Chinese Students' Motivation in Physical Activity: Goal Profile Analysis Using Nicholl's Achievement Goal Theory

C. K. John Wang[1], W. C. Liu[1], Yanlin Sun[2], B. S. Coral Lim[1], and Nikos L. D. Chatzisarantis[1]

[1] Motivation in Educational Research Lab, National Institute of Education, Nanyang Technological University, Singapore
[2] Tianjin Institute of Physical Education

Abstract

One of the contributing factors for the increased obesity rate in China is the reduction of physical activity and exercise. With this as the backdrop, understanding Chinese students' motivation toward physical education (PE) and physical activity is a worthy area of study. The purpose of this study was to examine Chinese students' motivation for physical activity using the achievement goal approach. A total of 984 Chinese students from six schools in mainland China participated in the survey measuring achievement goals, motivational regulation, perceived competence, attitudes toward PE, and physical activity. Using cluster analysis, four goal profiles were found. Three clusters were similar to the 'highly motivated,' 'moderately motivated,' and 'lowly motivated' clusters found in previous study (Wang, Chatzisarantis, Spray, & Biddle, 2002). One additional cluster with a 'moderate task/moderate ego/high perceived competence' goal profile (Cluster 2) consisted of 39.6% of the sample and was unique to the Chinese sample. This cluster was found to have the lowest external regulation and high identified regulation and intrinsic motivation; they also had the most positive attitudes toward PE and reported highest participation in physical activity. There were gender differences among the four goal profiles. The majority of the Chinese students did not have an ideal goal profile adaptive for long term motivation. Therefore, there is a need for intervention to increase the task orientation and perceived competence of Chinese students in PE.

Key words: achievement goal profile, cluster analysis, motivation

According to World Health Organization (2008), obesity has reached epidemic proportion on a global scale; there are more than one billion overweight adults, with 300 million of them clinically obese, and an estimated 22 million children under the age of five are overweight worldwide. The rate of increase in the number of obese and overweight children in developing countries such as China is alarming. According to the 2002

Corresponding author: C. K. John Wang, Physical Education and Sports Science, National Institute of Education, Blk 5 #03-20, 1 Nanyang Walk, Singapore 637616. Email: john.wang@nie.edu.sg

National Nutrition and Health Survey carried out in China (Wu et al., 2005), obesity rates in children ages 7-18 were 28 times higher in 2002 as compared to surveys from 1985. Chinese people account for one fifth of the overweight population worldwide. The survey also shows that the prevalence of overweight and obese populations in China has caught up with Western countries in a relatively short period. Diseases related to being overweight and obese are well documented (Biddle, Sallis, & Cavill, 1998; Bouchard, Shephard, & Stephens, 1994; Sallis, 1994). Prevention of childhood obesity, therefore, is of high priority.

One of the contributing factors for the increased obesity rate in China is the reduction of physical activity and exercise (Wu, 2006). With this as the backdrop, understanding Chinese students' motivation toward physical education and physical activity is a worthy area of study. Through an understanding of motivation for physical activity in you—determined by assessing motivational profiles associated with school physical education—future interventions in school could be based on a theory-guided framework. The main theoretical framework used in this study is Nicholls' achievement goal theory framework (Nicholls, 1989).

Nicholls' achievement goal theory (Nicholls, 1989) assumes that every individual seeks to demonstrate competence and avoid showing incompetence in any achievement setting. The perception of ability, therefore, becomes a central variable. According to Nicholls (1989), there are at least two ways to define competence or success and they are embedded in the goals that one seeks to achieve in that setting. He identified the dichotomous model that consisted of two types of achievement goals: task and ego. The first type of goal focuses on self-referenced mastery or learning how to perform the task; it is labelled as 'task' or 'mastery' goal. The second type of goal emphasizes the normative comparison of ability or performance relative to others; it is labelled as 'ego' or 'performance' goal ADDIN ENRfu (Pintrich, 2000). The two achievement goals are found to be independent or orthogonal. That is, one can be high in both, low in both, or high in one and low in another. Variations in these two goals are linked to differences in cognition, affect, and behavior (e.g., Biddle, Wang, Kavussanu, & Spray, 2003; Fox, Goudas, Biddle, Duda, & Armstrong, 1994; Ntoumanis, Biddle, & Haddock, 1999; Roberts & Ommundsen, 1996; Spray, 2000; Stephens, 2000).

Using Nicholls' achievement goal theory, many studies examining achievement motivation in physical activity settings have been conducted in the past two decades (e.g., Biddle, 2001; Duda, 2001; Hom, Duda, & Miller, 1993; Xiang, Lee, & Shen, 2001; Xiang, Lee, & Solmon, 1997). In general, task orientation has been found to be positively associated with various indicators of motivation, including intrinsic motivation and positive affect, while, albeit of weaker strength, the relationship between ego orientation and motivational indicators is usually found to be less motivationally adaptive. Specifically, in a recent systematic review conducted by Biddle and his colleagues (Biddle et al., 2003), it was found that 98 English articles were published from 1990 to 2000 involving 110 independent samples (total N = 21,076). In essence, results of the systematic review of these articles showed that task orientation is found to be positively related with the belief that effort causes success, the belief that the purposes of sport and PE

concern mastery/cooperation, fitness/health, and development of self-esteem, adaptive achievement strategies, motives of skill development and team membership, positive affect, and motivated-related behaviors (such as intention to be physically active). On the other hand, task orientation has a small negative association with an accompanying self-reported negative affect.

Ego orientation appears to be positively linked to the belief that ability causes success, the belief that the purposes of sport and PE concern the gaining of social status, motives of status/recognition and competition for participation, unsportsperson-like attitudes, endorsement of intentionally aggressive sport acts, and displays of aggressive behaviors in the sport context. Ego orientation is found to be unrelated to motivated behaviors, such as choosing moderately challenging tasks, exerting high effort, and showing persistence.

The literature in achievement goal theory, particularly in the sport and exercise domain, has been slow to realize that task and ego orientations are orthogonal constructs. Biddle et al. (2003), for example, found that more than 80% of the studies they reviewed did not examine the interactive goal profiles of the participants. However, the trend in goal-profile studies is steadily growing (e.g., Fox et al., 1994; Wang & Biddle, 2001). The use of goal-profile analysis allows for the examination of the interactive effects of the two achievement goals.

One other shortcoming in the achievement goal theory literature is the use of mean or median splits 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. Due to the much skewed distribution of the task orientation score, even the low task/low ego group would have relatively high task orientation scores, at least when compared to those of ego orientation. It can be argued that this way of artificially imposing a structure on the observed data may not be completely realistic. In addition, since task and ego orientations may vary within the same person ADDIN ENRfu (Ntoumanis & Biddle, 1999), it makes sense to examine the intra-individual differences in goal profiles rather than to look at individual differences.

Finally, the proposed theory states that task orientation, regardless of levels of perceived competence, exhibits positively or adaptively motivated behavior. However, ego-involved individuals with high perceived competence should also have adaptive motivational patterns (Dweck, 1986, 1999; Nicholls, 1984, 1989). Ego-oriented people with low perceived competence are likely to be motivationally fragile and to exhibit maladaptive motivational responses. Therefore, the goal profile analysis should include perceived competence as the key variable in differentiating an individual's profile.

One theory that is closely linked to Nicholls' achievement goal theory is self-determination theory (SDT; see Ntoumanis, 2001). Studies have shown that variations in achievement goals produce different degrees of self-determination. For example, task orientation is linked to intrinsic motivation or increased self-determined motivation, whereas ego orientation is associated with a more controlling type of behavioral regulation (Deci & Ryan, 1985, 2000; Wang & Biddle, 2001).

The SDT posits that individuals have three innate needs (i.e., autonomy, competence, and relatedness) which must be satisfied by social contexts in order to facilitate motivation, performance, well-being, and development. Therefore, an individual's motivation is presumed to be, not a direct function of social factors (e.g., perception of the PE class climate), but rather the proposed motivational impact of social environments mediated by these three innate needs.

In SDT, motivation is construed as a multidimensional phenomenon. There are different types of motivation or behavioral regulations central to SDT, each one reflecting a qualitatively different motive for the chosen behavior. Assessing behavioral regulations might provide further insight into how people differ in their motivational and goal profiles (Wang & Biddle, 2007; Wang, Biddle, & Elliot, 2007). Deci and Ryan (1985, 1991) proposed a self-determination continuum to describe motivation types with varying degrees of self-determination. In order from greater to lesser self-determination, these motivation types are intrinsic motivation, extrinsic motivation, and amotivation.

Intrinsic motivation refers to engaging in an activity for reasons that emanate from within the self or within the activity itself. On the other extreme, amotivation refers to the lack of motivation. Extrinsic motivation—engaging for reasons that emanate from outside of the self (e.g., rewards)—can be further characterised by four types of regulation: external regulation, introjected regulation, identified regulation, and integrated regulation (Deci & Ryan, 1985, 1991, 2002). However, only external, introjected, and identified forms of regulation typically occur in studies involving youth.

External regulation occurs when behavior is regulated through external means such as rewards and constraints (Pelletier, Fortier, Vallerand, & Brière, 2001). Introjected regulation represents the first form of internalization. According to Ryan (1993), internalization refers to the process by which external regulations (linked to extrinsic incentives) are transformed into regulations by the self—that is, becoming more self-determined. Although introjected regulation is a form of motivation that comes from within, it is not fully self-determined. The internalization is only partial as the external regulatory process is taken in but not accepted as one's own (Williams & Deci, 1996). Introjection-based behaviors are performed to avoid guilt and shame or to gain ego enhancements and feelings of worth (Deci & Ryan, 2002). In contrast, identified regulation is more self-determined (Deci & Ryan, 1991). The behavior is valued and perceived as being chosen out of one's own volition. The motivation is extrinsic because the activity is not performed for its own sake or for pleasure or satisfaction, but instead, as a means to an end. Nevertheless, the behavior is self-determined because the individual has decided that the activity is beneficial and important, and thus, chooses freely to perform it.

Essentially, SDT asserts that intrinsic motivation and certain forms of extrinsic motivation (e.g., identified regulation) represent the higher levels of self-determination and lead to positive consequences. In contrast, motivational regulations that are lower in self-determination (e.g., external regulation and amotivation) are hypothesised to lead to negative consequences (Deci & Ryan, 1985).

Some research in PE has examined the relationship between achievement goal orientations and the intrinsic motivation construct of SDT (e.g., Cury et al., 1996; Dorobantu

& Biddle, 1997; Vlachopoulos & Biddle, 1996). In these studies, intrinsic motivation has been invariably associated with task orientation while ego orientation has been either inversely related or unrelated to intrinsic motivation. While this line of research has addressed the intrinsic motivation construct of SDT, there has been a gap in research addressing the other types of motivation fundamental to SDT. As certain researchers (e.g., Deci & Ryan, 1991; Ryan & Deci, 2000; Vallerand, 1997) have indicated, in order to gain a more complete understanding of human behavior, it is important to incorporate the full range of regulations (under extrinsic motivation) embraced by SDT, in addition to intrinsic motivation.

One recent study by Wang, Chatzisarantis, Spray, & Biddle (2002) has profiled achievement goals with perceived competence for 824 British secondary school students using a cluster analytical approach. The study found three types of goal profiles: low task/low ego/low perceived competence, moderate task/low ego/moderately low perceived competence, and high task/high ego/high perceived competence groups. The three groups were labelled 'lowly motivated,' 'moderately motivated,' and 'highly motivated.' The authors found that the highly motivated group had significantly higher introjected, identified regulation, and intrinsic motivation, and lower external regulation, compared to the lowly motivated cluster. Similarly, the moderately motivated group also differed from the lowly motivated group in these variables. In addition, the highly motivated group also reported significantly higher physical activity participation compared to the two other clusters, and the moderately motivated group also had higher physical activity participation compared to the lowly motivated group.

Researchers in sport and PE realize that achievement motivation and behavior are constructed in a cultural context and must be construed within the cultural background in which they occur (e.g., Heine, Lehman, Peng, & Greenholtz, 2002; Xiang et al., 2001; Xiang et al., 1997). To our knowledge, no study on goal profiling has been conducted with students from mainland China.

The purpose of this study was to examine Chinese students' motivation toward physical activity using the goal profile analysis grounded in the achievement goal approach as adopted by Fox et al. (1994). Specifically, this study seeks: (a) to examine the achievement goal profiles of Chinese students, and (b) to examine the relationship between the different goal profiles and motivational regulations, physical activity participation, and attitude toward PE. It was hypothesized that there were at least three types of goal profiles, similar to those found in the literature (Wang et al., 2002), and that variations in goal profiles would result in different motivational behaviors, attitudes toward PE, and physical activity participation.

METHODS

PARTICIPANTS AND PROCEDURE

A total of 984 Chinese students from six schools in mainland China participated in the survey. The pupils were aged 11 to 19 years (*M*= 14.12, *SD* = 3.11) and there were 342 males and 642 females.

Permission for the study was sought through the principals and heads of the PE department. Students were told that participation in the survey was voluntary and they were free to withdraw at any time. No pupil refused to take part. Questionnaires were administered in a quiet classroom under the supervision of research assistants. When completing the questionnaire, participants were informed that there were no right or wrong answers. They were assured of the confidentiality of their responses and were encouraged to ask questions if necessary.

MEASURES

All the measures used in the study were translated from English to Chinese. Researchers who were well versed in both Chinese and English did the initial translation from English to Chinese, the and back-translation, of the questionnaires. Following translation, two language experts determined content validity of the Chinese version. The questionnaires were found to be equivalent.

Achievement goal orientations. Students' achievement goal orientations were assessed by using the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1992). The stem for the 13 items was "I feel most successful in physical education when…" There were seven items measuring task orientation (e.g., "…I learn a new skill and it makes me want to practice more") and six items measuring ego orientation (e.g., "…I can do better than my friends"). Answers were given on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores for task orientation were obtained by averaging the scores for the seven items, while scores for ego orientation were similarly obtained through averaging the scores for the six items measuring this construct.

Motivational regulations. The Perceived Locus of Causality (PLOC) scale developed by Goudas, Biddle, and Fox (1994) was used to assess four types of motivational regulation in the PE context. The stem for all items was "I take part in PE…" There four items each of external regulation (e.g., "…because I'll get into trouble if I don't") and introjected regulation (e.g., "…because I'll feel bad about myself if I didn't"). There were three items each of identified regulation (e.g., "…because I want to improve in PE") and intrinsic motivation (e.g., "...because PE is fun"). Responses were also made on 5-point Likert scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Again, scores for each type of motivational regulation were obtained by averaging the scores for the items measuring that particular motivational regulation.

Perceived competence. Three items from the perceived sport competence subscale of the children's version of the Physical Self-Perception Profile (PSPP-PC; Fox & Corbin,

1989) were used to assess perceived competence. The original scale used a structured alternative format whereby participants chose one of two statements that best described them and then rated whether it was "sort of true for me" or "really true for me." This produces a 4-point scale. We modified the items "I feel that I am good when it comes to playing sport," "I feel that I am among the best when it comes to sport or athletic ability," and "I am quite confident when it comes to taking part in sports activities" so that responses could be given on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), consistent to all other measures. The mean scores for the three items were computed.

Attitudes toward PE. Two items were used to measure students' attitudes toward PE lessons (Wang, 1995). They are "I am very happy with my PE lessons' and "I look forward to my next PE lesson." Responses were given on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Mean scores were obtained by averaging the scores on these two items.

Physical activity participation. Two items were used as a proxy measure of the nature of sport/physical activity participation. The items capture the frequency (i.e., 1 = *none*, 2 = *once or twice per week*, 3 = *three to four times a week*, and 4 = *five or more times a week*) and duration of physical activity participation for each session outside of PE lessons (i.e., 1 = *one hour and below*, 2 = *one to three hours*, 3 = *three to six hours*, and 4 = *six hours or more*). Results were presented in terms of frequency and intensity percentages.

RESULTS

PSYCHOMETRIC PROPERTIES OF MEASUREMENT TOOLS

To examine the psychometric properties of the measurement tools, we conducted confirmatory factor analyses (CFA) on the TEOSQ and PLOC. The results of the first CFA on TEOSQ supported the factor structure (χ^2 = 220.07, *df* = 64, *p* < .001; NNFI = .936; CFI = .950; GFI = .967; SRMR = .054; RMSEA = .052, 90% CI of RMSEA = .044 to .059). Cronbach's alpha coefficients were .72 for task orientation and .82 for ego orientation.

Another confirmatory factor analysis was carried out using the maximum likelihood estimation procedure to examine the factor structure of the PLOC. The fit indices were satisfactory and supported the proposed four-factor structure (χ^2 = 249.20, *df* = 71, *p* < .001; NNFI = .925; CFI = .940; GFI = .957; SRMR = .059; RMSEA = .061, 90% CI of RMSEA = .054 to .068. Cronbach's alphas for external regulation, introjected regulation, identified regulation, and intrinsic motivation were .75, .66, .71, and .70, respectively. It should be noted that the alpha for introjected regulation was just below the typically accepted level of .7. Due to the theoretical relevance of the construct, we retained this subscale in the present study. The alpha coefficients for the subscale of perceived competence and attitudes toward PE were .79 and .80, respectively.

DESCRIPTIVE STATISTICS

The means, standard deviations, and correlations between the key variables of the overall sample are shown in Table 1. Overall, the Chinese students had moderate task orientation. This mean value for task orientation is largely similar to those reported of other Chinese samples in studies conducted by Xiang, Lee, and Shen (2001). Nonetheless, this value is lower when compared with results reported of American samples (Duda & Whitehead, 1998; Xiang et al., 2001; Xiang et al., 1997). On the whole, the Chinese students reported ego orientation comparable to those reported of both the American and Chinese samples in Xiang and colleagues' studies (Xiang et al., 2001; Xiang et al., 1997), as well as Duda and Whitehead's study (1998). The Chinese students reported relatively high intrinsic motivation and low extrinsic motivation in PE. They also had moderately low perceived competence but generally positive attitudes toward PE. Sixty-three percent of the students participated in physical activity less than three times a week. Forty-seven percent of them spent less than one hour each time. Overall, the rate of physical activity participation among Chinese students appeared to be low.

Task orientation was positively related to ego orientation ($r = .38$, $p < .05$), identified and intrinsic motivation, perceived competence, and positive attitudes toward PE. Task orientation was negatively related to external regulation. Ego orientation was found to be positively related to perceived competence, and moderately positive with identified and intrinsic motivation (see Table 1). Attitudes toward PE had positive association with intrinsic motivation.

Table 1. Descriptive Statistics and Zero-Order Correlations
Between Key Variables of the Overall Sample

	Mean	SD	1	2	3	4	5	6	7	8
1. Task orientation	3.89	.64	1.00							
2. Ego orientation	2.89	.84	.38**	1.00						
3. Competence	2.83	1.02	.34**	.59**	1.00					
4. External regulation	2.24	.96	−.29**	−.05	−.13**	1.00				
5. Introjected regulation	2.77	.99	.06	.12**	.06*	.44**	1.00			
6. Identified regulation	3.82	.89	.56**	.33**	.34**	−.35**	.13**	1.00		
7. Intrinsic motivation	3.86	.91	.49**	.25**	.28**	−.37**	.09**	.60**	1.00	
8. Attitudes PE	3.98	1.05	.40**	.18**	.23**	−.42**	.00	.42**	.48**	1.00
9. Physical activity	2.31	.97	.15**	.22**	.29**	−.14**	−.02	.19**	.13**	.11**

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

GOAL PROFILE ANALYSIS

In order to identify homogeneous groups or clusters based on the characteristics they possessed, achievement goals and perceived competence were used as clustering variables. Cluster analysis was conducted using the hierarchical clustering method (Hair, Anderson, Tatham, & Black, 1998). Dendrogram and agglomeration schedules were generated to provide basis for determining the number of clusters. Ward's method with squared Euclidean distance was used to determine the number of cluster groups (Aldenderfer & Blashfield, 1984). Before the cluster analyses were carried out, the clustering variables were standardized using z scores ($M = 0$; $SD = 1$). The purpose of this was to allow comparisons across the variable means and previous studies.

The results showed that a four-cluster solution was suitable from the agglomeration schedule. The cluster means and standard deviations of the four-cluster solution from the hierarchical cluster analysis are shown in Table 2.

The graphical representation of the four cluster profiles is shown in Figure 1. Z scores close to +/−.5 or greater were used as criteria to describe whether a goal profile is relatively high or low in comparison among the clusters and z scores close to +/−.3 which were considered moderate.

The first cluster shows a group of Chinese students with high positive scores in task and ego orientations and perceived competence. This cluster contained 133 participants (13.6%), of which 46.6% were males ($n = 62$) and 53.4% were females ($n = 71$). This cluster was labelled as the 'high task/high ego/high perceived competence' cluster.

Cluster 2 comprised of students with moderately high task and ego orientations and very high perceived competence; 39.6% of the participants formed this cluster ($n = 387$). There were 36.7% males and 63.3% females. We labelled this cluster as 'moderate task/moderate ego/high perceived competence' cluster.

Cluster 3 was made up of 335 Chinese students (34.2%) with moderately low task orientation, low ego orientation, and extremely low perceived competence; 26.9% of the students were males and 73.1% were females. This cluster was named 'moderate low task/low ego/low perceived competence' cluster.

Table 2. Cluster Means, Standard Deviations, and Z Scores for the Four Goal Profiles

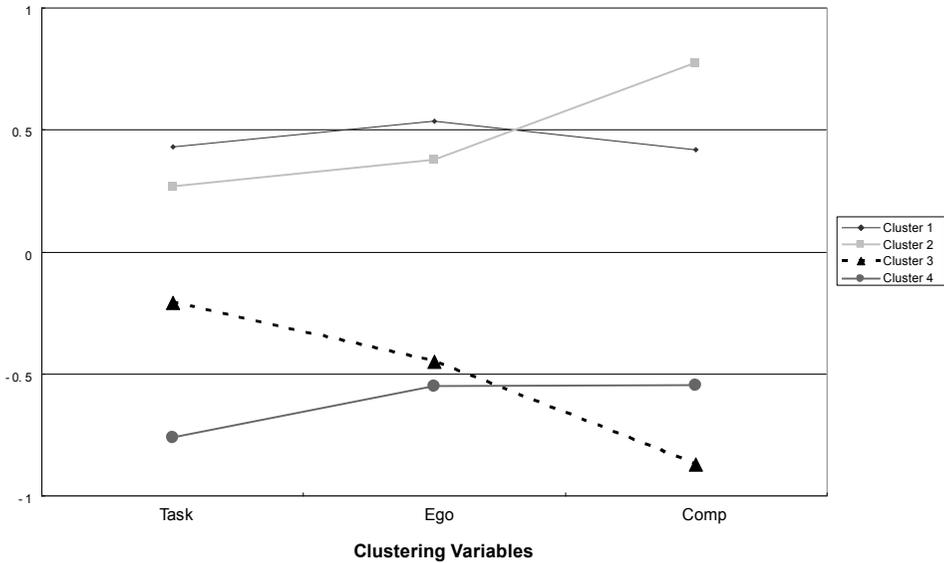|	Cluster 1 ($n = 133$)			Cluster 2 ($n = 387$)			Cluster 3 ($n = 335$)			Cluster 4 ($n = 123$)		
	M	SD	z	M	SD	z	M	SD	z	M	SD	z
Clustering Variables												
1. Task	4.17	.56	.43	4.07	.57	.27	3.76	.57	−.21	3.41	.72	−.76
2. Ego	3.34	.76	.54	3.21	.73	.38	2.51	.74	−.45	2.43	.83	−.55
3. Competence	3.26	.78	.42	3.62	.68	.77	1.94	.53	−.87	2.27	.87	−.55

Figure 1. Achievement goal profiles of the four-cluster solution.

The final cluster had extremely low task and ego orientation, as well as low perceived competence. There were 123 students (12.6%), and 36.6% of them were males and 63.4% were females. This cluster was labelled as the 'low task/low ego/low perceived competence' cluster.

GENDER DIFFERENCES AMONG CLUSTERS

We conducted a chi-square test to examine gender differences among the four clusters. The results of the chi-square test indicated that there were gender differences among the clusters, $\chi^2 = (3, N = 978) = 18.29$, $p < .01$. There were significantly more males than females in Cluster 1 ($n = 62$ observed versus 46 expected) and Cluster 2 ($n = 142$ observed versus 134 expected), but more females than males in Cluster 3 ($n = 245$ observed compared to 219 expected).

CLUSTER DIFFERENCES IN MOTIVATIONAL REGULATIONS, ATTITUDES, AND PHYSICAL ACTIVITY

In order to examine the differences among the four clusters in motivational regulations, attitudes toward PE, and physical activity participation, a one-way multivariate analysis of variance (MANOVA) and two separate analyses of variance (ANOVA) were conducted with the cluster as the independent variable. The results of the MANOVA showed that there were significant multivariate effects on cluster, Pillai's Trace = .34, $F(12, 2919)$

Table 3. Comparison of Four Goal Profiles with Criterion Variables

	Cluster 1 (n = 133)		Cluster 2 (n = 387)		Cluster 3 (n = 335)		Cluster 4 (n = 123)		$F_{(3, 974)}$	η^2
	M	SD	M	SD	M	SD	M	SD		
Variables										
1. External regulation	2.69$_a$	1.06	1.96$_b$	.83	2.32$_c$	.92	2.39$_{ac}$	1.10	23.39	.07
2. Introjected regulation	3.52$_a$	.97	2.68$_b$	.99	2.76$_{bc}$	.85	2.27$_d$	.91	41.74	.11
3. Identified regulation	4.25$_a$	.76	4.08$_a$	.75	3.63$_b$	.83	3.02$_c$	.95	73.29	.18
4. Intrinsic motivation	4.29$_a$	.73	4.09$_a$	.78	3.69$_b$	.88	3.10$_c$	.95	60.26	.16
5. Attitudes PE	4.14$_a$	1.02	4.24$_a$	.90	3.83$_b$	1.01	3.39$_c$	1.30	25.75	.07
6. Physical activity	2.38$_a$	.95	2.53$_{ab}$	.99	2.05$_c$	.91	2.24$_{cd}$	.89	15.89	.05

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

= 31.06, *p* < .001, η^2= .11. A follow-up ANOVA showed that the four clusters differed significantly in all four types of motivational regulations (see Table 3).

Interestingly, Tukey's Honestly Significant Difference (HSD) tests indicated that Cluster 1 had significantly higher external regulation compared to Clusters 2 and 3. Cluster 1 also had significantly higher introjected regulation compared to all other clusters (see Table 3) and higher identified regulation and intrinsic motivation compared to Clusters 3 and 4 (all *p* < .05). Cluster 2 had significantly lower external regulation than all clusters, and higher identified regulation and intrinsic motivation than Clusters 3 and 4. In summary, it appeared that Cluster 2 had the most adaptive motivational regulation, followed by Clusters 1, 3, and 4 in that order.

The results of the first ANOVA with attitudes toward PE as a dependent variable showed that students from Clusters 1 and 2 had the most positive attitudes toward PE compared to students from Clusters 3 and 4. Students from Cluster 4 had the most negative attitudes toward PE. The second ANOVA dealt with physical activity participation. The results showed that students from Clusters 1 and 2 reported significantly higher physical activity compared to students from Cluster 3. Students from Cluster 2 also had higher physical activity participation compared to Cluster 4.

In summary, the results of the goal profile analysis showed that the moderate low task/low ego/low perceived competence and low task/low ego/low perceived competence clusters were the worst in terms of motivational regulation, attitudes toward PE, and physical activity participation.

DISCUSSION

The purpose of this study was to examine Chinese students' motivation toward physical activity using the achievement goal approach. A cluster analysis was conducted to examine the achievement goal profiles of Chinese students. The second aim of the current study was to examine the relationship between the different goal profiles and motivational regulations, physical activity participation, and attitudes toward PE.

In the preliminary analysis, the factor structures of the Chinese version of TEOSQ and PLOC were tested via confirmatory factor analysis. The results confirmed the factor validity of both questionnaires, as well as the internal reliability of all the measures used in this study.

In general, the descriptive statistics showed that Chinese students had lower task orientation ($M = 3.89$, $SD = .64$) compared to the English sample ($M = 4.14$, $SD = .61$) in Wang et al. (2002), American samples (see Xiang et al., 1997, 2001), and overall from the 70 studies reviewed in Duda and Whitehead (1998). However, their task orientation was similar to the Chinese sample in Xiang and colleagues' study (2001). Ego orientation of the Chinese students was comparable to that of both studies ($M = 2.83$, $SD = .82$) in Wang et al. (2002) and ($M = 2.87$, $SD = .81$) in Duda & Whitehead (1998). The perceived competence of the Chinese students ($M = 2.83$, $SD = 1.02$) also appeared to be lower compared to Wang et al.'s study, ($M = 3.18$, $SD = .72$). Bearing in mind that the current study comprised a majority of female students, the finding is not encouraging. Female students typically had much higher task orientation and lower ego orientation compared to their male counterparts (Duda & Whitehead, 1998). High task orientation is known to be more motivationally adaptive, regardless of the level of ego orientation and compared to low task orientation (Biddle & Wang, 2003; Wang & Biddle, 2001). In other studies, more work should be done in Chinese schools to increase students' task orientation in PE and perceived competence.

The lower task orientation scores of the Chinese students in this study, when compared with the American samples in previous studies (Duda & Whitehead, 1998; Xiang et al., 2001; Xiang et al., 1997), was not as expected: The Chinese traditionally placed more emphasis on achievement in school and efficacy of effort. There seemed to be two plausible explanations for this finding.

Firstly, aligned with similar issues faced by cross-cultural researchers when applying social or psychological measures—which originated for use with the American sample—the measures of goal orientation were not originally designed to examine the way the Chinese students defined success. Due to the differing cultural backgrounds, Chinese students may define success differently from Americans, and thus, the measure of goal orientation may not have been able to fully reflect an accurate picture.

Secondly, the Chinese culture is one of collectivism (Hess, Chang, & McDevitt, 1987) and a major characteristic of collectivism is the emphasis on harmonious relationships. As such, humbleness, modesty, and moderation have long been fundamental social values in the Chinese culture. In view of this, one can argue that since Chinese children have been socialized from youth to be humble, modest, and moderate, it is then

not surprising that the Chinese students in this study may have considered moderate responses to the questionnaires to be more appropriate and safe. Hui and Triandis (1989) have also discussed this issue of expression of modesty in their study, suggesting that when asked to respond to Likert-type scales, Chinese students may choose responses in the middle and avoid extreme responses.

According to the theory, task and ego orientation are largely orthogonal in nature ADDIN ENRfu (Nicholls, 1989). Dweck (1986) and Nicholls (1989), along with their colleagues (Dweck & Elliot, 1983; Nicholls & Miller, 1984), presented a strong case in support of the performance-mastery goal dichotomy. Contrary to findings by Xiang and colleagues (Xiang et al., 2001; Xiang et al., 1997) where task and ego orientation clearly remained as two distinct constructs across cultures, this study found that Chinese students' task orientation was positively related to ego orientation. This is consistent with previous Asian studies that examined the relationship between task and ego orientation in Thailand (Li, Harmer, & Vongjaturapat, 1996) and Korea (Kim & Gill, 1997). Hom, Duda and Miller (1993) have also reported such interdependence of the task and ego orientations. The findings from this study add to evidence from extant literature implying that the relationship between task and ego orientation varies with culture.

The positive association between task and ego orientations suggests that the Chinese students in this study do not necessarily use a single criterion to evaluate their success in PE. They tended to adopt multiple criteria to judge if they had been successful in PE, including both personal improvement and superiority over others. Literature from cross-cultural studies has found similar results in fields not limited to sport and PE (e.g., Hofstede, 1980; Kemmelmeier & Cheng, 2004; Oyserman, Coon, & Kemmelmeier, 2002).

Over the past decade, psychologists have begun to recognize that cultures often differ in their world views and, consequently, members of different cultural groups can have different self structures and processes. Markus and Kitayama (1994), for instance, contrasted American culture's emphasis on individual rights with Chinese culture's emphasis on hierarchy and group harmony. Markus and Kitayama (1991) proposed that, while the Americans are more likely to have independent self-construals—and, therefore, to value being unique, asserting oneself, expressing one's inner attributes, and promoting one's own goals—people from Asia are more likely to have interdependent self-construals, and as such, value belonging, fitting in, maintaining harmony, restraining oneself, and promoting others' goals.

These differences in self-construals affect the motivational domain of an individual. For example, for people with independent selves, feeling good about oneself requires fulfilling the tasks associated with being an independent self (e.g., being unique or expressing one's inner attributes). On the other hand, for people with interdependent selves, positive feelings come from fulfilling the tasks associated with being an interdependent self (e.g., belonging, maintaining harmony, fitting in and occupying one's proper place). Consequently, while Americans emphasize self-expression and self-assertion, Chinese culture places greater importance on fitting in and occupying one's proper

place. Modesty and humility are highly regarded. And as such, the Chinese students in this study, being more likely to exhibit interdependent self-construals due to culture, in order to occupy one's rightful place and for propriety reasons, could have adopted multiple criteria in pursuing success in PE (e.g., seeking personal improvement but having to outdo others in order to compete for limited resources as well).

Four unique goal profiles were found: a high task/high ego/high perceived competence (Cluster 1), a moderate task/moderate ego/high perceived competence (Cluster 2), a moderate low task low ego/low perceived competence (Cluster 3), and a final cluster of low task/low ego/low perceived competence (Cluster 4). However, Wang et al. (2002) found only three clusters in the British students. The Cluster 1 profile found in this study mirrors the highly motivated profile, Cluster 3 maps exactly to the moderately motivated profile, and Cluster 4 is similar to the lowly motivated cluster found in Wang et al.'s (2002) study.

Cluster 2 with moderate task/moderate ego/very high perceived competence appeared to be unique to the Chinese sample; there were significantly more females than males in this cluster as well. According to achievement goal theory (Nicholls, 1989), this profile will show similar adaptive behavioral patterns to high task-involved individuals, such as choosing challenging tasks of normative difficulty where success would reinforce their level of ability. In terms of the motivational profile, Cluster 2 was found to have the lowest external regulation and high identified regulation and intrinsic motivation; they also had the most positive attitudes toward PE and reported the highest participation in physical activity. However, in a longer term, this goal profile may not be ideal motivationally. The students may encounter stronger and better skilled players as they progress through time, those who start to doubt their ability may exhibit helpless responses such as effort reduction, lack of trying, negative affect, dropping out of the activity, impaired performance, and choosing extreme tasks in terms of the perceived challenge (Dweck, 1999). Therefore, there is a need for intervention to increase the task orientation of this cluster which consists of the highest proportion of students.

Clusters 3 and 4 are made up of close to 48% of the total sample and they are predominantly low in perceived competence. As such, they are not intrinsically motivated in PE and are not likely to participate in physical activity outside of PE. This could be linked to the increased focus of physical fitness performance and assessment in Chinese schools. Since 2002, China started a nationwide physical fitness testing for children and adolescents from ages 7-22 years (*China Youth Daily,* 2003). There are 13 items in the test which include body type, mental and physical health, BMI, and health-related fitness.

The findings of this study provide insight into the achievement goal profile and related motivation among Chinese school children. It appears that immediate attention would be required to help students to increase task orientation and perceived competence in PE. In this light, Ames's work on creating a mastery motivational climate in PE may be the most relevant here ADDIN ENRfu (Ames, 1984, 1992a, 1992b). Students are more likely to perceive a mastery class climate when the situational cues emphasize learning and improvement—effort is rewarded, mistakes are seen as part of learning, and choice

is provided ADDIN ENRfu (Ames, 1992a, 1992b). Epstein ADDIN ENRfu (1989) took significant steps to examine the structure of the classroom that may foster a mastery, or task, orientation. The acronym TARGET was coined to represent task, authority, recognition, grouping, evaluation, and timing within the classroom structure.

In a PE classroom, teachers should design the tasks for a variety of enjoyable activities and cater to different abilities. In the completion of tasks, teachers should encourage students to set goals that are self-referenced rather than other-referenced. In addition, students should be encouraged to make decisions and should be given leadership roles. Recognition should be given privately and should focus on effort and improvement. Furthermore, the grouping of the pupils should be in heterogeneous, cooperative groups, rather than homogenous groups. Evaluation should be based on task mastery and individual progress. Finally, time spent on a task should be flexible and should maximize opportunities for learning.

In relation to the SDT, enhancing the task orientation of students theoretically helps to foster more self-determined forms of motivational/behavioral regulations among the students (Deci & Ryan, 1985). Providing leadership and decision-making opportunities also enhances the students' innate need for autonomy, and consequently, helps to foster more self-determined forms of motivational/behavioral regulations in them. Overall, students who perceive their class to be task-orientated are more likely to feel competent, have a mastery goal orientation and feel intrinsically interested in the PE class. Past research has established that task orientation is associated with intrinsic motivation (Biddle et al., 2003); therefore, enhancing task orientation in the students may help students to internalize motives for participation and move toward more self-determined forms of motivational/behavioral regulation.

Some limitations of this study should be mentioned. First, this is a cross-sectional survey and causal relationship cannot be inferred. More studies are therefore needed to replicate these findings. Second, this study only used a three-item perceived competence measure and a two-item measure of physical activity participation and attitudes. Future studies should include more items in these measures. Finally, this study measured the dispositional goal orientations of the students without taking into account the perceived environment or situational goal orientations. It would be of interest for researchers to examine these relationships in order to gain a more complete picture of the different factors affecting motivation.

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