



## Relationship among achievement goal orientations and multidimensional situational motivation in physical education

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**Background.** Contemporary research suggests that task and ego achievement goal orientations affect students' intrinsic motivation in physical education. This research has assessed intrinsic motivation as a unidimensional construct, however, which is inconsistent with the more contemporary postulates of self-determination theory (Deci & Ryan, 1985, 1991) which states that intrinsic motivation is only one type of motivation. To date, research has not addressed whether different types of motivation at the situational level are influenced by the proneness to adopt task or ego involvement.

**Aims.** To examine the relationship between achievement goal orientations and multidimensional situational motivation in PE.

**Sample.** Middle school children (182 male, 136 female; *M* age = 13.2 years).

**Method.** Responded to questionnaires assessing their dispositional goal orientation (POSQ; Roberts, Treasure, & Balague, 1998) and situational motivation (SIMS; Guay, Vallerand, & Blanchard, 2000) in PE.

**Results.** Task orientation was found to be positively associated with more self-determined types of situational motivation. Ego orientation was weakly related to less self-determined motivation. An extreme group split was conducted to create four goal groups and goal profile analyses conducted. A significant MANOVA was followed by univariate analyses, post hoc comparisons, and calculated effect sizes, which revealed that groups high in task orientation reported more motivationally adaptive responses than groups low in task orientation.

**Conclusions.** The results suggest that a high level of task orientation singularly or in combination with ego orientation fosters self-determined situational motivation in the context of PE.

Research has shown that as children grow older their interest and participation in physical education (PE) decreases (Van Wersch, Trew, & Turner, 1992). This is a worrying finding given the growing concern expressed about the sedentary lifestyles adopted by a significant number of children and adolescents in the United Kingdom (Biddle, Sallis, & Cavill, 1998). A paucity of research, however, has been conducted to understand the motivational processes that may underlie these changes in interest and participation in PE. We would argue that this represents a significant gap in the literature. In addition to being the subject on the curriculum most directly related to the promotion of an active lifestyle, PE represents an ideal achievement context to examine the motivation process. As Biddle (2001) indicates, the strength and direction of children's motivation in PE varies greatly, and while it is the pinnacle of the day for some children, for others it represents a primary source of stress and a major reason for truancy. PE, therefore, represents an ideal context for researchers to examine motivation across a full and diverse range of students. Two theoretical approaches that have shown promise in explaining children's motivation in PE are Nicholls' (1984, 1989) achievement goal theory and Deci and Ryan's theory of self-determination (1985, 1991; Ryan & Deci, 2000).

According to achievement goal theory (Nicholls, 1984, 1989), the primary intent of individuals in achievement contexts is the demonstration of ability. The way individuals judge and interpret this ability, and subsequently define successful goal accomplishment, provides the energising and critical antecedents to variations in achievement-related cognitions, behaviours, and affective responses (c.f. Duda, 2001). Specifically, Nicholls (1984, 1989) contends that two conceptions of ability exist in achievement contexts, and that these manifest themselves through two distinct goal states of involvement, namely task and ego. An individual's dispositional tendency towards adopting task and ego involvement is referred to as their goal orientation. Achievement goal theory assumes that these goal orientations are not bi-polar opposites of the same construct, but orthogonal, meaning that an individual can be high or/and low in both orientations at any given time (Nicholls, 1984, 1989). While it is proposed that these dispositional orientations can be experienced simultaneously and fluctuate in terms of the degree to which they make task and ego involvement more likely, Nicholls (1984, 1989) refers to task and ego involvement as two distinct and independent states concerning how we process activities. Specifically, Nicholls' writings suggest that these diverse states of involvement may fluctuate throughout an achievement activity (e.g., a PE class), but cannot be experienced at the same time (c.f. Treasure *et al.*, 2001). Individuals who are in a state of task involvement believe that ability is demonstrated through developing new skills, elevating levels of competence, and exerting maximum effort. Since task involvement is self-referenced, success is perceived when mastery is demonstrated (Dweck & Elliott, 1983; Nicholls, 1984, 1989). In contrast, an individual who is in a state of ego involvement believes that ability is demonstrated through favourable normative comparisons with others. In the case of the ego involved individual, the focal concern is with social comparison, thus, ability is demonstrated when his/her performance is perceived to exceed that of others, especially when this is achieved by exerting less effort (Nicholls, 1989).


Given the proposed orthogonality of achievement goals (Nicholls, 1984, 1989), Fox, Goudas, Biddle, Duda, and Armstrong (1994) suggested that a truer representation of achievement goals, and their subsequent consequences, should derive from analysing goal profiles. To this end, four profiles have been identified, namely high task and high ego (Hi-T/Hi-E), high task and low ego (Hi-T/Lo-E), low task and high ego (Lo-T/Hi-E),

and low task and low ego (Lo-T/Lo-E). As Biddle (2001) indicates, results may differ when analysing goals separately compared to a combined goal profile. Moreover, an advantage of adopting a goal orientation profile approach is that this method accommodates two groups that are neglected by correlational studies, namely the high task/high ego and low task/low ego groups (White, 1998). A limitation of the use of goal profiles, however, pertains to the somewhat arbitrary and rather crude scores of central tendency that have typically been used to generate the respective profile groups (i.e., usually median or mean scores have been used to create goal profile groups). This issue notwithstanding, goal profiles based on more stringent criteria (e.g., extreme groups, cluster analysis, an ideographic approach) may offer an important insight into how these orientations function in 'real world' settings. It should be noted at this point that, due to disparities regarding age, gender, culture, and participation level in the extant literature, the critically needed group norms for goal orientations within the various physical activity domains remain unavailable to researchers, hence, goal-profile analyses remain highly sample-specific (c.f. Treasure & Harwood, 2000). Research that has employed a goal profile approach to the study of achievement goals and motivational responses in physical activity settings has generally revealed that individuals high in task orientation, both singularly or in combination with ego orientation, display greater levels of adaptive responses than those low in task orientation (e.g., Dorobantu & Biddle, 1997; Goudas, Biddle, & Fox, 1994; Fox *et al.*, 1994; Roberts, Treasure, & Kavussanu, 1996; Vlachopoulos & Biddle, 1996).

Although not as extensively studied in the context of PE as achievement goal theory, research from a self-determination theoretical perspective (Deci & Ryan, 1985, 1991) is steadily increasing (e.g., Brunel, 1999; Chatzisarantis, Biddle, & Meek, 1997; Ntoumanis, 2001). Self-determination theory is an organismic theory that encompasses both a needs-based and a multidimensional motive approach to understanding affective, cognitive, and behavioural responses. Self-determination theory assumes that individuals have three basic innate needs (autonomy, competence, and relatedness) which must be satisfied by social contexts in order to facilitate motivation, performance, well-being, and development. Thus, an individual's motivation is presumed not to be a direct function of social factors (i.e., perception of the PE class climate), but rather the proposed motivational impact of social environments is mediated by these three innate needs.

To examine the regulation of behaviour that results from the degree to which these needs are satisfied, research from this perspective adopts a multidimensional approach embracing three types of motivation, namely intrinsic motivation, extrinsic motivation, and amotivation. With this multidimensional approach in mind, Deci and Ryan (1985, 1991) have proposed a self-determination continuum to describe motivation types with varying degrees of self-determination. From greater to lesser self-determination these motivation types are intrinsic motivation, extrinsic motivation (integrated regulation, identified regulation, introjected regulation, external regulation) and amotivation. Moreover, in line with the self-determination continuum, the pattern of relationships among these motivational types are posited to conform to a simplex-ordered correlation structure (Ryan & Connell, 1989). Specifically, those motivation types adjacent along the self-continuum (i.e., intrinsic motivation, integrated regulation) are expected to be more positively correlated than those more distal (i.e., amotivation, intrinsic motivation). Figure 1 illustrates the self-determination continuum delineating the types of motivation, their regulatory styles, behaviour, and related processes.

Intrinsic motivation represents the most self-determined regulation and refers to the participation in activities for their own sake, namely for the feelings of pleasure and satisfaction that derive directly from participation (Deci & Ryan, 1985). For example, a pupil who participates in football because he/she enjoys the feelings of pleasure, fun, and satisfaction that arise from football would be said to be intrinsically motivated as

MOTIVATION	AMOTIVATION	EXTRINSIC MOTIVATION				INTRINSIC MOTIVATION
REGULATORY STYLE	Non-Regulation	External	Introjection	Identified	Integration	Intrinsic
PERCEIVED LOCUS OF CAUSALITY	Impersonal	External	Somewhat external	Somewhat internal	Internal	Internal
BEHAVIOUR						
	Non-self-determined			Self-determined		
RELEVANT REGULATORY PROCESSES	Lack of -competence -contingency -intention -activity value	Presence of external -constraints -rewards -compliance -punishments	-Focus on approval (i.e. self or others) -Ego involvement -Internal rewards and punishment	-Activity valued -Personally important -Consciously pursued	-Synthesis of identified regulations to self -Awareness -Congruence	Inherent -enjoyment -fun -satisfaction -pleasure

**Figure 1.** The self-determination continuum outlining types of motivation, and their regulatory styles, behaviour, and related processes. (Adapted from Ryan & Deci, 2000)

their participation is self-endorsed and not underscored by external rewards (i.e., payment, threats, etc).

In contrast to intrinsic motivation, extrinsic motivation refers to a variety of regulatory styles that range from external regulation to integrated regulation and are characterised by an individual’s goal of action being directed by some separable consequence (i.e., reward, threat, punishment). Representing extrinsic motivation as traditionally defined, external regulation is the least self-determined extrinsic regulation, and refers to actions that are carried out in order to gain an external reward or avoid punishment (means to an end). For example, a child that partakes in PE in order to receive praise from the PE teacher (reward) and/or to avoid confrontation with their parents would be said to be externally regulated. Such motivation is therefore directed by separable outcomes, in this case, the pleasing or appeasing of others.

Located next on the self-determination continuum is introjected regulation. Like external regulation, introjected regulation represents a non-self-determined form of extrinsic motivation as an individual’s behaviour is externally governed. With introjected regulation, however, the regulation of behaviour is characterised by a shift from external (i.e., rewards, threats, punishment) to self-imposed (i.e., self-guilt) sources of pressure. An example of introjected regulation would be a student that attends football practice during his lunch break, not because he enjoys football, but because he would feel a sense of guilt if he were not to attend.

Identified regulation refers to behaviours that occur when individuals accept certain activities as important to their personal goals and values (e.g., ‘I participate in PE for health benefits’). With identified regulation the behaviours are autonomous as the

initiation emanates from the self. However, this withstanding, the underlying motive to engage in activities is still external as the decision to participate is directed by external benefits (e.g., 'I can lose weight from participating in PE'), rather than the pleasure and satisfaction inherent in the activity.

The final type of extrinsic regulation is termed integrated regulation. Integrated regulation occurs when identified regulations have been incorporated to the self, meaning that they have been assessed and brought into congruence with the individual's other values and needs (Ryan & Deci, 2000). Although this regulation shares many of the same characteristics of intrinsic motivation (i.e., it is autonomous), this regulation is still considered extrinsic as actions are directed, although coherently and harmoniously, by separable consequences (i.e., valued outcome), opposed to inherent feelings of joy which mark intrinsic motivation.

The least self-determined construct embedded in self-determination theory is coined amotivation, and represents a lack of intention and a relative absence of motivation (Vallerand, 1997). Amotivation can occur when an individual does not perceive contingencies between their behaviours and subsequent outcomes, lack competence, and/or believe the activity to be unimportant (Ryan & Deci, 2000; Vallerand, 1997) (e.g., 'I participate in PE, but I'm not sure it is worth it'). Amotivated individuals are neither intrinsically nor extrinsically motivated; they believe that because success is unachievable or highly unlikely there is little purpose in exerting unnecessary effort towards an uncontrollable outcome.

Essentially, self-determination theory asserts that intrinsic motivation and certain forms of extrinsic motivation (e.g., identified regulation) represent the highest levels of self-determination and lead to positive consequences. In contrast, motivational regulations low in self-determination (e.g., external regulation and amotivation) are hypothesised to lead to negative consequences. Recent empirical research has revealed that motivation types high in self-determination are predictive of positive outcomes in a variety of contexts including health care (Williams, Rodin, Ryan, Grolnick, & Deci, 1998), sport (Kowal & Fortier, 1999), and education (e.g., Miserandino, 1996; Ntoumanis, 2001; Ryan & Connell, 1989; Vallerand & Bissonnette, 1992).

Embracing the fundamental tenets of self-determination theory, Vallerand (1997) has proposed a hierarchical model which contends that motivation and its determinants, mediators, and consequences operate at three levels, namely global (or personality), contextual (or life domain), and situational (or state). According to Vallerand motivation at the global level is similar to a personality trait, and pertains to the manner in which the individual generally interacts with the environment, be that in an intrinsically, extrinsically, or amotivated fashion. Contextual motivation represents a relatively stable motivational disposition that an individual adopts towards a particular context (i.e., sport, work, education). For example, a student may have high contextual motivation towards PE, but be amotivated towards mathematics.

The final level of the hierarchical model is situational motivation and refers to the motivation an individual experiences while currently engaging in a particular activity, the 'here and now' of motivation (i.e., motivation in one PE class). Given the complexity of human motivation, Vallerand (1997) argues that it is futile to study motivation in general; he argues that a more thorough understanding may derive from comprehending a collection of motivations that differ in type and level of generality, as incorporated in his proposed hierarchical framework. These levels of motivational generality are hypothesised to have both a top-down effect, in that each level of motivation is believed to correspond and impact adjacently the next (i.e., situational

motivation is expected to be influenced by contextual motivation, and less by global motivation) and a recursive pattern in which in which motivation experience at a lower level may impact the next level up (i.e., successful situational experiences in PE may lead to the development of contextual intrinsic motivation towards PE).

Of particular interest to the present study are the situational and contextual levels of motivational generality. As previously mentioned, within the hierarchical model, situational motivation refers to the motivation an individual experiences while currently engaging in a particular activity, the 'here and now' of motivation (Vallerand, 1997) while contextual motivation pertains to one's usual motivational orientation towards a distinct context (e.g., education, sport). In line with the predictions of Vallerand's model, situational motivation towards a specific activity (e.g., motivation while presently participating in football) should be influenced by contextual motivation for that specific activity (i.e., one's general motivation towards football), and unaffected by non-relevant contextual motivations (motivation towards mathematics). Supporting this pattern of relationships, a study by Blanchard, Vallerand, and Provencher (1998, cited in Vallerand, 2001) found that individuals high in contextual self-determination towards basketball were also high in situational self-determination towards basketball. In addition to supporting the specificity effect embraced by the top-down postulation of Vallerand's model, this finding also supported the recursive postulation of Vallerand's model, as situational motivation experienced after the second basketball match influenced post-season contextual motivation. Such findings support the premise that situational experiences that induce situational intrinsic motivation may eventually impact one's more general contextual motivation (c.f. Vallerand, 1997).

Central to achievement goal and self-determination theories is the contention that task/mastery involvement in or towards an activity facilitates intrinsic motivation as achievement striving is experienced as an end in itself. Consequently, task involvement, characterised by a concern to improve and learn, should enhance intrinsic motivation (Nicholls, 1989). As Ryan and Deci (1989) state, both theories 'advocate the use of feedback and procedures that minimize ego involvement and facilitate a fuller, more task-involved engagement with academic endeavors' (p.268) to foster intrinsic motivation. At the same time, both approaches recognise the potentially detrimental effect of ego involvement to achievement striving. Deci and Ryan (1995) contend that the adoption of ego involvement is likely to be associated with low levels of autonomy, and thus undermines one of the antecedents of self-determined motivation. Such theoretical reasoning is mirrored by Nicholls (1989) who proposed a negative relationship between ego involvement and intrinsic motivation. Specifically, individuals who are extrinsically motivated see the activity as a means to an end. As Ryan and Deci (1989) state, 'the views of ego involvement espoused by Nicholls and us are in many ways complementary and that additional efforts toward synthesis could be of great value' (p.267).

Recent research in PE has examined the relationship between achievement goal orientations and the intrinsic motivation construct of self-determination theory (e.g., Cury *et al.*, 1996; Dorobantu & Biddle, 1997; Goudas *et al.*, 1994; 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 self-determination theory, there has been a paucity of research addressing the other types of motivation fundamental to the theory. As certain researchers (e.g., Deci & Ryan, 1991; Frederick & Ryan, 1995; Ryan & Deci, 2000; Vallerand, 1997) have

indicated, however, to gain a more complete understanding of human behaviour it is important to examine the various constructs of extrinsic motivation and amotivation in addition to intrinsic motivation. Moreover, according to Ryan and Connell (1989) employing a simplex approach to the study of multi-dimensional motivation gives greater insight, as it (a) preserves the integrity of various types of motivational regulations while displaying their interrelationships, (b) reveals the underlying parameter along which the regulations are arranged, and (c) allows for a more comprehensive analysis of motivation, beyond that of the traditional dichotomy approach (intrinsic versus extrinsic motivation) by incorporating the full range of regulations embraced by self-determination theory.

To date, little research has addressed the possible utility of integrating achievement goals and the spectrum of multidimensional regulations posited by self-determination theory. With college PE students, Brunel (1996, 1999) found that task orientation was related with more self-determining types of motivational regulation. In contrast, he found ego orientation to be related to motivational regulations low in self-determination. While Brunel's studies addressed the relationship between contextual motivational orientations, namely task and ego, and contextual constructs of self-determination, no research to our knowledge has examined the relationship between contextual goals and multidimensional situational motivation in PE. With this in mind, Vallerand (1997) suggests that research needs to look at individual difference factors (i.e., goal orientations) to reveal how these factors prime the contextual-situational motivation relationship. In line with the hierarchical model, relatively stable individual differences that operate at the contextual level may have a top-down effect on situational motivation. For example, in the present study individuals' dispositional tendency towards viewing success as self-referenced in PE (task orientation) may make it more likely that his/her situational motivation is self-determined (intrinsic motivation/identified regulation), as their participation is directed by intrinsic (effort, learning, self-improvement) rather than extrinsic means (outperforming classmates).

There were three purposes of the present study. First, consistent with previous research (e.g., Guay, Vallerand, & Blanchard, 2000; Standage, Treasure, & Duda, 2000; Treasure, Standage, & Lochbaum, 1999) and self-determination theory, we hypothesised that a simplex pattern of relationships would emerge between the subscales of the Situational Motivation Scale (SIMS; Guay *et al.*, 2000). Second, we sought to examine the relationships between dispositional goal orientations, and multidimensional situational motivation in PE. Consistent with previous PE based research, we hypothesised that task orientation would be related with more self-determined types of motivation (intrinsic motivation and identified regulation). In contrast, we expected ego orientation to be related to motivational constructs depicted by low levels of self-determination (external regulation and amotivation). Finally, consistent with previous research in the context of PE (e.g., Dorobantu & Biddle, 1997; Goudas *et al.*, 1994; Vlachopoulos & Biddle, 1996) we hypothesised that goal profile groups high in task orientation would display higher levels of self-determined motivation than groups low in task orientation.

## **Method**

### ***Participants and procedures***

Participants for the present study were 318 12–14 year-olds (182 males, 136 females, Mean age = 13 years 2 months; SD = .66 months) attending two middle schools situated in the Midwest of the United States of America. Parental and participant consent was obtained prior to starting the study. Children responded to questionnaires assessing their goal orientation and multidimensional situational motivation immediately following their regularly scheduled PE class. At this time, it was emphasised to the participants that there were no right or wrong answers to any of the questionnaire items, and that the investigator was interested in their feelings toward PE. The principal investigator distributed the questionnaires and helped any participant who had questions pertaining to the wording and/or meaning of any of the items. The inventory took approximately 15 minutes to complete.

### ***Measures***

#### *Goal orientation*

Individual differences in the proneness for task and ego involvement were assessed by responses to the children's version of the Perception of Success Questionnaire (POSQ) (Roberts, Treasure, & Balague, 1998) (see Appendix 1). The POSQ is a 12-item scale consisting of six task and six ego items. In the present study, each participant responded to the stem 'When participating in Physical Education, I feel most successful when . . .' Each item was rated on a 5-point Likert scale anchored by 1 'strongly disagree' to 5 'strongly agree'. The POSQ has demonstrated acceptable reliability with similar aged participants in previous research (e.g., Treasure & Roberts, 1994a, 1994b).

#### *Multi-Dimensional Situational Motivation*

The Situational Motivation Scale (SIMS) (Guay *et al.*, 2000) was used to assess the participants' situational (or state) motivation in PE (see Appendix 2). The SIMS is a 16-item self-report inventory, which is designed to measure intrinsic motivation, identified regulation, external regulation, and amotivation. The SIMS does not measure the introjected and integrated facets of extrinsic motivation. In the present study, participants were asked to rate how important each of the 16 statements were to their personal motives to engage in PE, by responding to the stem 'Why are you currently engaged in Physical Education?'. Each item was, in this case, rated on a 7-point Likert scale, anchored by 1 'strongly disagree' to 7 'strongly agree'. Previous work in physical achievement contexts has supported the reliability (Blanchard & Vallerand, 1996; Kowal & Fortier, 1999, 2000; Standage, Butki, & Treasure, 1999; Treasure *et al.*, 1999) and the factorial structure (Standage *et al.*, 2000) of the SIMS. In addition, research that has employed the SIMS has supported the presence of the self-determination continuum by displaying a simplex-ordered correlation pattern among the four subscales (e.g., Guay *et al.*, 2000; Standage *et al.*, 2000; Treasure *et al.*, 1999).

#### ***Data analysis***

Prior to analysing the alpha coefficients and group data, a confirmatory factor analysis (CFA) was conducted on the SIMS data to examine its factorial validity. The CFA was



conducted as the SIMS has not been validated to date in the context of PE. Descriptive statistics and bivariate correlations among the study variables were then computed to test the first hypothesis and give an indication of the orthogonality of task and ego orientations. Subsequently, goal profile groups were formed using an extreme group split.

To determine whether participants differed on the constructs of situational motivation as a function of goal profile a one-way multivariate analysis of variance (MANOVA) was conducted. Based on the concerns regarding the use of goal profiles, the present study employed an extreme group split in order to analyse subsamples of the present data, based on the extremities of task and ego scores. In this analysis, goal orientations served as the independent variable and the types of situational motivation the dependent variables. Follow-up one-way analyses of variance (ANOVAs), with Bonferroni adjustment ( $p = .05/4 = .0125$ ) were conducted with post-hoc Tukey pairwise comparisons. Effects sizes (ES) were then conducted to examine the meaningfulness of the statistical findings. Due to the unequal sample sizes, the pooled standard deviation ( $M_1 - M_2 / SD_{\text{pooled}}$ ) of the comparison groups was used as the measure of group variability (Hedges, 1981). Consistent with the standards advocated by Cohen (1988) for the social and behavioural sciences an effect size (ES) of 0.2 was considered small; 0.5 a moderate ES; and 0.8 and above a large ES.

## Results

### **Confirmatory factor analyses**

The initial analysis examined the multivariate normality of the 16 SIMS indicators for the present data. The results of the multivariate kurtosis coefficient (Mardia, 1974) (80.69,  $p < .001$ ) indicated that the present sample was non-normal in distribution. In view of the present sample size, it was considered inappropriate to use the asymptotically distribution free (ADF) method to analyse the non-normal data, as this method is sample size dependent (Arbuckle & Wothke, 1999; Ullman, 2001). Therefore, we utilised the 'bootstrapping approach' which does not require a distributional assumption and estimates the standard errors for parameter estimates using the bootstrap algorithm of Efron (1982).

The adequacy of the proposed a-priori factor structure underlying the SIMS was examined by CFA, using AMOS Version 4.0 (Arbuckle, 1999). The overall fit of the model to the data was examined using the chi-square test ( $\chi^2$ ), as expected the model did not fit the data well on this criterion [ $\chi^2(98) = 271.65, p \leq .001$ ], given that  $\chi^2$  is influenced by, and highly dependent upon sample size (Marsh, Balla, & McDonald, 1988). However, additional measures of absolute fit Goodness of Fit Index (.90) and the Adjusted Goodness of Fit Index (.86) suggested that the SIMS model approached an adequate fit to the data. Likewise, the incremental fit indices used in the present study, namely the Comparative Fit Index (.95) and Tucker-Lewis index (.94), supported the fit of the model to the data. Finally, the root mean square error of approximation (RMSEA) was used to examine the amount of unfitted residuals between the implied and observed covariance matrices. The value of .075 for the present study suggested an acceptable fit. That is, while values of .05 or less represent a very close fit, scores of .08 are still deemed acceptable (Browne & Cudeck, 1993).

An inspection of the modification indices (MIs) showed that item 11 in particular, and item 10 cross-loaded heavily on corresponding latent constructs.<sup>1</sup> Given the theoretical distinction between the motivation regulations presumed to be assessed by the SIMS, and given that such cross-loadings violate the exclusive item association of questionnaire development, it was deemed appropriate to explore the impact of excluding these items. Results of the subsequent CFA [ $\chi^2$  (71) = 176.46,  $p \leq .001$ ; GFI = .92; AGFI = .89; CFI = .96; TLI = .95; RMSEA = .068] supported an improvement in model fit. Moreover, since the competing models in the present study were non-nested it was inappropriate to conduct a chi-square difference test, thus Akaike's (1987) information criterion (AIC) and Bozdogan's (1987) consistent AIC (CAIC) were used to compare the 16-item and 14-item SIMS models. For both AIC and CAIC small values signify a more useful and parsimonious model (Ullman, 2001). Based on such criteria, the results indicated the 14-item model (AIC = 244.46; CAIC = 406.37) to be an improvement on the 16-item model (AIC = 347.64; CAIC = 528.60).

### **Descriptive statistics**

Descriptive statistics and alpha coefficients (Cronbach, 1951) for each measure are presented in Table 1. As shown, all internal consistencies exceeded Nunnally's (1978) criterion of .70 deemed to represent acceptable reliability in the psychological domain.

**Table 1.** Descriptive statistics and internal consistencies for each measure

Measure	M	SD	Skewness	Kurtosis	Alpha
Goal Orientation					
Task	3.99	.96	-1.24	1.25	.90
Ego	3.46	1.03	-.21	-.60	.89
Situational motivation					
Intrinsic motivation	4.75	1.68	-.54	-.54	.89
Identified regulation	4.85	1.59	-.69	-.16	.83
External regulation	4.88	1.70	-.61	-.48	.83
Amotivation	3.91	1.81	-.03	-1.12	.90

**Table 2.** Bivariate correlations between goal orientations and indices of situational motivation

	1	2	3	4	5	6
Goal orientation						
Task (1)	-					
Ego (2)	-.05	-				
Situational motivation						
Intrinsic motivation (3)	.63***	-.02	-			
Identified regulation (4)	.59***	-.07	.78***	-		
External regulation (5)	-.22***	.15**	-.31***	-.20***	-	
Amotivation (6)	-.52***	.18***	-.58***	-.59***	.49***	-

\*\*  $p < .05$

\*\*\*  $p < .01$

<sup>1</sup> It should also be noted that a second external regulation item (item 7) cross-loaded to a lesser extent.

### Correlational analyses

Congruent with previous research (e.g., Guay *et al.*, 2000; Standage *et al.*, 2000; Treasure *et al.*, 1999), a simplex-like pattern of correlations for the SIMS subscales emerged (see Table 2). Specifically, in line with self-determination theory those subscales adjacent along the self-determination continuum, for example, intrinsic motivation and identified regulation, were found to be more positively correlated than those more distant, for example, amotivation and intrinsic motivation.

Pearson bivariate correlations were computed in order to determine the relationship between goal orientations and situational motivation. These values are presented in Table 2. As shown task orientation was, as hypothesised, positively related to intrinsic motivation and identified regulation and negatively related to external regulation and amotivation. Ego orientation displayed an inverse pattern of relationships to that of task orientation. Specifically, weak positive correlations emerged between ego orientation and external regulation and amotivation. The correlations between ego orientation and intrinsic motivation and identified regulation emerged negative, but were not statistically significant.

### Goal profiles comparisons

Consistent with previous research (e.g., Duda, Fox, Biddle, & Armstrong, 1992; Fox *et al.*, 1994; Roberts *et al.*, 1996) a non-significant bivariate correlation ( $r = -.05$ ) endorsed the proposed orthogonal relationship of task and ego goal orientations (Nicholls, 1984, 1989). Subsequently, we created four goal profile groups based on an extreme median split ( $+/- .25$  SD) for each goal dimension (Task *Mdn* = 4.17; Ego *Mdn* = 3.33). Table 3 displays descriptive statistics for each extreme goal profile group. To determine whether participants differed on the constructs of situational motivation as a function of goal profile a one-way MANOVA was conducted. Results of the MANOVA indicated a significant group main effect for situational motivation (Wilks' lambda=.54;  $F(12, 506) = 11.12, p < .001$ ). To decompose the significant multivariate

**Table 3.** Mean scores for situational motivation of each extreme goal profile

	N	Intrinsic motivation	Identified regulation	External regulation	Amotivation
High Task/High Ego	66	5.82	5.81	4.83	3.05
High Task/Low Ego	37	5.61	5.70	4.06	2.86
Low Task/High Ego	47	3.14	3.40	5.62	5.58
Low Task/Low Ego	48	4.02	4.37	5.06	4.15

effect, four one-way ANOVAs, with Bonferroni adjustment, were then conducted. Results indicated significant group effects for intrinsic motivation [ $F(3, 194) = 39.88, p < .001$ ], identified regulation [ $F(3, 194) = 32.88, p < .001$ ], external regulation [ $F(3, 194) = 5.65, p < .01$ ], and amotivation [ $F(3, 194) = 29.24, p < .001$ ].

Post-hoc Tukey (HSD) pairwise comparison tests were conducted and ESs ( $g$ ) calculated to examine how the extreme groups differed on the situational motivation constructs. Results revealed that students high in task orientation (Hi-T/Hi-E and Hi-T/Lo-E) reported significantly higher levels of intrinsic motivation ( $g = 1.47$ , large ES) and identified regulation ( $g = 1.29$ , large ES) than groups low in task orientation (Lo-T/Hi-E

and Lo-T/Lo-E). Likewise, groups low in task orientation (Lo-T/Hi-E and Lo-T/Lo-E) reported significantly higher levels of amotivation ( $g = 1.13$ , large ES) than groups high in task orientation (Hi-T/Hi-E and Hi-T/Lo-E). Similarly, with regard to external regulation, the low task/low ego group ( $g = .62$ , moderate ES) and the low task/high ego group ( $g = .90$ , large ES) reported significantly higher levels than the high task/low ego group. Lastly, significant differences pertaining to identified regulation and amotivation emerged, with the low task/high ego group reporting a lower level of identified regulation ( $g = .63$ , moderate ES) and a higher level of amotivation ( $g = 1.0$ , large ES) than the low task/low ego group.

## Discussion

Aligned with previous research (Guay *et al.*, 2000; Standage *et al.*, 2000; Treasure *et al.*, 1999), the results of the present study provide further empirical support for the simplex-like pattern of relationships among the SIMS subscales. That is, the inter-relationships among the four subscales of the SIMS, as expected, formed a simplex pattern in which those subscales adjacent along the continuum correlated more positively than those more distal along the continuum (Ryan & Connell, 1989). This pattern of significant correlations suggests that the SIMS does capture multidimensional motivation in line with the theoretical tenets proposed by Deci and Ryan (1985, 1991).

The present findings are consistent with the suggestion by achievement goal theory (Nicholls, 1984, 1989) that goal orientations energise cognition, affect, and behaviour in achievement settings, although of course the present design is not such that this direction of effect can be claimed to have been demonstrated. Specifically, and as hypothesised, task orientation was found to be positively associated with more self-determined types of situational motivation (intrinsic motivation and identified regulation) and negatively related to regulations low in self-determination (external regulation and amotivation). This finding is congruent with a recent meta-analysis conducted by Ntoumanis and Biddle (1999) who found a moderate-strong relationship between task orientation and positive affect in the context of physical activity and supports Nicholls' (1984, 1989) contention that the quest for task mastery leads to increases in intrinsic interest. In contrast, ego orientation was found to be related with less autonomous types of situational motivation. This finding is of particular concern as less self-determined types of motivation have consistently been found to be related to less positive outcomes than more self-determined motivation (c.f. Ryan & Deci, 2000; Vallerand, 1997, 2001).

Although the results of the correlation analyses provide some insight into the relationship between achievement goal orientations and situational motivation, an important assumption of achievement goal theory is that task and ego goals are orthogonal. To this end, the results of the goal profile analyses provide a more complete insight into the relationship between goal orientations and situational motivation. As hypothesised, individuals' situational motivation differed as a function of goal profile group membership. Specifically, results revealed that those students high in task orientation singularly or in combination with high ego orientation, reported higher levels of intrinsic motivation and identified regulation than their lower task oriented counterparts. Aligned with previous research we found that, in general, groups high in both orientations displayed the same adaptive responses as the high task/low ego group (e.g., Dorobantu & Biddle, 1997; Roberts *et al.*, 1996; Vlachopoulos & Biddle, 1996).

Duda (1997) argues, 'what may make (high task/high ego) individuals motivated 'over the long haul' . . . is the fact that they have their strong task orientation to fall back on when their sense of normative competence is in jeopardy' (p.309). Consistent with Duda (1997), task orientation in the present study appears to be the decisive construct for increased motivation. Further, this perception of success appears to moderate any debilitating effects incurred by ego orientation (Roberts *et al.*, 1996).

A contrary pattern of results emerged for groups low in task orientation, with these groups reporting higher levels of amotivation towards PE than groups high in task orientation. Given that amotivated individuals withdraw task effort, presuming success to be uncontrollable and highly unlikely, the connection with low task orientation, especially in conjunction with high ego orientation, may result from a combination of unsuccessful attempts and the lack of internal success criteria. To this end, we found the low task/high ego and low task/low ego groups to have higher levels of external regulation than the high task/low ego group. In addition to the lack of internal success criteria, given the controlling nature of external regulation, it would appear that for these individuals their perception of ability is normatively referenced and influenced predominantly by external factors (e.g., reward, perceived threat). With this in mind, we concur with Brunel (2000) who stated that it is important to remind students that they are engaged in PE to learn and not to outperform their classmates. If the emphasis is to outperform others then such situations make it difficult for students who have concerns over their ability to maintain active, unselfconscious involvement (Nicholls, 1989).

Interestingly, the results revealed the low task/low ego group to be lower in amotivation, and higher in identified regulation than the low task/high ego group. This finding concurs with the findings of Roberts and colleagues (1996) who found the low task/high ego group to be the most motivationally at risk group. These findings suggest that the motivation deficiency of low task orientation is greater for students that have an accompanying high disposition towards ego involvement. Disparity exists in the achievement goal literature, however, as other research has identified the low task/low ego group to be the most motivationally deficient goal profile (e.g., Pensgaard & Roberts, 1997; Walling & Duda, 1995). Clearly, more research is required to examine the goal profile group most at-risk from a motivational perspective.

## Conclusion

Duda and Hall (2001) have argued that it is important for researchers to explore models of motivation which complement, extend, and synthesise existing knowledge. From a theoretical perspective the results of the present study suggest that achievement goal theory and self-determination theory may be two such approaches in the context of PE. Specifically, the data demonstrate task orientation to be related to what Vallerand and colleagues have referred to as 'a self-determined motivational profile' (i.e., high intrinsic motivation, high identified regulation, low external regulation, and low amotivation) (Vallerand, 1997; Vallerand & Fortier, 1998). From an applied perspective, this finding also provides some insight into how physical educators may begin to combat the decrease in interest and participation in PE during the school years.

Specifically, the data suggest that PE teachers should look to emphasise and foster task orientation in their students if they want to facilitate self-determined forms of situational motivation and consequent interest and participation rates. Future

experimental research should therefore be designed to examine the long-term effects of promoting self-determined motivation on interest and participation in PE. From a public health perspective this would appear to be very important as the schools, specifically PE, represent an important context in which to target health promotion across large numbers of the nation's youth (Biddle *et al.*, 1998; Sallis *et al.*, 1992).

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## References

- Akaike, H (1987). Factor analysis and AIC. *Psychometrika*, *52*, 317–332.
- Arbuckle, J.L., (1999). *AMOS (version 4.0)*. [Computer software.]. Chicago, IL: SmallWaters Corporation.
- Arbuckle, J.L., & Wothke, W. (1999). *AMOS 4.0 users' guide*. Chicago, IL: Smallwaters Corporation.
- Biddle, S.J.H (2001). Enhancing motivation in physical education. In G.C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 101–127). Champaign, IL: Human Kinetics.
- Biddle, S.J.H, Sallis, J., & Cavill, N (1998). *Young and active? Young people and health enhancing physical activity: Evidence and implications*. London: Health Education Authority.
- Blanchard, C., & Vallerand, R.J. (1996). *On the social and interpersonal determinants of situational motivation*. Unpublished manuscript, University of Quebec at Montreal, Canada.
- Bozdogan, H (1987). Model selection and Akaike's information criteria (AIC): The general theory and its analytical extensions. *Psychometrika*, *52*, 345–370.
- Browne, M.W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K.A. Bollen & J.S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.
- Brunel, P.C. (1996). The relationship of task and ego orientation to intrinsic and extrinsic motivation. *Journal of Sport and Exercise Psychology*, *18* (Suppl.), S59.
- Brunel, P.C. (1999). Relationship between achievement goal orientations and perceived motivational climate on intrinsic motivation. *Scandinavian Journal of Medicine & Sciences in Sports*, *9*, 365–374.
- Brunel, P.C. (2000). *Achievement motivation: Towards interactive effects of dispositional and situational variables on motivation and social cognitions*. Unpublished doctoral dissertation. University of Limoges, France.
- Chatzisarantis, N.L.D., Biddle, S.J.H., & Meek, G.A (1997). A self-determination theory approach to the study of intentions and the intention-behaviour relationship in children's physical activity. *British Journal of Health Psychology*, *2*, 343–360.
- Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*, 297–334.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed.). Hillsdale, NJ: Erlbaum.
- Cury, F., Biddle, S., Famose, J., Goudas, M., Sarrazin, P., & Durand, M. (1996). Personal and situational factors influencing intrinsic interest of adolescent girls in school physical education: A structural equation modelling analysis. *Educational Psychology*, *16*, 305–315.

- Deci, E.L., & Ryan, R.M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E.L., & Ryan, R.M. (1991). A motivational approach to self: Integration in personality. In R.A. Dienstbier (Ed.), *Nebraska symposium on motivation: Perspectives on motivation* (Vol. 38, pp. 237–288). Lincoln, NE: University of Nebraska.
- Deci, E.L., & Ryan, R.M. (1995). Human autonomy: The basis for true self-esteem. In M.H. Kernis (Ed.), *Efficacy, agency and self-esteem* (pp. 31–49). New York: Plenum.
- Dorobantu, M., & Biddle, S.J.H. (1997). The influence of situational and individual goals on the intrinsic motivation of Romanian adolescents towards physical education. *European Yearbook of Sport Psychology, 1*, 148–165.
- Duda, J.L. (1997). Perpetuating myths: A response to Hardy's 1996 Coleman Griffith Address. *Journal of Applied Sport Psychology, 9*, 307–313.
- Duda, J.L. (2001). Goal perspective research in sport in sport: Pushing the boundaries and clarifying some misunderstandings. In G.C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 129–182). Champaign, IL: Human Kinetics.
- Duda, J.L., & Hall, H.K. (2001). Achievement goal theory in sport: Recent extensions and future directions. In R. Singer, H. Hausenblas, & C. Janelle (Eds.), *Handbook of research in sport psychology* (2<sup>nd</sup> ed.) (pp. 417–434). New York: John Wiley & Sons.
- Duda, J.L., Fox, K.R., Biddle, S.J.H., & Armstrong, N. (1992). Children's achievement goals and beliefs about success in sport. *British Journal of Educational Psychology, 62*, 313–323.
- Dweck, C.S., & Elliott, E.L. (1983). Achievement motivation. In M. Hetherington (Ed.), *Handbook of child psychology. Vol. 4: Socialization, personality and social development* (pp. 643–691). New York: Wiley.
- Efron, B. (1982). *The jackknife, the bootstrap and other resampling plans*. Philadelphia, PA: SIAM.
- Fox, K.R., Goudas, M., Biddle, S.J.H., Duda, J.L., & Armstrong, N. (1994). Task and ego goal profiles in sport. *British Journal of Educational Psychology, 64*, 253–261.
- Frederick, C.M., & Ryan, R.M. (1995). Self-determination in sport: A review using cognitive evaluation theory. *International Journal of Sport Psychology, 26*, 5–23.
- Goudas, M., Biddle, S.J.H., & Fox, K.R. (1994). Achievement goal orientations and intrinsic motivation in physical testing with children. *Pediatric Exercise Science, 6*, 159–167.
- Guay, F., Vallerand, R.J., & Blanchard, C.M. (2000). On the assessment of state intrinsic and extrinsic motivation: The situational motivation scale (SIMS). *Motivation and Emotion, 24*, 175–213.
- Hedges, L.V. (1981). Distribution theory for Glass's estimator of effect size and related estimators. *Journal of Educational Statistics, 7*, 119–137.
- Kowal, J., & Fortier, M.S. (1999). Motivational determinants of flow: Contributions from self-determination theory. *Journal of Social Psychology, 139* (3), 355–368.
- Kowal, J., & Fortier, M.S. (2000). Testing relationships from the hierarchical model of intrinsic and extrinsic motivation using flow as a motivational consequence. *Research Quarterly for Exercise and Sport, 71*, 171–181.
- Mardia, K.V. (1974). Applications of some measures of multivariate skewness and kurtosis in testing normality and robustness studies. *Sankhya, Series B, 36*, 115–128.
- Marsh, H.W., Balla, J.R., & McDonald, R.P. (1998). Goodness-of-fit indices in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin, 102*, 391–410.
- Miserandino, M. (1996). Children who do well in school: Individual differences in perceived competence and autonomy in above average children. *Journal of Educational Psychology, 88*, 203–214.
- Nicholls, J. (1984). Conceptions of ability and achievement motivation. In R. Ames & C. Ames (Eds.), *Research on motivation in education: Student motivation* (Vol. 1, pp. 39–73). New York: Academic Press.
- Nicholls, J. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.
- Ntoumanis, N. (2001). A self-determination approach to the understanding of motivation in physical education. *British Journal of Educational Psychology, 71*, 225–242.
- 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.
- Nunnally, J.C. (1978). *Psychometric theory*. New York: McGraw-Hill.

- Pensgaard, A.M., & Roberts, G.C. (1997). The interaction between goal orientations and use of coping strategies among elite sport participants. In R. Lidor & M. Bar-Eli (Eds.), *Innovations in sport psychology: Linking theory and practice. Proceedings of the IX World Congress of Sport Psychology* (pp. 552–554). Netanya, Israel: Ministry of Education, Culture, and Sport.
- Roberts, G.C., Treasure, D.C., & Balague, G. (1998). Achievement goals in sport: Development and validation of the perception of success questionnaire. *Journal of Sport Sciences*, *16*, 337–347.
- Roberts, G.C., Treasure, D.C., & Kavussanu, M. (1996). Orthogonality of achievement goals and its relationship to beliefs about success and satisfaction in sport. *The Sport Psychologist*, *10*, 398–408.
- 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. (1989). Bridging the research traditions of task/ego involvement and intrinsic extrinsic motivation: Comment on Butler (1987). *Journal of Educational Psychology*, *2*, 265–268.
- 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.
- Sallis, J.F., Simons-Morton, B., Stone, E., Corbin, C., Epstein, L.H., Faucette, N., Iannotti, R., Killen, J., Klesges, R., Petray, C., Rowland, T., & Taylor, W. (1992). Determinants of physical activity and interventions in youth. *Medicine and Science in Sports and Exercise*, *24* (Suppl.), S248–257.
- Standage, M., Butki, B.D., & Treasure, D.C. (1999). Predicting satisfaction/interest and boredom in the context of physical activity: Achievement goal orientations, situational intrinsic motivation, and perceived ability. *Journal of Sport & Exercise Psychology*, *21* (Suppl.), S103.
- Standage, M., Treasure, D.C., & Duda, J.L. (October, 2000). *Validity and reliability of the situational motivation scale (SIMS) across three physical activity contexts*. Paper presented to the Association for the Advancement of Applied Sport Psychology, Nashville, TN.
- Treasure, D.C., & Harwood, C.J. (2000). *Point, counter-point: Goal profiling*. Association for the Advancement of Applied Sport Psychology, Newsletter, *15*, 7–12.
- Treasure, D.C., & Roberts, G.C. (1994a). Cognitive and affective concomitants of task and ego goal orientations during the middle school years. *Journal of Sport & Exercise Psychology*, *16*, 15–28.
- Treasure, D.C., & Roberts, G.C. (1994b). Perception of Success Questionnaire: Preliminary validation in an adolescent population. *Perceptual and Motor Skills*, *79*, 607–610.
- Treasure, D.C., Standage, M., & Lochbaum, M. (September, 1999). *Perceptions of the motivational climate and situational motivation in elite youth sport*. Paper presented to the Association for the Advancement of Applied Sport Psychology, Banff, Alberta, Canada.
- Treasure, D.C., Duda, J.L., Hall, H.K., Roberts, G.C., Ames, C., & Maehr, M.L. (2001). Clarifying misconceptions and misrepresentations in achievement goal research in sport: A response to Harwood, Hardy, and Swain. *Journal of Sport and Exercise Psychology*, *24*, 317–329.
- Ullman, J.B. (2001). Structural equation modeling. In B.G. Tabachnick & L.S. Fidell (Eds.), *Using multivariate statistics* (4<sup>th</sup> ed.) (pp. 653–771). Needham Heights, MA: Allyn and Bacon.
- Vallerand, R.J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M.P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 271–360). New York: Academic Press.
- Vallerand, R.J. (2001). A hierarchical model of intrinsic and motivation in sport and exercise. In G.C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 263–320). Champaign, IL: Human Kinetics.
- Vallerand, R.J., & Bissonnette, R. (1992). Intrinsic, extrinsic, and amotivational styles as predictors of behavior: A prospective study. *Journal of Personality*, *60*, 599–620.
- Vallerand, R.J., & Fortier, M.S. (1998). Measurement of intrinsic and extrinsic motivation in sport and physical activity: A review and critique. In J.L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 81–101). Morgantown, WV: FIT Press.
- Van Wersch, A., Trew, K., & Turner, I. (1992). Post-primary school pupils' interest in physical education: Age and gender differences. *British Journal of Educational Psychology*, *62*, 56–72.
- Vlachopoulos, S., & Biddle, S. (1996). Achievement goal orientations and intrinsic motivation in a



- track and field event in school physical education. *European Physical Education Review*, 2, 158–164.
- Walling, M.D., & Duda, J.L. (1995). Goals and their associations with beliefs about success in, and perceptions of the purposes of physical education. *Journal of Teaching in Physical Education*, 14, 140–156.
- White, S.A. (1998). Adolescent goal profiles, perceptions of the parent-initiated motivational climate and competitive trait anxiety. *The Sport Psychologist*, 12, 16–28.
- Williams, G.C., Rodin, G.C., Ryan, R.M., Grolnick, W.S., & Deci, E.L. (1998). Autonomous regulation and long-term medication adherence in adult outpatients. *Health Psychology*, 17, 269–276.

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## **Appendix 1: Children's Version of the Perceptions of Success Questionnaire (Roberts et al., 1998)**

*When participating in Physical Education, I feel most successful when . . .*

1. I beat other people (E)
2. I am the best (E)
3. I do better than others (E)
4. I show other people I am the best (E)
5. I try hard (T)
6. I really improve (T)
7. I overcome difficulties (T)
8. I succeed at something I could not do before (T)
9. I perform to the best of my ability (T)
10. I reach a target I set for myself (T)
11. I am clearly better (E)
12. I accomplish something others cannot do (E)

*Note:* Ego orientation items are denoted with (E), while task orientation items are denoted with (T).

## **Appendix 2: The Situational Motivation Scale (Guay et al., 2000)**

*Why are you currently engaged in this activity?*

1. Because I think that this activity is interesting (IM)
2. Because I am doing it for my own good (IR)
3. Because I am supposed to do it (ER)
4. There may be good reasons to do this activity, but personally I don't see any (AM)
5. Because I think that this activity is pleasant (IM)
6. Because I think this activity is good for myself (IR)
7. Because it is something that I have to do (ER)
8. I do this activity but I am not sure if it is worth it (AM)
9. Because this activity is fun (IM)
10. By personal decision (IR)
11. Because I don't have any choice (ER)
12. I don't know; I don't see what the activity brings me (AM)
13. Because I feel good when doing this activity (IM)
14. Because I believe this activity is important for me (IR)
15. Because I feel that I have to do it (ER)
16. I do this activity, but I am not sure it is a good thing to pursue it (AM)

*Note:* Intrinsic motivation items are denoted with (IM), Identified regulation with (IR), external regulation with (ER), and amotivation with (AM).