



## Psychological profiles of elite school sports players in Singapore

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### Abstract

*Objectives.* Sport has become such a powerful global phenomenon that a country like Singapore has set its sights on becoming one of the top ten sporting nations in Asia. A full ‘Sport School’ will commence in 2004 to achieve these aims and to further entice the commitment of potential young stars, a significant reward system has been created. This study examined the motivational types, achievement goals and beliefs about various aspects of sport in a Singapore secondary school that classified students into sport- and non-sport streams.

*Method.* This study cluster analysed the profile of motivational types and achievement goals in 121 Grade 9 pupils ( $n = 52$  sport stream,  $n = 69$  non-sport stream) aged between 14 and 15 yrs ( $M = 14.18$  yr,  $SD = 0.48$ ) and examined the differences in their beliefs about the purposes of sport.

*Results.* Results revealed three-distinct clusters with 33% of the sample with an ‘amotivated’ profile, 48% in a ‘highly motivated’ cluster and 19% in a ‘high task-mastery’ cluster. These three clusters differed significantly in their beliefs about the purposes of sport. Also, ‘amotivated’ students were less likely to endorse ‘mastery and physically active lifestyle’ and ‘being a good citizen’ as purposes of sport compared to the other two clusters (both  $P_s < 0.05$ ). The main difference between the ‘highly motivated’ and ‘high task-mastery’ clusters was that the former were more likely to endorse ‘gaining social status’ as one of the main purposes of sport ( $P < 0.05$ ).

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## Introduction

Globally, vast legions of children and young people currently participate in organised sport. In the United States, an estimated 45 million children are involved in some form of agency-sponsored or school-sponsored sport competition (Weinberg & Gould, 1999). In Asia, sport is also becoming a more powerful phenomenon, such that a country like Singapore has set a goal to become one of the top ten sporting nations in Asia in the next ten years. Huge amounts of funding have been provided for sport excellence programmes and a reward system has been created to provide incentives for success: For example, a reward of \$500, 000 (US \$295,000) is to be given for an Asian Games gold medallist. In addition, a full 'sports school' will commence in 2004 to help Singapore achieves its goal. As understanding the motivation of athletes in this extrinsic context is an important area of research (Amorose & Horn, 2000; Vallerand, Deci, & Ryan, 1987), this study examined the motives of Singapore athletes, their achievement goals and beliefs about various aspects of sport.

### *Intrinsic and extrinsic motivation*

There are many types of motivation in sport. Implicit in the literature is the assumption that intrinsic motivation is more advantageous in sports than extrinsic motivation. Intrinsic motivation is defined as doing something for its own sake and not for external rewards, whilst extrinsic motivation is defined as doing something as a means to an end, such as for monetary rewards or status recognition. Motivation is not a simple dichotomous concept, but is multi-dimensional. In the self-determination theory proposed by Deci and Ryan (1985; Ryan & Deci, 2000a,b), a differentiated view of motivation is presented to explain the perceived forces that regulate human behaviour. There are at least four main types of regulatory processes or motivation: external regulation, introjected regulation, identified regulation, and intrinsic motivation. The first three types are seen as extrinsic motivation with varying degrees of relative autonomy: External Regulation is characterised by behaviour that is controlled by external rewards or punishments; Introjected Regulation is behaviour controlled by self-imposed pressure, such as avoidance of guilt and shame; Identified Regulation involves acting out because behaviour is seen as personally important; and finally, Intrinsic Motivation is behaviour performed for personal interest and enjoyment and is usually considered as unidimensional. However, Vallerand and his colleagues (Brière, Vallerand, Blais, & Pelletier, 1995; Fortier, Vallerand, Brière, & Provencher, 1995; Pelletier et al., 1995) recently proposed that Intrinsic Motivation could be further differentiated into intrinsic motivation 'to know', intrinsic motivation 'to accomplish', and intrinsic motivation 'to experience stimulation'. A seven-factor Sport Motivation Scale or Echelle de Motivation dans le Sport (SMS/EMS) was designed to include these three intrinsic dimensions of motivation (Brière et al., 1995; Pelletier et al., 1995). Researchers have normally combined these different subscales into a self-determination index (e.g., Ryan & Connell, 1989; Losier & Vallerand, 1994), known as the Relative Autonomy Index (RAI), which is obtained by weighting each subscale differently. Positive RAI scores indicate more self-determined regulation, whereas negative RAI scores indicate more controlling or external regulation. Furthermore, a state of lacking any intention to act, called amotivation, exists: this is a non-self-determined regulation that results from either not valuing the activity itself or possessing a lack

of competence to produce the necessary outcome. Although studies have supported the construct validity and internal consistencies of the SMS/EMS and RAI (e.g. Fortier et al., 1995; Vallerand, Fortier, & Guay, 1997), most of the participants were French or American, and it is not known whether the multidimensional aspect of intrinsic motivation applies to Singaporeans.

Research in the sport and exercise psychology literature has also shown that when one is more self-determined in sport, the more motivationally adaptive one will be in the physical activity domain (Goudas, Biddle, & Fox, 1994; Wang & Biddle, 2001).

### *Achievement goals*

Achievement goal theory centres on two distinct ways of judging competence or defining success in sport. These two conceptions of ability manifest themselves in the goals individuals pursue when engaging in achievement-related activity (Duda, 1989; Nicholls, 1992; Roberts, 1984). Individuals tend to employ the undifferentiated conception of ability when they are engaged in tasks that are characterised by low social evaluation, low emphasis on competition, and valued learning processes (Nicholls, 1989). When this conception of ability is induced, individuals are in a state of task involvement. On the other hand, the more differentiated conception of ability as capacity is used when the situation is characterised by high evaluation, such as a test, events that increase public self-awareness (e.g. presence of others), or interpersonal competition or comparison (Nicholls, 1989). When a state of differentiated conception of ability is activated, individuals are said to be ego-involved.

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. On the other hand, when ego involvement prevails, individuals conceive of ability as a capacity that limits the effect of effort on performance. Success is other-referenced when the focus is outperforming others or winning with less effort. The dispositions towards these two goals are termed as task orientation and ego orientation, respectively.

A task-oriented person is more likely to define success or construe competence in terms of mastery or task improvement. He or she tends to adopt personal criteria for evaluation. An ego-oriented person is more likely to define success or construe competence in normative terms, such as through winning or outperforming others. In sport and physical education, task orientation has been found to be positively associated with various indicators of motivation, including intrinsic motivation (Duda, Chi, Newton, Walling, & Catley, 1995; Goudas et al., 1994) and positive affect (Ntoumanis & Biddle, 1999). In contrast, ego orientation has been linked with motivationally maladaptive behaviours and cognition, such as choosing easy tasks or very difficult tasks to avoid challenge and low physical self-worth (Duda, 1989; Dweck & Leggett, 1988; Nicholls, 1989).

Both goal orientations have been found to be independently related, thus it is possible to be high or low in both, or high in one and low in the other (Fox, Goudas, Biddle, Duda, & Armstrong, 1994). Fox et al. (1994) also found that it is the young people, who are both highly task and ego oriented that appear to be more motivated in sport. It could be that they were motivated because they had high task orientation to fall back on in the face of challenge (Duda, 1997). However, very few studies examined the different motivational types of the different goal profiles at an intra-individual level in relation to cognition, such as beliefs about the purpose of

sport. Vallerand, 1997, 2001) has proposed the need to examine different motivational profiles in relation to different cognition, outcomes and consequences. Ntoumanis (2002) has examined the motivational clusters in physical education with motivation types, perceived motivational climate and enjoyment. However, the achievement goal orientation was not examined. Thus, the interactions between goals and motivational types remain unclear.

Research studies have established that an individual's propensity towards task or ego orientations is related to the belief one holds concerning the wider purposes of the achievement activity (Nicholls, 1989). In sport, a task orientation is associated with the belief that the purpose of sport is to promote mastery and the values of effort exertion, the enhancement of social responsibility, as well as the encouragement of lifetime participation (e.g. White, Duda, & Keller, 1998). In contrast, ego orientation has been linked to the belief that sport is a means of enhancing one's status and recognition (Treasure & Roberts, 1994). Although previous studies have focused on the various correlates of task and ego orientations, a recent review (Duda & Whitehead, 1998) found that very few studies have focused on the relationships between school athletes' goal orientations and their beliefs about the purposes of sport.

### *Purposes of the study*

This study examined the psychological parameters of pupils involved in elite sport and of those without a competitive sporting background. The study was conducted in a Singapore secondary school that classified students into sport or non-sport streams. Specifically, the purposes of this study were to identify the homogenous groupings of students with distinct goal orientation profiles and motivational types and to determine their views about the purposes of sport. In addition, the differences between the sport and non-sport stream students were examined.

## **Methods**

### *Participants and procedure*

One hundred and twenty-one Grade 9 pupils ( $n = 59$  males,  $n = 62$  females) aged between 14 and 15 yr ( $M = 14.18$ ,  $SD = 0.48$ ) took part in the study. Sixty-nine pupils were from the non-sport stream and the remainder were from the sport stream, representing their school in three major sports (18 from basketball, 22 from badminton, and 12 from table tennis). Permission for the study was granted by the Ministry of Education (Singapore), school principal and head of department for PE, and no pupils refused to take part. Administration of the questionnaires took place in quiet classroom conditions under the supervision of a researcher. Questionnaires were completed in approximately 30 min. Participants were informed that there were no right or wrong answers, assured of the confidentiality of their responses, and encouraged to be honest and to ask questions if necessary.

## Measures

### Goal orientations

The participants' propensity towards task and ego involvement in sport was assessed by the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Whitehead, 1998). The TEOSQ has been extensively utilised in investigations underpinned by achievement goal theory, and possesses sound psychometric properties (Duda & Whitehead, 1998). The stem for all items was, 'I feel most successful in sport when ...', and pupils responded on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). There were seven items measuring task orientation (e.g., 'I do my best') and six items assessing ego orientation (e.g., 'I can do better than my teammates'). Cronbach's alpha coefficients for task and ego orientations were 0.69 and 0.79 respectively. Confirmatory Factor Analysis (CFA) on TEOSQ showed acceptable fit indices (CFI = 0.92, GFI = 0.89, NNFI = 0.92, RMSEA = 0.07).

### Purposes of sport questionnaire

Pupils' perceptions of the purposes of sport were determined using a 45-item questionnaire developed by Duda (1989). Responses were made on a 5-point Likert scale as above. As this questionnaire is used commonly in western countries and not in the east (e.g. Duda, 1989; Papaioannou & Macdonald, 1993), it is necessary to examine the factor structure of the questionnaire.

Principal-components factor analyses were conducted on the responses of all participants to the 45-items contained in the purposes of sport questionnaire. Previous studies had found high correlations among the various factors of the Purposes of Sport questionnaire (e.g. Carpenter & Yates, 1997; Duda, 1989), consequently, oblique rotation was used in the factor analysis. In this study, positive relationships were also found among the factors. Therefore, oblique rotations were used. Initial analyses showed that 15 items did not load on the intended factors or cross-loaded on another factor and were deleted from further analyses. A second factor analysis on the remaining 30 items found that these items loaded on four factors accounting for 42.5% of the variance and had eigenvalues above 1.00.

The first factor consisted of items related to *social status*. This factor accounted for 17.4% of the variance and comprised of ten items. The internal consistency was satisfactory ( $\alpha = 0.84$ ). The second factor was made up of seven items related to *mastery and having a physically active lifestyle* with loadings ranging from 0.56 to 0.70. This factor accounted for 11.4% of the variance and has a Cronbach's alpha of 0.74. The third factor comprised a subscale with eight items, accounting for 7.0% of the variance with loadings between 0.47 and 0.68. This factor focused on purposes of sport pertaining to *becoming a good citizen* ( $\alpha = 0.72$ ). The last factor accounted for 6.7% of the variance and consisted of five items pertaining to the purposes of sport *encouraging competition*. The loadings ranged from 0.57 to 0.68 with a Cronbach's alpha of 0.66.

### Motivational type

The Sport Motivation Scale (Pelletier et al., 1995) was used to assess seven motivational types in the sport context. When completing this inventory, pupils were asked why they participated in sport. There were three types of intrinsic motivation measured: intrinsic motivation to know (e.g. 'for the pleasure of discovering new training techniques'), intrinsic motivation to

accomplish (e.g. ‘for the pleasure I feel while improving some of my weak points’) and intrinsic motivation to experience stimulation (e.g. ‘for the intense emotions that I feel while executing certain difficult movements’). The inventory also measured three types of extrinsic motivation: external regulation (e.g. ‘because it allows me to be well regarded by people I know’), introjection (e.g. ‘because I must do sport to feel good about myself’), and identification (e.g., ‘because in my opinion, it is one of the best ways to meet people’). Lastly, one subscale measured amotivation (e.g. ‘I don’t know anymore; I have the impression that I am incapable of succeeding in my sport’). There were four items in each subscale with a total of 28 items. The pupils responded on a 7-point scale ranging from 1 (‘does not correspond at all’) to 7 (‘corresponds exactly’).

A Principal-components factor analysis was conducted on the SMS. It was found that many items in the three subscales of intrinsic motivation loaded on one factor (eight out of 12 items). It was decided that these three subscales of intrinsic motivation should be combined into one factor and given the same weighting, a single score for intrinsic motivation was determined by averaging the three mean scores of the subscales (Brière et al., 1995; Fortier et al., 1995). The internal consistencies were 0.87 for intrinsic motivation, 0.70 for amotivation, 0.73 for external regulation, 0.72 for identification and 0.61 for introjection. The low alpha for introjection is found to be typically below 0.70 in previous studies (e.g. Goudas et al., 1994; Wang & Biddle, 2001).

## Results

### *Descriptive statistics for the overall sample*

Table 1 shows the descriptive statistics and intercorrelations between variables for the whole sample. In general, the participants were highly task-oriented and moderately ego-oriented, most of them seemed intrinsically motivated towards sport and regarded mastery of skills, promoting physically active lifestyles and being a good citizen as the main purposes of sport. Task orientation was moderately correlated with intrinsic motivation, identified regulation and mastery and active lifestyle. Ego orientation, however, was linked to external regulation and a belief that gaining social status was the purpose for sport participation. Intrinsic motivation was linked to beliefs that mastery of skills and promoting an active lifestyle were the main purposes of sport involvement. In contrast, external regulation was associated with beliefs that competition and gaining social status were main purposes of sport. Intrinsic motivation was found to be unrelated to beliefs that gaining social status was a purpose of sport. Finally, there were small positive relationships between intrinsic motivation, identified regulation, introjected regulation, and that of competition. These correlations were not markedly different from each other.

A two-way MANOVA was conducted to determine significant differences between boys and girls, as well as between sport and non-sport groups on the dependent variables. The results showed a significant main effect for gender [Wilks’ $\Lambda = 0.84$ ,  $F(7, 111) = 3.08$ ,  $P < 0.01$ ,  $\eta^2 = 0.16$ ], but no main effect on sport/non-sport group or interaction effect. Follow-up tests revealed that boys scored higher in identified, introjected and external regulations compared to girls (all  $P$ s  $< 0.01$ ).

Table 1  
Descriptive statistics and intercorrelations among variables (overall sample)<sup>a</sup>

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Task orientation	4.26	0.43										
2. Ego orientation	3.09	0.76	0.02									
3. Intrinsic motivation	5.02	0.95	0.45**	0.10								
4. Identification	4.41	1.22	0.39**	0.13	0.60**							
5. Introjection	4.04	1.05	0.24**	0.12	0.45**	0.56**						
6. External regulation	3.19	1.16	0.10	0.36**	0.33**	0.46**	0.56**					
7. Amotivation	3.23	1.29	-0.14	0.07	-0.37**	-0.11	-0.16	-0.04				
8. Mastery	4.25	0.37	0.44**	0.03	0.33**	0.47**	0.23*	0.02	0.01			
9. Good citizens	3.51	0.48	0.28**	0.07	0.20*	0.39**	0.34**	0.11	0.00	0.33**		
10. Competition	2.60	0.63	0.13	0.18*	0.19*	0.21*	0.29**	0.35**	0.02	0.10	0.18	
11. Social status	2.37	0.59	0.07	0.39**	0.08	0.27**	0.26**	0.50**	0.12	0.08	0.27**	0.37**

<sup>a</sup> \* $P < 0.05$ ; \*\* $P < 0.01$ .

### Cluster analysis

To identify subgroups of pupils based on achievement goals and motivational types, a hierarchical cluster analysis with Ward's method was used (Hair, Anderson, Tatham, & Black, 1998). The Ward method was preferred as it minimised the within-cluster differences and avoided problems with forming long, snake-like chains found in other methods, such as the single-linkage procedure (Aldenderfer & Blashfield, 1984). The cluster analyses were conducted on seven variables, with two goal orientations (task and ego) and five motivational types (intrinsic motivation, identification, introjection, external regulation, and amotivation). Before the cluster analyses were carried out, all the variables were standardized using  $Z$  scores (mean of 0 and a standard deviation of 1). This was because the motivational types utilised a 7-point scale compared to the other variables which used a 5-point scale. Standardisation prevents variables that are measured in larger units from contributing more towards the distance measured than the variables measured in smaller units (Everitt, 1993). The agglomeration schedule and dendrogram were used to identify the number of clusters. These suggested a three-cluster solution to be suitable for the sample. The cluster means, standard deviations, and  $Z$  scores for the three-cluster solution are shown in Table 2.

### Profiles of cluster groups

Fig. 1 shows the cluster profiles for the three-cluster solution of the hierarchical analysis. Cluster 1, labelled as 'amotivated', contained 40 students. There were 23 girls and 17 boys in this cluster. It is surprising that 16 participants were from the sport stream. This cluster had very low task orientation, intrinsic motivation, identification, introjection, and very high amotivation. They also had moderately low ego orientation and low external regulation.

Cluster 2, labelled 'highly motivated', contained 58 students (23 girls and 35 boys) evenly distributed in both the sport and non-sport streams. Other than having a high ego orientation, this



Table 2

Cluster means, standard deviations, and *z* scores for the three-cluster solution

Variable	Cluster 1 ( <i>n</i> = 40)			Cluster 2 ( <i>n</i> = 58)			Cluster 3 ( <i>n</i> = 23)		
	Mean	SD	<i>Z</i>	Mean	SD	<i>Z</i>	Mean	SD	<i>Z</i>
Task orientation	3.92	0.40	−0.77	4.37	0.36	0.27	4.54	0.25	0.66
Ego orientation	2.87	0.74	−0.29	3.46	0.67	0.48	2.56	0.56	−0.70
Intrinsic motivation	4.25	1.06	−0.80	5.47	0.66	0.48	5.18	0.38	0.18
Identification	3.61	1.22	−0.65	5.10	0.95	0.57	4.04	0.76	−0.30
Introjection	3.30	0.92	−0.70	4.63	0.82	0.56	3.83	0.92	−0.20
External regulation	2.54	0.89	−0.55	4.00	0.84	0.70	2.24	0.81	−0.81
Amotivation	4.14	1.23	0.71	2.84	1.12	−0.31	2.64	0.89	−0.46

cluster almost formed a conflicting pattern when compared to the first cluster. That is, students in this cluster had moderately high task orientation, high intrinsic motivation, they were regulated through identification and introjection, as well as high external motivation. They were not amotivated towards participation in sport.

Cluster 3 was labelled ‘high task-mastery’ and contained 23 students. The majority of the students were girls (*n* = 16) and were not from the sport stream (*n* = 16). The pupils in this cluster had relatively higher task orientation compared to the other two clusters. They were moderately intrinsically motivated and had the lowest external regulation and amotivation.

In order to examine whether these three clusters differed in levels of their beliefs in the purposes of sport, a one-way MANOVA was conducted using the four subscales of the Purposes of Sport Inventory as the dependent variables and the clusters as the independent variable. The results (Table 3) showed significant differences between the three clusters on the dependent measures, Wilk’s  $\Lambda = 0.782$ ,  $F(8, 230) = 3.76$ ,  $P < 0.001$ ,  $\eta^2 = 0.12$ ). The effect size was large. Follow-up ANOVAs revealed that except for competition, significant differences between the three clusters were found in ‘mastery’, ‘being a good citizen’, and gaining ‘social status’ through sport (all  $P < 0.05$ ). Tukey’s HSD revealed that the ‘amotivated’ cluster were less likely to endorse ‘mastery and physically active lifestyle’ and ‘being a good citizen’ as purposes of sport

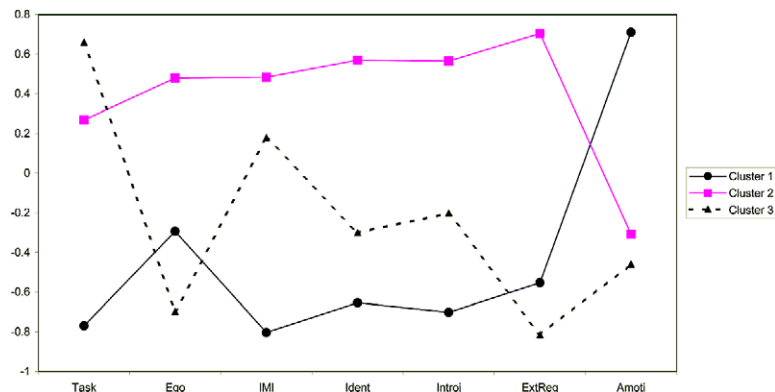


Fig. 1. Cluster profile for the three achievement goals and motivational types clusters.



Table 3  
Significance testing of cluster differences in the beliefs about purposes of sport<sup>a</sup>

Variable	Cluster 1 amotivated		Cluster 2 highly motivated		Cluster 3 high task-mastery	
	Mean	SD	Mean	SD	Mean	SD
Mastery	4.08 <sub>a</sub>	0.36	4.33 <sub>b</sub>	0.35	4.32 <sub>b</sub>	0.49
Good citizen	3.34 <sub>a</sub>	0.51	3.58 <sub>b</sub>	0.45	3.61 <sub>b</sub>	0.56
Competition	2.53 <sub>a</sub>	0.53	2.73 <sub>a</sub>	0.63	2.41 <sub>a</sub>	0.75
Social status	2.18 <sub>a</sub>	0.52	2.57 <sub>b</sub>	0.62	2.18 <sub>a</sub>	0.42

<sup>a</sup> Means in the same row that do not share subscripts differ at  $P < 0.05$  in the Tukey HSD comparisons.

compared to the other two clusters (both  $P$ s  $< 0.05$ ). The only difference between the ‘highly motivated’ and ‘high task-mastery’ clusters was that ‘highly motivated’ pupils were more likely to endorse ‘gaining social status’ as one of the main purposes of sport ( $P < 0.05$ ).

#### Follow-up study

A follow-up postal questionnaire was distributed to the sports pupils two years after leaving the school (68% rate of return), it was found that all the females and most males (80%) were still participating and competing in sport at tertiary level (junior colleges or polytechnics).

#### Discussion

The findings of the study showed that three distinct groups of pupils could be distinguished in their levels of goal orientation and motivational types. Instead of using mean- or median-split to create the four goal orientation profiles of high task/high ego, high task/low ego, low task/high ego and low task/low ego groups (e.g. Fox et al., 1994), this study examined the intra-individual differences in goal profiles and motivational types using cluster analysis. This way of identifying homogenous groupings may be more realistic than artificially imposing a structure on the observed data. The three clusters that had been identified differed significantly in their views about the purposes of sport, although most differences were found between the ‘amotivated’ cluster and the other two clusters.

Previous studies have examined the relationships between goal orientations and beliefs about the purposes of sport and motivational orientations separately. This study examined the combined effects of goals, motivational types and beliefs. The results showed that the goals and motivational types of the ‘elite’ sports pupils were not so different from those in the regular curriculum. However, it was unexpected that such a high proportion of sports pupils were found in the ‘amotivated’ cluster (30%). The relatively high number of ‘amotivated’ sports players is alarming but can possibly be explained by the fact that the programme commenced with many more players (two full classes = 69 pupils) than was necessary to service the school teams (McNeill, 1999), therefore very few were selected and became disillusioned and felt marginalised. Equally, selection for school teams was considered over a two-year period and at the time of the study these 15 year-olds were in the younger age band for selection. Consequently, they

may perceive no contingency between their training effort and outcome. In addition, their amotivation may have increased when they did not make sufficient progress relative to others or did not make it to the team. These pupils may have been neglected during training sessions. The findings of this study suggest that this group of athletes requires much greater attention for the enhancement of their motivation.

Most of the elite sports players were to be found, not surprisingly in the ‘highly motivated’ group (56%) and had moderate task and high ego dispositions. This cluster was also identified with a very high level of external motivation. Regulating a balance in their psychological framework was the level of intrinsic motivation they exhibited, ensuring that the overall desire to be successful did not degenerate into a ‘win-at-all-costs’ mentality. Consistent with the findings of Rowley (1993) and Whitehead (1993), there were more boys in this cluster than girls.

The finding that a majority of the sports pupils were still participating and competing in sport at tertiary level was encouraging. Sport participation at the tertiary institutions in Singapore (Ministry of Education, 2003) varies from 10 to 20%. The fact that these sports pupils continued to participate in sport provides some evidence to support the adaptive nature of their profile.

The cluster labelled ‘high task mastery’ contained a high proportion of females, again consistent with Rowley’s perspective (1993), but hardly any sports players. With a very low ego orientation, low external regulation and low amotivation (refer to Fig. 1), these pupils most probably disliked competition but enjoyed mastery and the sport itself.

The findings of this study provide an insight of elite sport players in a sport school setting. First, athletes low in task orientation and intrinsic motivation and high in amotivation may not perceive any purpose for continuing to participate in sport. Immediate attention would be required to help athletes such as these gain more focus back in their sport. Goal setting techniques (Burton, 1989) could be used to make learning, task mastery, and personal improvement the highest priorities among these athletes. Second, moderate task orientation, high ego orientation, high extrinsic forms of motivation may not be detrimental to continued motivation in sport, so long as they are coupled with high intrinsic forms of motivation and low amotivation.

A potential limitation of this study is the small sample size. More studies are therefore needed to replicate these findings. Future studies should include measures of perceived sport competence. According to achievement goal theory (Dweck & Leggett, 1988; Nicholls, 1989), perceived competence should have a moderating effect between ego orientation and behaviour (Butler, 1999; Kaplan & Midgley, 1997), and it is possible that more clusters may be differentiated with the inclusion of perceived competence. The results of this study did not support the three intrinsic motivation subscales proposed by Vallerand and his colleagues (Brière et al., 1995; Fortier et al., 1995; Pelletier et al., 1995). Instead, there is only one factor for intrinsic motivation suggested by Deci and Ryan (1985). Future research should examine further the conceptual framework of the Sport Motivation Scale.

## References

- Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster analysis*. Newbury Park, CA: Sage Publications.
- Amorose, A. J., & Horn, T. S. (2000). Intrinsic motivation: relationships with collegiate athletes’ gender, scholarship status, and perceptions of their coaches’ behavior. *Journal of Sport and Exercise Psychology*, 22, 63–84.

- Brière, N. M., Vallerand, R. J., Blais, M. R., & Pelletier, L. G. (1995). Développement et validation d'une mesure de motivation intrinsèque et d'amotivation en contexte sportif: l'Échelle de Motivation dans les Sports (EMS). *International Journal of Sport Psychology*, *26*, 465–489.
- Burton, D. (1989). Winning isn't everything: examining the impact of performance goals on collegiate swimmers' cognitions and performance. *The Sport Psychologist*, *3*, 105–132.
- Butler, R. (1999). Information seeking and achievement motivation in middle childhood and adolescence: the role of conceptions of ability. *Developmental Psychology*, *35*, 146–163.
- Carpenter, P. J., & Yates, B. (1997). Relationship between achievement goals and the perceived purposes of soccer for semiprofessional and amateur players. *Journal of Sport and Exercise Psychology*, *19*, 302–311.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behaviour*. New York: Plenum Press.
- Duda, J. L. (1989). Relationship between task and ego orientation and the perceived purpose of sport among high school athletes. *Journal of Sport and Exercise Psychology*, *11*, 318–335.
- Duda, J. L. (1997). Goal perspectives and their implications for an active and healthy life-style among girls and women. *Women in Sport and Physical Activity Journal*, *6*, 239–253.
- Duda, J. L., Chi, L., Newton, M., Walling, M., & Catley, D. (1995). Task and ego orientation and intrinsic motivation in sport. *International Journal of Sport Psychology*, *26*, 40–63.
- Duda, J. L., & Whitehead, J. (1998). Measurement of goal perspectives in the physical domain. In J. L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 21–48). Morgantown: Fitness Information Technology.
- Dweck, C. S., & Leggett, E. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, *95*, 256–273.
- Everitt, B. S. (1993). *Cluster analysis*. New York: Wiley.
- Fortier, M. S., Vallerand, R. J., Brière, N., & Provencher, P. J. (1995). Competitive and recreational sport structures and gender: a test of their relationship with sport motivation. *International Journal of Sport Psychology*, *26*, 24–39.
- Fox, K., Goudas, M., Biddle, S., Duda, J., & Armstrong, N. (1994). Children's task and ego goal profiles in sport. *British Journal of Educational Psychology*, *64*, 253–261.
- Goudas, M., Biddle, S., & Fox, K. (1994). Perceived locus of causality, goal orientations and perceived competence in school physical education classes. *British Journal of Educational Psychology*, *64*, 453–463.
- Hair, J. F. J., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis*. (5th ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Kaplan, A., & Midgley, C. (1997). The effect of achievement goals: does level of perceived academic competence make a difference? *Contemporary Educational Psychology*, *22*, 415–435.
- Losier, G. F., & Vallerand, R. J. (1994). The temporal relationship between perceived competence and self-determined motivation. *Journal of Sport Psychology*, *134*, 793–801.
- McNeill, M.C. (1999). Sport specialisation in a Singapore secondary school: A case for legitimisation. Unpublished Ph.D. thesis, Loughborough University.
- Ministry of Education (2003). Moulding the future of our nation: Singapore. Retrieved April 22, 2003, from <http://www1.moe.edu.sg/schdiv/>.
- Ntoumanis, N. (2002). Motivational clusters in a sample of British physical education classes. *Psychology of Sport and Exercise*, *3*, 177–194.
- Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.
- Nicholls, J. G. (1992). The general and the specific in the development and expression of achievement motivation. In Roberts (Ed.), *Motivation in sport and exercise* (pp. 31–56). Champaign, IL: Human Kinetics.
- Ntoumanis, N., & Biddle, S. J. H. (1999). Affect and achievement goals in physical activity: a meta-analysis. *Scandinavian Journal of Medicine and Science in Sports*, *9*, 315–332.
- Papaioannou, A., & Macdonald, A. I. (1993). Goal perspectives and purposes of physical education as perceived by Greek adolescents. *Physical Education Review*, *16*, 41–48.

- Pelletier, L. G., Fortier, M. S., Vallerand, R. J., Tuson, K. M., Briere, N. M., & Blais, M. R. (1995). Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: the Sport Motivation Scale (SMS). *Journal of Sport and Exercise Psychology, 17*, 35–53.
- Roberts, G. C. (1984). Achievement motivation in children's sports. In J. G. Nicholls (Ed.), *Advances in motivation and achievement. The development of achievement motivation* (pp. 251–281). Greenwich, CT: JAI Press.
- Rowley, S. (1993). Causes of children's anxiety in sport. In M. Lee (Ed.), *Coaching children in sport—principles and practice* (pp. 134–144). London: E&FN Spon.
- Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: examining reasons for acting in two domains. *Journal of Personality and Social Psychology, 57*, 749–761.
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: classic definitions and new directions. *Contemporary Educational Psychology, 25*, 54–67.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychologist, 55*, 68–78.
- Treasure, D. C., & Roberts, G. C. (1994). Cognitive and affective concomitants of task and ego orientations during the middle school years. *Journal of Sport and Exercise Psychology, 16*, 15–28.
- Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. Zanna (Ed.), *Exercise and sport science reviews* (pp. 271–360). New York: Academic Press.
- Vallerand, R. J. (2001). A hierarchical model of intrinsic and extrinsic motivation in sport and exercise. In G. C. (Ed.), *Advances in motivation in sport and exercise* (pp. 263–319). Champaign, IL: Human Kinetics.
- Vallerand, R. J., Deci, E. L., & Ryan, R. M. (1987). Intrinsic motivation in sport. In K. Pandolf (Ed.), *Exercise and sport science reviews* (pp. 389–425). New York: Macmillan.
- Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: toward a motivational model of high school dropout. *Journal of Personality and Social Psychology, 72*, 1161–1176.
- Wang, C. K. J., & Biddle, S. J. H. (2001). Young people's motivational profiles in physical activity: a cluster analysis. *Journal of Sport and Exercise Psychology, 23*, 1–22.
- Weinberg, R. S., & Gould, D. (1999). *Foundations of sport and exercise psychology*. (2nd ed.). Champaign, IL: Human Kinetics.
- White, S. A., Duda, J. L., & Keller, M. R. (1998). The relationship between goal orientation and perceived purposes of sport among youth sport participants. *Journal of Sport Behavior, 20*, 474–483.
- Whitehead, N. (1993). Why children choose to do sport-or stop. In M. Lee (Ed.), *Coaching children in sport-principles and practice* (pp. 109–121). London: E&FN Spon.