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Running head:  ATTITUDES AND PERCEIVED PURPOSES OF PE

Students' Attitudes and Perceived Purposes of Physical Education

in Singapore: Perspectives From a $2 \times 2$ Achievement Goal

Framework

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Abstract

The aim of the present study was to re-examine the relationships between achievement goals and perceived purposes of PE, perceived motivational climates, attitudes towards their PE teachers and affective outcomes using the $2 \times 2$ achievement goal framework. Four hundred and ninety-three secondary school students (222 males, 262 females, 9 missing) in Singapore completed questionnaires. Cluster analysis revealed three distinct clusters that differed significantly in their achievement goals profiles. One cluster consisting of high scores on mastery-approach, mastery-avoidance and performance-avoidance achievement goals was linked to the most positive set of characteristics and outcomes while the cluster with low achievement goals was linked to most negative characteristics and outcomes. There was another cluster with moderate levels of mastery-approach that had relatively positive perceptions and attitudes towards PE. The findings of these three goal profiles provide insight and add knowledge to the existing literature. Research that ignores the independence of the $2 \times 2$ achievement goal framework may risk making spurious conclusions.

Keywords: physical education, achievement goals, perceived purposes of PE, attitudes, enjoyment

Students' Attitudes and Perceived Purposes of Physical Education

in Singapore: Perspectives From a $2 \times 2$ Achievement Goal

Framework

There is strong evidence that physical activity has a positive influence on young people's physical and psychological health (Biddle, Sallis, & Cavill, 1998; McAuley & Overman, 2004; Tortolero, Taylor, & Murray, 2000). A recent review by Tortolero et al. (2000) indicated that physical activity and fitness in young people are positively associated with several psychological variables such as self-efficacy, self-esteem, and perceived physical competence and negatively related to depression and stress. However, research has also shown that young people in many countries do not participate adequately in regular physical activity to gain health benefits (Armstrong & McManus, 1994; Chia, Wang, Teo-Koh, Quek, & Gosian, 2002; Trew, Scully, Kremer, & Ogle, 1999). Therefore there is a need to understand young people's motivation for physical activity participation (Goudas & Biddle, 1993). Specifically, recent studies have started to look into predicting young people's physical activity behaviour from psychological variables such as achievement goals, beliefs, intentions and intrinsic interest (Biddle, Soos, & Chatzisarantis, 1999; Goudas, Biddle, & Fox, 1994; Wang & Biddle, 2001).

Physical Education (PE) in schools is seen as an important means by which young people can be encouraged to participate in physical activity in order to promote their health and well-being (Cale, 2000). One reason for this is that PE provides an existing organisational structure and opportunities to reach almost all school-aged children (5-17 years). Within such a 'captive audience', descriptive research has established that young people can be influenced to develop high motivation, high perceived physical competence and positive attitudes towards physical activity (Goudas & Biddle, 1993; Van Wersch, Trew, & Turner, 1992). Therefore, studying students' perception of the purposes of PE and their

motivation in PE are worthy areas of research. The achievement goal theory has been used in recent years to help understand the motivational processes of students in the PE setting (see Biddle, 1999; Duda & Whitehead, 1998; Roberts, 2001; Whitehead, Andree, & Lee, 2004). In this study, we sought to examine students' perception of the purposes of PE and their motivation in PE using the achievement goal perspective.

*Traditional Achievement Goal Theory*

Achievement goal research in PE settings has relied mainly on the traditional dichotomous achievement goal framework, particularly the one proposed by John Nicholls (1984). In this traditional achievement goal theory approach, one underlying assumption is that the goal of action is the demonstration of competence and therefore the perception of ability becomes a central variable (Duda & Whitehead, 1998). Nicholls (1984, 1989) proposed that two different conceptions of ability in achievement contexts are embedded in the two goal involvement states of task and ego. These, in turn, influence the cognitive and affective responses of individuals in achievement striving.

According to Nicholls (1989), the two conceptions of ability manifest themselves in the goals individuals pursue when engaging in achievement-related activity. Children, as they get older, move from a less differentiated conception to a more differentiated conception of ability. In the initial stage, children do not distinguish between effort and ability. They tend to see high ability as equivalent to learning and improvement through effort. Therefore, high effort implies high ability. At eleven or twelve years of age, ability is clearly differentiated from effort. The element of ability is viewed as the presently developed level of capacity and that more effort does not indicate high ability. Thus, when equal outcomes occur, the one who exerts less effort believes he or she has the higher ability. Similarly, when the effort exertion is equal, the better performer is also seen to be the more able one.

In addition, although older adolescents, as well as adults, possess the more differentiated conception of ability, they may employ this conception or the less differentiated one in achievement settings, depending on the goals that they adopt in the settings. Individuals tend to employ the undifferentiated conception of ability when they are engaged in tasks that are characterized by low social evaluation, low emphasis on competition, and valued learning processes (Nicholls, 1989). When this conception of ability is induced, individuals are in the state of task involvement. On the other hand, the more differentiated conception of ability as capacity is used when the situation is characterized as highly evaluative, or as a test, events that increase public self-awareness (e.g., presence of others), or interpersonal competition or comparison (Nicholls, 1989). When this state of differentiated conception of ability is activated, individuals are in the state of ego involvement.

When task involvement prevails, perceived ability is evaluated in a self-referenced manner and the focus is on achieving mastery, effort investment, and progress in learning. Alternatively, when ego involvement prevails, individuals conceive of ability as a capacity that limits the effect of effort on performance. Success is 'other-referenced' and the focus is on outperforming others or winning with less effort. Depending on the levels of perceived ability, the two goal-involvement states predict different behavioural outcomes in achievement domains.

Nicholls (1989) also proposed that individual differences in proneness to task and/or ego involvement may influence the type of involvement adopted in a particular situation. Therefore, research studies should take into account these dispositional goals when investigating achievement behaviour. These dispositions have been named task and ego orientations. A recent systematic review conducted by Biddle and his colleagues (Biddle, Wang, Kavussanu, & Spray, 2003) found that task orientation has a moderate-to-large

association with the belief that effort causes success. On the other hand, an ego orientation has a moderate-to-large association with the belief that ability causes success. In terms of beliefs about the purposes of sport and PE, task orientation was found to be associated with beliefs that the purposes of sport and PE concern mastery/co-operation, fitness/health, and development of self-esteem. Ego orientation, however, was associated with beliefs that concerned the gaining of social status, having an easy class and learning to be more competitive. It is surprising that only three studies have examined the students' beliefs about the purposes of PE (Papaioannou & McDonald, 1993; Walling & Duda, 1995) and PE teachers (Wang & Koh, 2006).

*Motivational Climate*

Achievement goal theory also proposed that the perceived goal structure of an environment (students' perceptions of the way their PE teachers teach, design of task, recognition, grouping of students, and evaluation) may influence students' motivation. Research in this area focuses on the students' perceptions of the motivational climate made salient by the teachers (Solmon, 1996; Todorovich & Curtner-Smith, 2002; Treasure, 1993). A mastery climate is one in which mastery and self-improvement are encouraged by the teacher and success is defined in self-referenced terms. In contrast, performance climate is perceived when the teacher encourages norm-referenced success. Studies (e.g., Papaioannou, 1995; Parish & Treasure, 2003; Treasure, 1997; Treasure & Roberts, 1998) have consistently shown that a perceived mastery climate is positively related to intrinsic motivation, satisfaction, and beliefs that success is due to effort, as well as a positive attitude towards the activity. A perceived performance climate, in contrast, has been linked to low perceived ability, a negative attitude, and beliefs that success is the result of ability and deceptive strategies (such as cheating). Since dispositional goal orientations and perceived motivational

climate interact to affect cognition, emotion, and behaviour in achievement settings, it is important to study both simultaneously (Treasure & Roberts, 1998).

*2 × 2 Achievement Goal Framework*

In recent years, a more complex model of achievement goal orientation has been proposed by Elliot and his colleagues (Elliot, 1999; Elliot & McGregor, 2001; Wang, Biddle, & Elliot, 2007). In this model, the addition of an approach-avoidance dimension was proposed. Perceived competence is viewed as the core construct of achievement goals and can be differentiated in two ways: definition and valence. As a result, four types of achievement goals exist in the 2 × 2 framework: mastery-approach, performance-approach, mastery-avoidance, and performance-avoidance. The mastery-approach goal is when one focuses on task-based or intrapersonal competence, for example 'I want to learn as much as possible from this PE class'; Performance-approach goals occur when one aims to achieve normative competence, such as 'it is important for me to do better than other students in this PE class'; Mastery-avoidance goals focus on task-based or intrapersonal incompetence, for example, 'I am often concerned that I may not learn all that there is to learn in this PE class'; Finally, performance-avoidance goals focus on normative incompetence, for example, 'my goal in this PE class is to avoid performing poorly'. In these four goals, competence is defined as the standard for evaluating either mastery of the task itself in a self-referenced way (mastery) or when comparing with others' performance (performance). Competence is valenced in terms of whether the focus is on a positive possibility (approach) or a negative possibility (avoidance). The traditional achievement goal approach only focuses on the approach dimension and ignores the avoidance dimension. In this study, we documented the differential effects of the 2 × 2 achievement goals on students' perception of the purposes of PE at an intra-individual level. That is, the combination of the effects of the four goals on students' beliefs systems.

Elliot (2005) proposed that each goal predicted a different pattern of achievement-relevant process and outcomes. That is, mastery-approach and performance-approach goals contribute to positive effects and consequences, while mastery-avoidance and performance-avoidance goals predict and produce less adaptive motivational patterns (e.g., Elliot & McGregor, 2001; McGregor & Elliot, 2002). Since a person may endorse multiple goal perspectives (Pastor, Barron, Miller, & Davis, 2007), examining the independent effect of each goal may not reveal a complete picture of the person's achievement motivation.

In a recent study, Wang et al. (2007) used cluster analysis to examine the interactive effect of the $2 \times 2$ achievement goal framework at an intra-individual level. They found four distinct clusters in their sample:

1. a 'moderate achievement goals' profile with scores from all four achievement goals close to a standard score of zero,

2. a 'low achievement goals' profile, in which all achievement goal scores were very low,

3. a 'high achievement goals' profile where scores of the four goals were all very high, and

4. a 'mastery achievement goals' profile with high mastery-approach and mastery-avoidance goal scores, and moderate performance-approach and performance-avoidance goal scores.

While the 'high achievement goals' group had the most positive pattern of characteristics and outcomes, the 'low achievement goals' group was the motivationally least adaptive, scoring low on variables such as autonomy, relatedness, and perceived competence, and high in amotivation. The 'low achievement goals' group also reported the least enjoyment of PE activities. Therefore, there is a need to understand students' perceptions and

attitudes in PE, and the relationships between achievement goals, using an intra-individual approach.

In summary, research has provided findings to support the theoretical predictions of the achievement goal theory on the relationships between achievement goals and students' behaviour, perceptions and attitudes in PE. However, only a few studies have looked at the students' beliefs about the purposes of PE. In addition, much of the research has used the traditional achievement goal theory which only focused on the approach dimension and ignored the avoidance dimension. As such, the relationships established using the traditional approach need to be re-examined using the most recent framework. The relatively few studies which have used the more complex $2 \times 2$ achievement framework and examined at the intra-individual level, suggest that more research is needed. Thus, the present study aimed to re-examine the relationships between students' $2 \times 2$ achievement goals, perceived motivational climates, attitudes towards their PE teachers, their beliefs about the purposes of PE, their self-reported enjoyment in PE, and their intentions to be physically active.

*Methods*

*Participants and Procedure*

Four hundred and ninety-three secondary school students (222 males, 262 females, 9 missing) from four schools in Singapore took part in this study. The age range of the participants was between 13 to 18 years ($m = 14.32$, $sd = .98$). They were informed that there were no right or wrong answers, assured of the confidentiality of their responses, and encouraged to ask questions if necessary. They were also informed that they were allowed to withdraw from taking part in the study any time they so chose. Research procedures for the study were cleared by the Ethical Review Committee of the university. The questionnaires, administered in a quiet classroom, took about 15 minutes to complete.

*Measures*

　　*The Achievement Goal in Physical Education Questionnaire (AGPEQ).* The AGPEQ (Wang et al., 2007) was used to measure four achievement goals in the PE context. The four achievement goals are: mastery-approach (e.g. 'I want to learn as much as possible from this PE class'), mastery-avoidance (e.g., 'I am often concerned that I may not learn all that there is to learn in this PE class'), performance-approach (e.g., 'It is important for me to do better than other students in this PE class'), and performance-avoidance (e.g., 'My fear of performing poorly in this PE class is often what motivates me'). There were 3 items in each subscale. Students responded on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The internal consistency coefficients (Alpha) for mastery-approach, mastery-avoidance, performance-approach, performance-avoidance in the present investigation were .73, .69, .82, and .69, respectively. A previous study (Wang et al., 2007) had found that the reliability coefficients of the two avoidance goals were typically below .70.

　　*Perceived Mastery and Performance Climates.* A 13-item inventory from Marsh, Papaioannou, Martin, and Theodorakis (2006) was used to measure student's perceptions of the motivational climate in their PE class. The 7-item mastery climate scale had internal consistency reliability estimates of .86 and the 6-item performance climate scale had internal consistency reliability estimates of .70. Answers were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

　　*Perceived Sport Competence.* The Sport Competence items from the Physical Self-Perception Profile (PSPP; Fox & Corbin, 1989) were administered. Responses were also given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). This instrument has become a popular measure of individuals' perceptions regarding their ability and confidence to join sporting activities (see Biddle et al, 2003 for review). In the present study, the instrument was shown to be internally reliable ($\alpha = .86$).

*Perceived Purposes of Physical Education Questionnaire*. An adapted version of the Perceived Purposes of PE Questionnaire (PPSQ; see McNeill & Wang, 2005; Wang & Koh, 2006) was used to measure participants' perceptions of the purposes of PE. The adapted version had twenty four items (see Wang & Koh, 2006). The stem of the questions was 'A very important thing that Physical Education lessons should do is to …'. There are five subscales including: *social status* (8 items; e.g. '… makes me popular among my friends'), *health and fitness* (4 items; e.g., '… teach me how to keep myself fit'), *self-esteem* (3 items; e.g., '…increase my self-confidence'), *becoming a good citizen* (3 items; e.g., '… make us responsible law-abiding citizens'), and *mastery* (5 items; e.g., '… show me that success means always trying my best'). Responses were made on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The internal consistency coefficients were satisfactory for the 5 subscales (social status, $\alpha$ = .86; health and fitness, $\alpha$ = .86; self-esteem, $\alpha$ = .69; becoming a good citizen, $\alpha$ = .78; mastery, $\alpha$ = .87).

*Enjoyment.* The enjoyment and effort subscales of the Intrinsic Motivation Inventory (IMI, McAuley, Duncan, & Tammen, 1989) were adapted to assess enjoyment (6 items, e.g., 'I enjoy PE very much'). The items were measured on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha for enjoyment was .91.

*Perception towards PE Teachers.* Sixteen items were used to measure students' perceptions towards their PE teachers (Wang, 1995). There were ten items measuring positive teacher behaviour such as 'my PE teacher tries to make the PE lesson interesting' and 'my PE teacher motivates me to do my best in PE' and six items measuring negative teacher behaviour such as 'my PE teacher puts me off PE' and 'my PE teacher looks unfit and unhealthy'. Responses were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha for positive teacher behaviour and negative teacher behaviour were .93 and .80 respectively.

*Intention to Exercise During Leisure Time.* Two items were used to measure intention to exercise during leisure time (Hagger et al., 2007). The students were asked whether they planned to play sport or exercise three times a week for the next two weeks and whether they intended to play sport or exercise three times a week for the next two weeks. These measures of intention were assessed on a 5-point scale from 1 (very unlikely) to 5 (very likely).

*Results*

*Descriptive Statistics*

The means, standard deviations and distribution of the key variables of the overall sample are presented in Table 1. Overall, the participants had high mastery-approach and moderately high mastery-avoidance and performance-avoidance goals in PE. They also reported low scores in performance-approach goals. They had moderate levels of perceived competence, perceived mastery and performance climates. In terms of beliefs of the purposes of PE, the participants felt that the purposes of PE were to teach them how to achieve mastery, increase their self-esteem, show them how to lead a healthy and fit lifestyle, and how to become good citizens. The participants had positive perceptions towards their PE teachers. They also reported high enjoyment in PE and high intention to participate in physical activity.

**** Table 1 near here ****

Table 2 displays the bivariate correlations among the key variables. The four achievement goals were positively correlated. The mastery-approach goal was positively correlated with perceived competence, mastery climate, and beliefs that the purposes of PE were to teach students health and fitness, mastery, to become good citizens, and to enhance self-esteem. The high mastery-approach goal was also positively correlated with positive

perceptions of PE teachers and enjoyment in PE. The performance-approach goal was positively associated with perceived competence, and strongly related to the beliefs that the purposes of PE were to enhance social status, and was moderately associated with the beliefs that the purposes of PE were to help students to become good citizens, and to enhance self-esteem. The mastery-avoidance goal had a similar but weaker trend in the pattern of relationships (*r* ranged from .34 to .42). The performance-avoidance goal was positively related to the purposes of PE to enhance social status, to become good citizens and to develop self-esteem. Perception of mastery climate was positively related to the beliefs that the purposes of PE were to teach students mastery, health and fitness, to become good citizens, and to enhance self-esteem. In addition, mastery climate was strongly correlated with positive perceptions of the PE teacher and enjoyment in PE. Performance climate was positively associated with beliefs that the purposes of PE were to enhance social status and negative perceptions of PE teacher.

**** Table 2 near here ****

*Gender and Athletic Status*

To examine whether there were main gender and athletic status main effects on the main variables, four separate two-way MANOVAs and one two-way ANOVA were conducted. The first MANOVA dealt with achievement goals and perceived motivational climate. The second MANOVA used the five subscales of purposes of sport as the dependent variables. The third MANOVA included the two perceptions of PE teachers and the final MANOVA examined enjoyment and intention to be physically active as dependent variables. The ANOVA used perceived competence as the dependent variable.

Overall, the results of the first and third MANOVAs showed no significant differences in achievement goals, perceived motivational climates (Wilk's $\Lambda = .975$, $F$ (6,

475) = 2.05, $p = .06$ for gender, Wilk's $\Lambda = .977$, $F(6, 475) = 1.88$, $p = .08$ for athletic

status), and the perceptions of PE teachers' behaviour (Wilk's $\Lambda = .990$, $F(2, 479) = 2.41$, $p$

= .09 for gender, Wilk's $\Lambda = .996$, $F(2, 479) = .90$, $p = .41$ for athletic status). The results of

the second MANOVA on purposes of PE, however, showed significant multivariate effects

on gender, Wilk's $\Lambda = .950$, $F(5, 476) = 5.02$, $p < 0.01$, $\eta^2 = .05$, but no athletic main or

interaction effects. Follow-up ANOVAs revealed that males and females differed

significantly in beliefs that the purpose of PE was to enhance social status, $F(1, 480) = 6.34$,

$p < .01$, $\eta^2 = .03$. Males scored higher in social status than females. A significant main effect

on athletic status was also found in the MANOVA involving enjoyment and intention, Wilk's

$\Lambda = .938$, $F(2, 475) = 15.88$, $p < .01$, $\eta^2 = .06$. Follow-up ANOVA showed that athletes and

non-athletes differed significantly in their intention to be physically active, $F(1, 480) =$

31.81, $p < .01$, $\eta^2 = .06$. Athletes demonstrated greater intention to participate compared to

non-athletes. Finally, the results of the ANOVA showed significant differences between

athletic status in perceived competence, $F(1, 480) = 18.02$, $p < .01$, $\eta^2 = .04$. Again, athletes

had higher perceived competence compared to non-athletes. With these differences identified,

further analyses were conducted to examine the composition of the cluster membership after

the main analysis.

*Cluster Analysis*

Cluster analysis is an interdependence technique that could provide a better

understanding of the relationships among variables than dependence methods (e.g.,

regression, discriminant analysis). Interdependence techniques define the structure in the data

without any associated dependence relationships, whereas dependence techniques are based

on the use of one set of independent variables to predict or explain one or more dependent

variables (Hair, Anderson, Tatham, & Black, 1998). We used cluster analysis to identify

homogenous groupings of participants with distinct patterns of the $2 \times 2$ achievement goals

and examined their characteristics. A hierarchical cluster analysis was conducted using SPSS for Windows (Version 15.0). The clustering method used was Ward's method and the agglomeration schedule and dendrogram were used to determine the number of clusters.

Table 3 shows the agglomeration schedule for the final seven stages and percentage changes in coefficient to the next level. The clustering coefficient shows the first large increase when four clusters merged to three clusters (11.8%). This implied that two dissimilar clusters were joined (Hair et al., 1998). Therefore, a three-cluster solution was found suitable. The dendrogram supported the decision.

**** Table 3 near here ****

Table 4 shows the cluster size, means, and standard deviations of the three clusters. Mean scores of above 3.5 and below 2.5 were used as criteria to describe whether a variable is relatively 'high' or 'low'.

**** Table 4 near here ****

The first cluster showed a 'High Mastery-Approach and Avoidance Goals' profile. There were 196 participants in this cluster (39.8%). Of these, 93 of them were male and 101 were female.

The second cluster had a 'Moderate Mastery-Approach Goal' profile (Cluster 2). There were 183 students in this cluster (77 males, 104 females).

Cluster 3 had a 'Low Achievement Goals' profile with low scores in all four achievement goals. This cluster consisted of 114 participants, with both genders evenly distributed (52 males and 57 females).

In order to examine the discrimination of the clusters in terms of perceived motivational climates, PE teacher's behaviour and outcome variables (enjoyment and intention), three separate MANOVAs using the clusters as the independent variables were conducted. A separate ANOVA was undertaken for perceived competence. The first MANOVA on perceived climates showed that there were significant differences between the three clusters, Wilk's $\Lambda$ = .895, F (4, 978) = 13.97, p < .01, $\eta^2$ = .05. Follow-up ANOVAs found differences in both perceived mastery and performance climates among the three clusters (F (2, 490) = 18.12, p < .01, $\eta^2$ = .07 for mastery, and F (2, 490) = 11.58, p < .01, $\eta^2$ = .05 for performance).

Post-hoc tests results indicated the Cluster 1 had significantly higher perceptions of mastery and performance climate compared with Clusters 2 and 3. Cluster 2 also had higher mastery and performance climate scores than Cluster 3 (all *p*s < .05).

In general, the findings suggest that the four achievement goal profiles have differential perceptions in the PE class climate (see Table 5).

**** Table 5 near here ****

The results of the second MANOVA on differences in perceptions of PE teachers between the three clusters also showed significant multivariate differences, Wilk's $\Lambda$ = .896, $F$ (4, 978) = 13.80, $p$ < .01, $\eta^2$ = .05. Follow-up tests revealed significant differences between the three clusters in positive and negative perceptions of PE teachers. Post-hoc Tukey's HSD tests found that students in the Cluster 1 reported higher positive perceptions of their PE teachers compared to the two other clusters (all *p*s < .05). Cluster 2 students also had significantly higher positive attitudes towards their PE teachers.

The results of the third MANOVA indicated that the three clusters also differed in terms of enjoyment and intention to be physically active (Wilk's $\Lambda = .835$, $F(4, 978) = 23.07$, $p < .01$, $\eta^2 = .09$). Follow-up tests found differences in both enjoyment and intention (see Table 5). Students in the Cluster 1 reported higher enjoyment and intention compared to the other two clusters (all $p$s $< .05$). Students from the Cluster 2 also reported higher enjoyment and intention to be physically active compared to Cluster 3.

In terms of perceived competence, the results of the ANOVA indicated significant differences between the three clusters, $F(2, 490) = 42.13$, $p < .01$, $\eta^2 = .15$. Post-hoc tests showed that Cluster 1 had higher perceived competence compared to the other two clusters (all $p$s $< .05$). Cluster 2 also reported higher perceived competence compared to Cluster 3.

To examine whether these three clusters differed in their beliefs on the purposes of PE, a separate one-way MANOVA was conducted using the five beliefs of the purposes of PE as dependent variables and the clusters as the independent variable. The results showed significant differences between the three clusters on the dependent measures, Wilk's $\Lambda = .716$, $F(10, 972) = 17.68$, $p < .01$, $\eta^2 = .15$. Test of between-subjects effects indicated significant differences existed for all five beliefs (see Table 5).

Post-hoc tests using Tukey's HSD showed that the Cluster 1 group had significantly higher scores across the five beliefs of the purposes of PE compared to the other two clusters (all $p$s $< .05$). Cluster 2 had higher scores in the five beliefs compared to Cluster 3 (all $p$s $< .01$).

*Clusters Composition*

As significant differences were found in gender and athletic status in the pre-analysis, we conducted two-way contingency table analysis using crosstabs to examine the relationships between gender and athletic status and the cluster groups. The results of the chi-

square tests indicated that there were no gender differences among the clusters [$\chi^2 = (2, N = 484) = 1.29, p = .52$] and athletic status [$\chi^2 = (2, N = 493) = 1.72, p = .42$].

*Discussion*

The purposes of the present study were to examine the relationships between students' $2 \times 2$ achievement goals, perceived motivational climates, attitudes towards their PE teachers, students' beliefs about the purposes of PE, self-reported enjoyment in PE and intentions to be physically active.

In general, the findings portray a positive overall picture of PE in Singapore. The students had high mastery-approach and low performance-approach goals. They demonstrated moderate levels of perceived competence and revealed positive perceptions towards their PE teachers. They believed that the purposes of PE were to teach them mastery, increase their self-esteem, teach them how to lead a healthy and fit lifestyle, and how to become good citizens. They also reported high enjoyment in PE and had high intentions to participate in physical activity.

Restricting the analysis to the overall means only may have masked the important differences among distinct groups of students at an intra-individual level (Wang & Koh, 2006). Specifically, the results of the cluster analysis showed that there are indeed homogenous groups of students with different achievement goal profiles, beliefs system and attitudes towards PE lessons. In terms of the $2 \times 2$ achievement goals, there are at least three distinct groups. Specifically, 39.8% of the sample had a high mastery-approach and high avoidance goal profile (Cluster 1) and another 37.1% with a moderate mastery-approach goal profile (Cluster 2). Both clusters had moderate levels of perceived competence. Finally, we found a cluster with distinctively low scores across the four achievement goals (Cluster 3). This cluster had very low level of perceived competence. The cluster profiles found in the

present study were similar to Wang et al's (2007) study (low, high, and mastery achievement goals).

The findings of these three goal profiles provide insight and add knowledge to the existing literature. First, this study provides further support that the four achievement goals are not dichotomous constructs but can coexist at an intra-individual level. That is, an individual can have high scores in all four goals, low scores in all four goals or a mixture of different levels on each goal. Research that ignores the independence of the $2 \times 2$ achievement goals may risk making incorrect conclusions. Secondly, this study sheds light on the relationships between perceived competence and the four achievement goals. According to the theory, if perceived competence is high, the approach dimension should be high and the avoidance dimension should be low and vice versa. However, this study showed that the effects of all four achievement goals in combination seem to be related to perceived competence. For example, the cluster with the highest competence was Cluster 1 (with high mastery-approach and high avoidance goal profile). Future studies need to re-examine the mechanisms between goals and perceived competence.

The cluster with 'High Mastery-Approach and Avoidance Goals' (Cluster 1) showed the most positive perceptions of classroom climate, attitudes towards PE teachers, belief systems and outcomes. Specifically, this cluster had the significantly highest perceived mastery climate, most positive attitudes towards PE teachers, highest enjoyment and intentions to be physically active, when compared to other clusters. In terms of beliefs about the purposes of PE, the students in this cluster also recorded scores that highly endorsed status, mastery, health and fitness, being a good citizen and self-esteem as main purposes of PE. On the other hand, the cluster labelled as 'Low Achievement Goals' had the significantly lowest perceived mastery and performance climates, least positive attitudes towards PE teachers, lowest enjoyment and intentions to be physically active among the three clusters. In

terms of their beliefs towards the purposes of PE, this group also scored lowest in all the five dimensions (mastery, status, health and fitness, good citizen, and self-esteem).

These findings resemble the findings of Wang et al.'s (2007) study in that the cluster consisting of high scores among the four achievement goals was linked to the most positive set of characteristics and outcomes while the cluster with low achievement goals was linked to more negative characteristics and outcomes. However, in terms of the beliefs about the purposes of PE, the students in the 'High Mastery-Approach and Avoidance Goals' cluster also highly endorsed that the purpose of PE was to help them gain social status. This may not be a desirable perception of the purpose of PE and could be due to the high scores in performance-avoidance goals adopted by the students. Previous studies (e.g. Biddle et al., 2003; Papaioannou & McDonald, 1993) have found that ego orientation was linked to the belief that the purpose of schooling is to enhance one's social status and gain wealth. For example, Biddle et al. (2003) established an effect size of .53 between ego orientation and social status. This group of students consisted mainly of boys and athletes and their perceptions of the purposes of PE could have evolved from their socialization as school athletes. Further studies are required to confirm this.

Another possible explanation may be the influence of their PE teachers. A recent study on the pre-service PE teachers' beliefs about the purposes of PE (Wang & Koh, 2006) found that 26.6% of the sample had low task and high ego orientations ('High Entity / Low Autonomy'). This group of pre-service PE teachers scored higher in beliefs that the purposes of PE were to enhance social status and competition. Could it be that the students learnt from their PE teachers? Again, further studies are needed to confirm this.

The practical implication is that PE teachers need to promote the mastery climate in their PE classes and re-examine the way the lessons are structured. The focus needs to be making the mastery or task-involving climate more salient. PE teachers need to keep their

values and beliefs in check because their beliefs and perceptions of PE may affect the implementation of the curriculum and student learning (Ennis, 1996).

The findings of this study provided support for Wang et al.'s (2007) findings that the adoption of avoidance goals in combination with the adoption of approach goals produce an optimal motivational profile. This again, is in contradiction with the existing theory. In general, the theory assumes that approach goals are associated with positive characteristics and outcomes, whereas avoidance goals are associated with negative characteristics and outcomes (Elliot, 1997). However, the findings of this study, like those in Wang et al.'s (2007), suggest that examining the independent effects of each achievement goal provides a less than complete picture of the PE experience. Future studies need to examine the interactive effects of the four achievement goals using a similar approach adopted in this study.

One last finding in the present study that is worth mentioning is that males and athletes were more strongly represented in the most adaptive achievement goal cluster, whereas females were more strongly represented in the least adaptive achievement goal cluster. This pattern is consistent with the findings of Wang and Biddle (2001) and Wang et al. (2007). Could it be that the PE curriculum in Singapore has greater relevance to males than females or is biased against the physically less able students, hence affecting their achievement goal profile? This is an important topic for future research as it has significant implications for PE pedagogy especially in coeducational settings. Contemporary trends indicate that young people prefer a range of individual recreational activities to team sports (Penney, 2002). Moreover, according to Flintoff and Scraton (2001), young women participated in a wider range of activities than young men and many of the activities are individual activities like jogging and swimming rather than team sports like hockey or

basketball. Research involving PE curricula that account for such trends may find distinctively different composition of students in the various clusters.

In conclusion, the results of the present study corroborate evidence supporting the use of the $2 \times 2$ achievement goal framework in PE research, which hopes to gain further insight into the beliefs and attitudes of students. The findings also suggest that the four achievement goals need to be examined simultaneously using an intra-individual analysis. It is clear that the present study raises more questions than it provides answers to the motivational issues in PE. More research is required to fully understand the adoption of multiple goals in PE settings.

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Table 1

*Descriptive Statistics of Key Variables (Overall Sample)*

|   |   | Mean | SD | Skewness | Kurtosis |
|---|---|------|-----|----------|----------|
| 1. | Mastery-Approach | 3.46 | .77 | - .193 | .222 |
| 2. | Performance-Approach | 2.69 | .82 | .254 | .345 |
| 3. | Mastery-Avoidance | 3.09 | .69 | - .190 | .469 |
| 4. | Performance-Avoidance | 3.10 | .77 | .020 | .260 |
| 5. | Perceived Competence | 2.81 | .81 | - .073 | .207 |
| 6. | Mastery Climate | 2.50 | .68 | - .291 | .399 |
| 7. | Performance Climate | 2.77 | .64 | - .230 | .340 |
| 8. | Social Status | 2.77 | .69 | - .064 | .429 |
| 9. | Mastery | 3.60 | .73 | - .457 | .449 |
| 10. | Fitness | 3.80 | .74 | .518 | .342 |
| 11. | Good Citizen | 3.14 | .71 | - .194 | .649 |
| 12. | Self-Esteem | 3.33 | .73 | - .273 | .861 |
| 13. | Positive Perception | 3.49 | .73 | - .306 | .935 |
| 14. | Negative Perception | 2.58 | .70 | .253 | .602 |
| 15. | Enjoyment | 3.58 | .85 | - .618 | .589 |
| 16. | Intention | 3.62 | .80 | - .175 | - .143 |

1    Table 2

2    *Bivariate Relationships among all Study Variables*

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Mastery-Approach | 1.00 | | | | | | | | | | | | | | |
| 2. | Performance-Approach | .43** | 1.00 | | | | | | | | | | | | | |
| 3. | Mastery-Avoidance | .50** | .40** | 1.00 | | | | | | | | | | | | |
| 4. | Performance-Avoidance | .44** | .52** | .48** | 1.00 | | | | | | | | | | | |
| 5. | Perceived Competence | .50** | .47** | .21** | .22** | 1.00 | | | | | | | | | | |
| 6. | Mastery Climate | .44** | .16** | .36** | .22** | .33** | 1.00 | | | | | | | | | |
| 7. | Performance Climate | - .02 | .29** | .16** | .20** | .05 | .09 | 1.00 | | | | | | | | |
| 8. | Social Status | .35** | .62** | .32** | .45** | .40** | .22** | .35** | 1.00 | | | | | | | |
| 9. | Mastery | .61** | .26** | .39** | .35** | .34** | .46** | - .15** | .32** | 1.00 | | | | | | |
| 10. | Fitness | .55** | .19** | .33** | .26** | .32** | .46** | - .16** | .23** | .74** | 1.00 | | | | | |
| 11. | Good Citizen | .52** | .33** | .42** | .38** | .36** | .48** | .07 | .51** | .66** | .54** | 1.00 | | | | |
| 12. | Self-Esteem | .51** | .37** | .35** | .40** | .44** | .37** | .04 | .58** | .66** | .60** | .62** | 1.00 | | | |
| 13. | Positive Perception | .47** | .12** | .33** | .17** | .34** | .65** | - .17** | .18** | .54** | .49** | .46** | .43** | 1.00 | | |
| 14. | Negative Perception | - .21** | .17** | - .00 | .15** | -.06 | -.23** | .41** | .24** | - .29** | - .27** | - .08 | - .04 | - .45** | 1.00 | |
| 15. | Enjoyment | .64** | .30** | .34** | .25** | .53** | .42** | - .14** | .33** | .64** | .63** | .49** | .56** | .55** | -.28** | 1.00 |
| 16. | Intention | .30** | .19** | .10* | .16** | .31** | .22** | .01 | .16** | .23** | .22** | .27** | .28** | .14** | -.05 | .31** |

3    *Note.* $^*$ $p < .05$; $^{**}$ $p < .01$

1    Table 3

2    *Analysis of Agglomeration Coefficients for Hierarchical Cluster Analysis*

| Number of Clusters | Agglomeration Coefficient | % Change in Coefficient to Next Level |
|:---:|:---:|:---:|
| 7 | 457.83 | 8.9% |
| 6 | 498.84 | 8.8% |
| 5 | 542.39 | 9.9% |
| 4 | 595.90 | 11.8% |
| 3 | 665.97 | 17.5% |
| 2 | 782.77 | 47.0% |
| 1 | 1151.85 | |

3

4

1 Table 4

2 *Cluster Means and Standard Deviations for the Three-Cluster Solution*

|  | Cluster 1 (N = 196) | | Cluster 2 (N = 183) | | Cluster 3 (N = 114) | |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | Mean | SD | Mean | SD | Mean | SD |
| Mastery-approach | 3.96 | .58 | 3.35 | .66 | 2.79 | .71 |
| Performance-approach | 3.28 | .71 | 2.57 | .55 | 1.85 | .51 |
| Mastery-avoidance | 3.52 | .61 | 3.07 | .38 | 2.37 | .57 |
| Performance-avoidance | 3.69 | .58 | 2.94 | .55 | 2.35 | .58 |

3

4

1    Table 5

2    *Cluster Profile and Beliefs about the Purposes of PE*

3

| Variable | Cluster 1 (N = 196) | | Cluster 2 (N = 183) | | Cluster 3 (N = 114) | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | | |
| | Mean | SD | Mean | SD | Mean | SD | F (4, 490) | *Eta²* |
| Mastery Climate | 3.69ᵃ | .66 | 3.48ᵇ | .60 | 3.22ᶜ | .74 | 18.12 | .07 |
| Performance Climate | 2.91ᵃ | .63 | 2.76ᵇ | .58 | 2.55ᶜ | .69 | 11.58 | .05 |
| Perceived Competence | 3.14ᵃ | .75 | 2.74ᵇ | .70 | 2.35ᶜ | .82 | 42.13 | .15 |
| Mastery | 3.92ᵃ | .62 | 3.51ᵇ | .63 | 3.21ᶜ | .82 | 42.55 | .15 |
| Social Status | 3.12ᵃ | .66 | 2.69ᵇ | .54 | 2.30ᶜ | .66 | 66.54 | .21 |
| Health and Fitness | 4.06ᵃ | .64 | 3.72ᵇ | .70 | 3.49ᶜ | .84 | 24.79 | .09 |
| Good Citizens | 3.44ᵃ | .67 | 3.09ᵇ | .57 | 2.70ᶜ | .75 | 46.09 | .16 |
| Self-Esteem | 3.67ᵃ | .67 | 3.21ᵇ | .62 | 2.95ᶜ | .76 | 45.92 | .16 |
| Positive Perception | 3.67ᵃ | .68 | 3.47ᵇ | .64 | 3.23ᶜ | .85 | 14.19 | .05 |
| Negative Perception | 2.67ᵃ | .73 | 2.48ᵇ | .62 | 2.57ᵃᵇ | .76 | 3.49 | .01 |
| Enjoyment | 3.97ᵃ | .66 | 3.40ᵇ | .71 | 3.18ᶜ | 1.06 | 43.24 | .15 |
| Intention | 3.83ᵃ | .78 | 3.57ᵇ | .73 | 3.36ᶜ | .84 | 14.02 | .05 |

4    Note: Means in the same row that do not share superscripts differ at $p < .05$ in the Tukey HSD comparison.