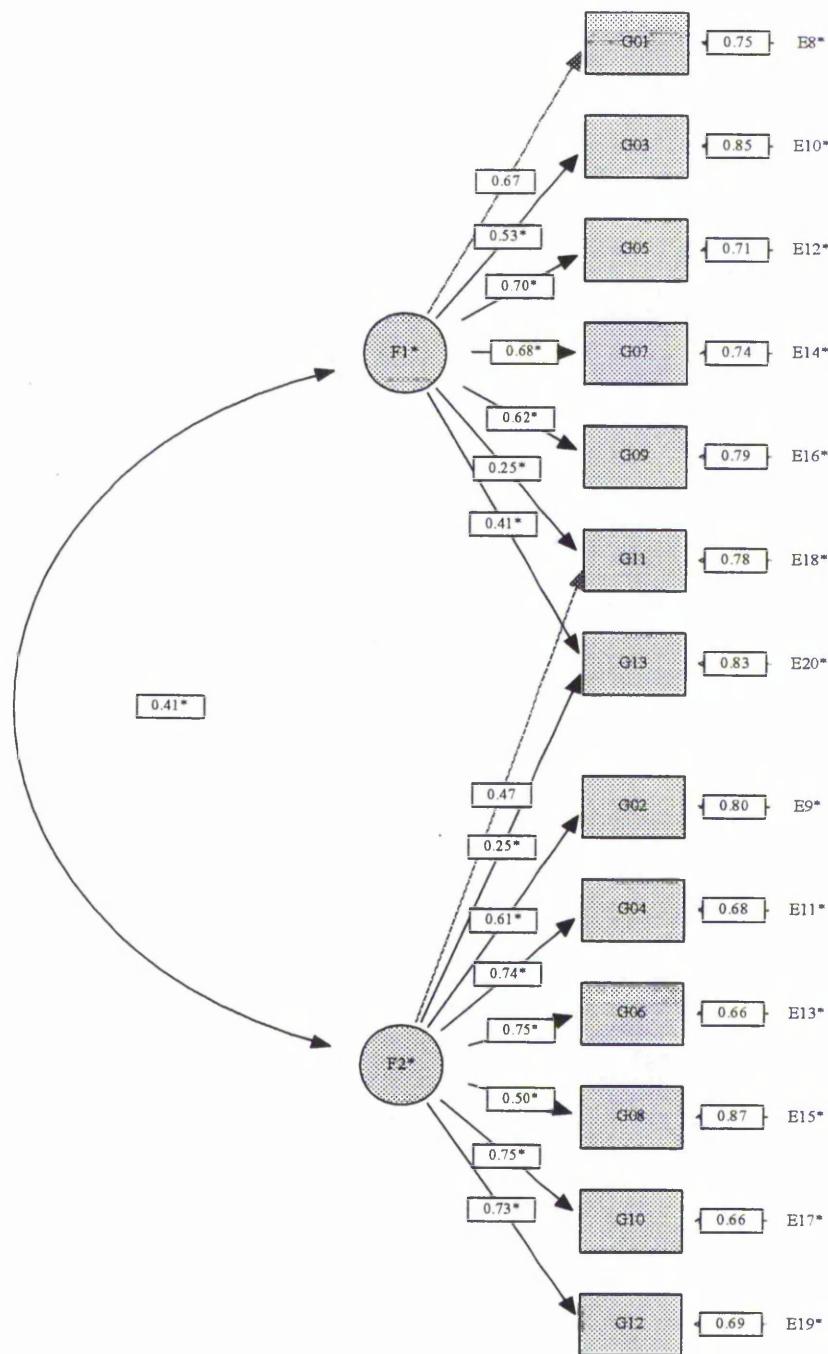
APPENDIX X
Factor Structure for the Simplex Three-Factor Model of SMS-Chi (MM₃)



Note. CFI = .96; SRMR=.05

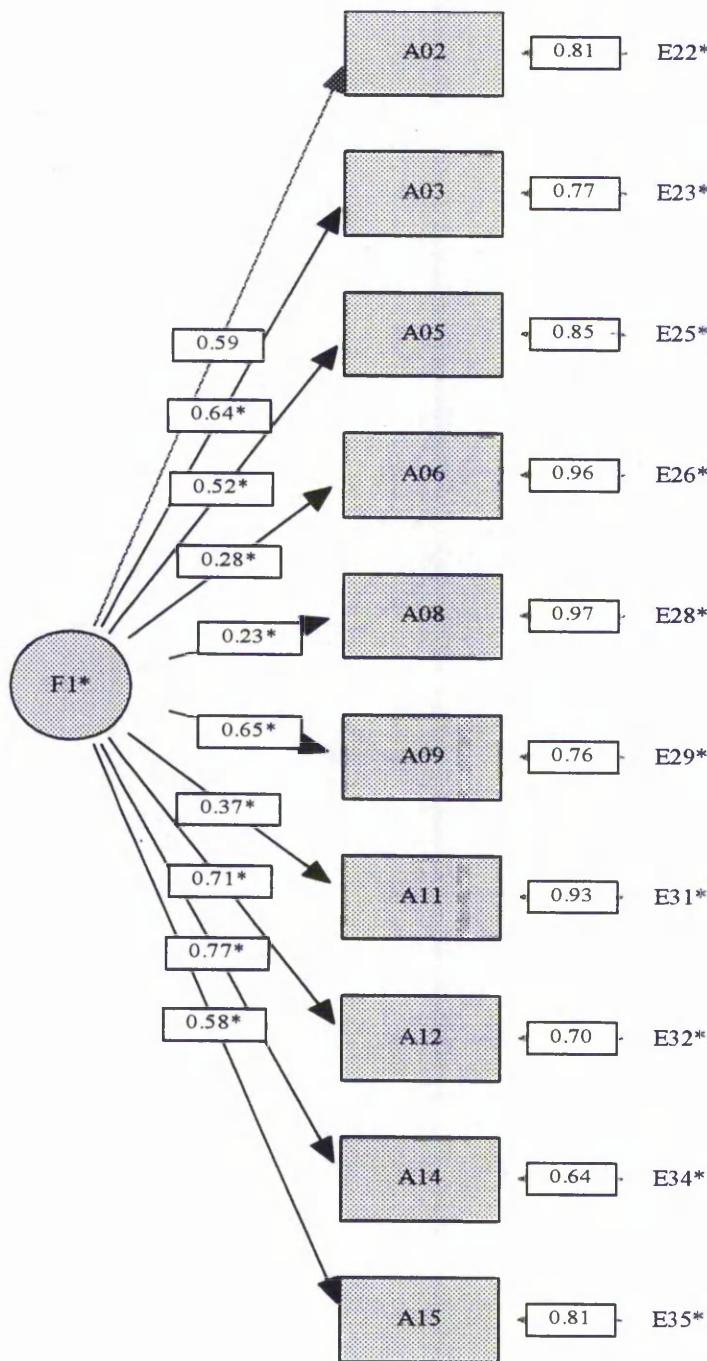
APPENDIX XI

Factor Structure for the Two-Factor Oblique Model Cross Loading of Two Items of TEOSQ-Chi (MG_{c2})



Note. $CFI = .95$; $SRMR = .04$

APPENDIX XII
Factor Structure for the 10-Item Theoretical Model of SCAT-Chi (MA_u)



Note. CFI = .97; SRMR=.04

APPENDIX XIII
Instructions to Self-Perception Profile for Children

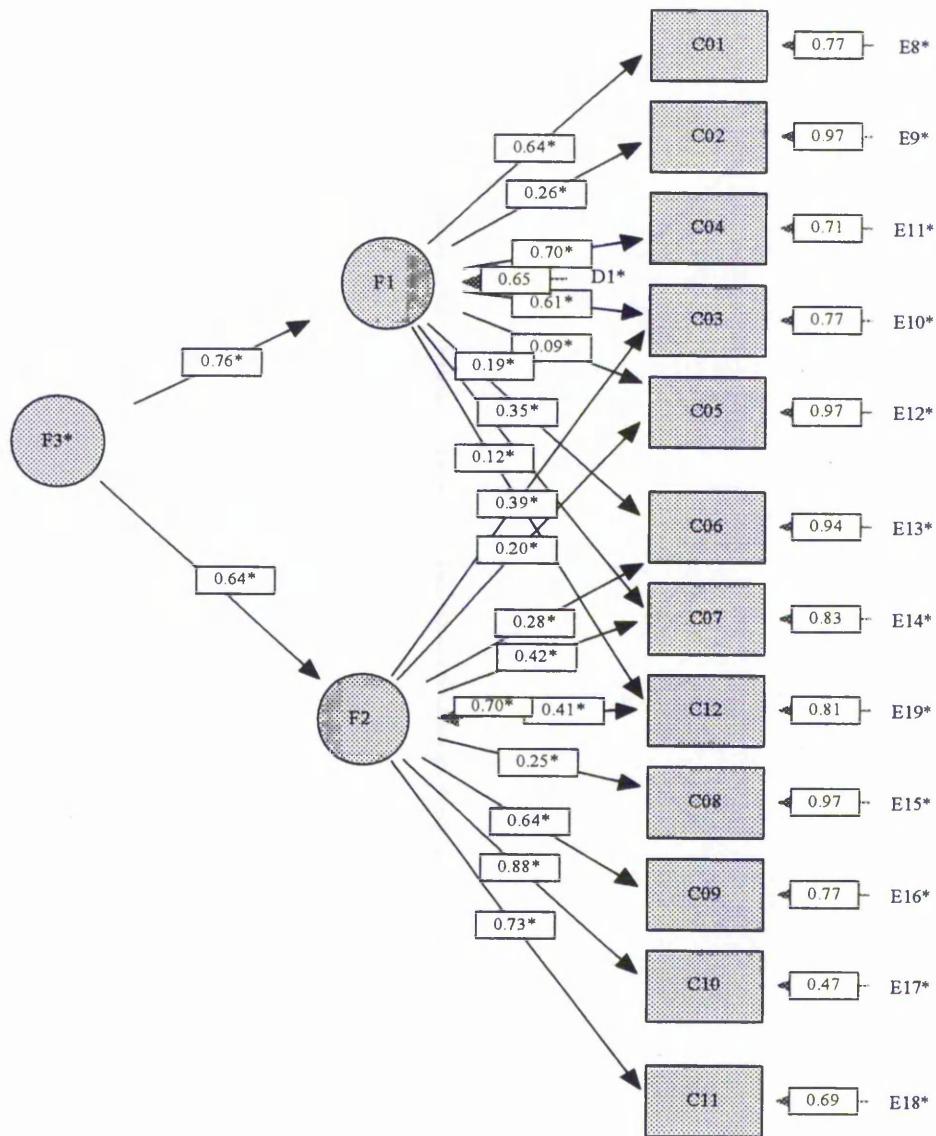
We have some sentences here and, as you can see from the top of your sheet where it says "WHAT I AM LIKE", we are interested in what each of you is like. This is a survey and NOT a test. There are no right or wrong answers. Since children are very different from one another, each of you will be putting down something different.

First let me explain how these questions work. There is an example question at the top, marked (a). I'll read it aloud and you follow along with me. This question talked about two kinds of children, and we want to know which children are most like you.

- (1) So, what I want you to decide first is whether you are more like the children on the left side who should rather play outdoors, more you are more like the kids on the right side who would rather watch T.V. Don't mark anything yet, but first decide which kind of children is most like you, and go to that side of the sentence.
- (2) Now, the second thing I want you to think about, now that you have decided which kind of children is most like you, is to decide whether that is only sort of true, or really true for you. If it is only sort of true, then circle the letter under sort of true, if it is really true, then circle the letter under really true.
- (3) For each sentence you check only answer. Sometimes it will be on one side of the page, another time it will be on the other side of the page, but you can check only one letter for each sentence. You don't check both sides, just one side most like you.
- (4) OK, that one was just for practice. Now we have some more sentences to do. For each one, just circle one letter, the one that goes with what is true for you, what you are most like.

APPENDIX XIV

Factor Structure for the3-Tier Model Cross Loading of Five Items of SPSS-Chi (MC_c)



Note. CFI = .93; SRMR = .07

APPENDIX XV

EQS Output for Modified Model (M_p) tested with the Sample ($n = 237$) in the Pilot Study

GOODNESS OF FIT SUMMARY FOR METHOD = ML

INDEPENDENCE MODEL CHI-SQUARE = 345.695 ON 21 DEGREES OF FREEDOM

INDEPENDENCE AIC = 303.69536 INDEPENDENCE CAIC = 210.86412

MODEL AIC = 5.03599 MODEL CAIC = -34.74882

CHI-SQUARE = 23.036 BASED ON 9 DEGREES OF FREEDOM

PROBABILITY VALUE FOR THE CHI-SQUARE STATISTIC IS .00612

THE NORMAL THEORY RLS CHI-SQUARE FOR THIS ML SOLUTION IS 22.781.

FIT INDICES

BENTLER-BONETT NORMED FIT INDEX = .933
BENTLER-BONETT NON-NORMED FIT INDEX = .899
COMPARATIVE FIT INDEX (CFI) = .957
BOLLEN (IFI) FIT INDEX = .958
MCDONALD (MFI) FIT INDEX = .969
LISREL GFI FIT INDEX = .972
LISREL AGFI FIT INDEX = .913
ROOT MEAN-SQUARE RESIDUAL (RMR) = .118
STANDARDIZED RMR = .057
ROOT MEAN-SQUARE ERROR OF APPROXIMATION (RMSEA) = .083
90% CONFIDENCE INTERVAL OF RMSEA (.042, .126)

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

STANDARDIZED SOLUTION: R-SQUARED

SPPC =V90 = .065*V76 - .038*V78 - .203*V79 + .296*V88
+ .050*V89 + .914 E90 .165

APPENDIX XVI
List and Location of Participated Schools

Code	School	District
1.	Buddhist Tai Hung College	So Uk, Kowloon
2.	Ju Ching Chu Secondary School	Yuen Long, New Territories
3.	Christ College	Shatin, New Territories
4.	Carmel Pak U Secondary School	Tai Po, New Territories
5.	S.K.H. Lui Ming Choi Secondary School	Wah Fu Estate, Hong Kong
6.	L.S.T. Leung Chik Wai Memorial School	Kwai Chung, New Territories
7.	Ho Fung College	Tsuen Wan, New Territories
8.	C.C.C. Mong Man Wai College	Kwun Tong, Kowloon
9.	Pui Ying Secondary School	West Point, Hong Kong
10.	Tuen Mun Methodist College	Tuen Mun, New Territories
11.	Pui Ching Middle School	Homantin, Kowloon



APPENDIX XVII

EQS Output for Hypothesized Model tested with Sample 1 ($n = 1101$) in the Main Study

FIT INDICES

BENTLER-BONETT	NORMED FIT INDEX	=	.943
BENTLER-BONETT NON-NORMED FIT INDEX		=	.859
COMPARATIVE FIT INDEX (CFI)		=	.946
BOLLEN (IFI) FIT INDEX		=	.947
MCDONALD (MFI) FIT INDEX		=	.958
LISREL GFI FIT INDEX		=	.975
LISREL AGFI FIT INDEX		=	.913
ROOT MEAN-SQUARE RESIDUAL (RMR)		=	.070
STANDARDIZED RMR		=	.076
ROOT MEAN-SQUARE ERROR OF APPROXIMATION (RMSEA)		=	.103
90% CONFIDENCE INTERVAL OF RMSEA (.085,	.121)	

WALD TEST (FOR DROPPING PARAMETERS)

MULTIVARIATE WALD TEST BY SIMULTANEOUS PROCESS

CUMULATIVE MULTIVARIATE STATISTICS	UNIVARIATE INCREMENT
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STEP	PARAMETER	CHI-SQUARE	D.F.	PROBABILITY	CHI-SQUARE	PROBABILITY
1	V7,V1	.003	1	.956	.003	.956
2	V7,V2	.287	2	.866	.284	.594

APPENDIX XVIII

EQS Output for Modified Model tested with Sample 1 ($n = 1101$) in the Main Study

FIT INDICES

BENTLER-BONETT	NORMED FIT INDEX	=	.965
BENTLER-BONETT	NON-NORMED FIT INDEX	=	.934
COMPARATIVE FIT INDEX (CFI)		=	.969
BOLLEN (IFI) FIT INDEX		=	.970
MCDONALD (MFI) FIT INDEX		=	.979
LISREL GFI FIT INDEX		=	.984
LISREL AGFI FIT INDEX		=	.953
ROOT MEAN-SQUARE RESIDUAL (RMR)		=	.057
STANDARDIZED RMR		=	.035
ROOT MEAN-SQUARE ERROR OF APPROXIMATION (RMSEA)		=	.078
90% CONFIDENCE INTERVAL OF RMSEA (.059,	.098)	

APPENDIX XIX

EQS Output for Modified Model tested with Sample 2 ($n = 1101$) in the Main Study

FIT INDICES

BENTLER-BONETT	NORMED FIT INDEX	=	.966
BENTLER-BONETT	NON-NORMED FIT INDEX	=	.936
COMPARATIVE	FIT INDEX (CFI)	=	.970
BOLLEN	(IFI) FIT INDEX	=	.970
MCDONALD	(MFI) FIT INDEX	=	.978
LISREL	GFI FIT INDEX	=	.983
LISREL	AGFI FIT INDEX	=	.950
ROOT MEAN-SQUARE RESIDUAL (RMR)		=	.053
STANDARDIZED RMR		=	.040
ROOT MEAN-SQUARE ERROR OF APPROXIMATION (RMSEA)		=	.081
90% CONFIDENCE INTERVAL OF RMSEA	(.062, .100)		

APPENDIX XX

EQS Output for Modified Model tested with Total Sample ($n = 2202$) in the Main Study

FIT INDICES

BENTLER-BONETT	NORMED FIT INDEX	=	.967
BENTLER-BONETT NON-NORMED FIT INDEX		=	.934
COMPARATIVE FIT INDEX (CFI)		=	.969
BOLLEN (IFI) FIT INDEX		=	.969
MCDONALD (MFI) FIT INDEX		=	.978
LISREL GFI FIT INDEX		=	.985
LISREL AGFI FIT INDEX		=	.954
ROOT MEAN-SQUARE RESIDUAL (RMR)		=	.044
STANDARDIZED RMR		=	.036
ROOT MEAN-SQUARE ERROR OF APPROXIMATION (RMSEA)		=	.080
90% CONFIDENCE INTERVAL OF RMSEA (.067,	.094)	

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

STANDARDIZED SOLUTION:

R-SQUARED

EM	= V5 =	.380*V1	+ .925 E5	.144
IM	= V6 =	.528*V1	+ .849 E6	.279
SPPC	= V7 =	.178*V5	+ .108*V6 - .236*V3 - .151*V4 + .914 E7	.164