Journal of Social, Behavioral, and Health Sciences
2008, Volume 2, Issue 1, Pages 8–32

DOI: 10.5590/JSBHS.2008.02.1.02

WALDEN UNIVERSITY
A higher degree. A higher purpose.

Children's Goal Profiles and Perceptions of the Motivational Climate: Interactive Association With Self-Determined Motivation and Affective Patterns in Physical Education

Sam Carr
University of Bath

Daniel A. Weigand
Walden University and Achieve Acumen, Inc.

Developing an understanding of youngster's motivation for physical education (PE) is becoming increasingly important. This study examined the interactive effects of children's multiple goal profiles and perceptions of the motivational climate on indices of self-determined motivation and affect in 429 students (201 boys, 228 girls; *M* age = 11.2, *SD* = .39) in northwest England. MANOVA results revealed a significant ($p < .05$) main effect for goal profiles and perceived motivational climate. Moreover, a significant interaction between goal profiles and perceived climate was found: Children with high mastery/high performance profiles had high levels of intrinsic motivation and identified regulation, regardless of the climate. In contrast, other profile groups (i.e., high mastery/low performance, low mastery/high performance, low mastery/low performance) were more likely to have high levels of intrinsic motivation and identified regulation from exposure to a perceived mastery climate. These results are discussed in terms of the contribution they appear to make to recent analyses of multiple goals.

Key words: Achievement goals, physical education, motivation

A good deal of concern has been expressed about the sedentary lifestyles of contemporary children and adolescents (Biddle, Sallis, & Cavill, 1998; Sallis et al., 1992). It is

Address correspondence to Dr. Sam Carr, Department of Education, University of Bath, Bath, UK, BA2 7AY. Tel: +44 1225 383489. Fax: +44 1225 386113. E-mail: S.Carr@bath.ac.uk. Author Note: Sam Carr, Department of Education, University of Bath; Daniel A. Weigand, College of Social and Behavioral Sciences, Walden University, and Achieve Acumen, Inc.

suggested that such inactivity may have negative ramifications for the health status of young people (Fehily, 1999). An additional concern is that a sedentary lifestyle is likely to shadow many children into adulthood, raising concerns about the health of future generations.

Accordingly, researchers (e.g., Biddle, 2001; Duda, 1996, 2001) have recognized that school-based physical education (PE) has great potential to reinforce a physically active lifestyle. For many children, one of the first opportunities they have to participate in sport is through PE. Often it is the enjoyment that children get from their PE experiences that compels them to join a local sports club and extend their sporting interests (White, Kavussanu, & Guest, 1998). Additionally, Sallis et al. (1992) have contended that PE has the most potential for impacting public health because an existing infrastructure is devoted to school-based PE. However, despite this, research has demonstrated that as they mature, a large percentage of youths lose interest in PE and participation levels decrease (Van Wersch, Trew, & Turner, 1992).

Duda (1996) has contended that in order to combat such trends, and to maximize the opportunity for youngsters to engage in a physically active lifestyle, researchers must develop an understanding of why children engage and invest in PE. To this end, two motivational theories have proved particularly productive to date: self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000a) and achievement goal theory (e.g., Ames, 1984; Dweck, 1986; Nicholls, 1984, 1989).

Self-Determination Theory

Research incorporating a self-determination perspective (Deci & Ryan, 1985; Ryan & Deci, 2000a) in the context of PE is increasing (e.g., Brunel, 1999; Carr, 2006) Chatzisarantis, Biddle, & Meek, 1997; Standage, Duda, & Ntoumanis, 2005; Standage & Treasure, 2002; Wang, Chatzisarantis, Spray, & Biddle, 2002). Essentially, self-determination theory posits that individuals have three innate needs (autonomy, competence, and relatedness) that must be satisfied by social contexts in order to facilitate motivation within that context. When individuals are able to realize these needs, motivation will be more self-determined and positive cognitive, affective, and behavioral responses will ensue (Vallerand, 2001).

To examine the behavioral regulation resulting from the satisfaction of these innate needs, researchers have employed a multidimensional perspective. That is, there is a continuum of behavioral regulations that each reflect a qualitatively different reason for individuals undertaking a given behavior, ranging from the most to the least self-determined forms of motivation: intrinsic, extrinsic (external regulation, introjected regulation, identified regulation), and amotivation (Deci & Ryan, 1985; Ryan & Deci, 2000b). Intrinsic motivation reflects behaviors that are performed purely for their own sake or as an end in themselves; that is, activities are undertaken solely for the feelings of pleasure, enjoyment, and satisfaction derived from participation (e.g., children participate in PE because they enjoy the positive feelings of fun, pleasure, and satisfaction they get). External regulation reflects behaviors that are undertaken for external reasons such as a specific reward or because of pressures from external authorities (e.g., children participate in PE in order to gain praise or avoid being punished by the teacher). Introjected regulation refers to behaviors that are carried out primarily due to self-imposed feelings of guilt or pressure. Behaviors are no longer adopted because of external sources of pressure, but because of an internalization of self-imposed pressures: belief that one "ought to" not "wants to" undertake a specific behavior (e.g., children participate in PE because they would be burdened with a sense of guilt if they did not participate). Identified regulation reflects behaviors that are undertaken because individuals have adopted them as part of a personal value and choice system. While this type of behavioral regulation is more self-

determined in the sense that it stems from within individuals, it is still essentially a form of external regulation as behaviors are regulated by perceived external benefits (e.g., "I do PE because it will help me to lose weight") and not by intrinsic pleasures inherent in the activity. Amotivation reflects an absence of motivation, where individuals appear to no longer recognize a perceived purpose for engaging in the activity (Vallerand, 2001) and cannot identify a link between their actions and worthwhile outcomes (e.g., children cannot identify why they participate in PE).

Within a self-determination theory framework, research in both education (e.g., Miserandino, 1996; Ntoumanis, 2001; Ryan & Connell, 1989) and sport and PE (e.g., Kowal & Fortier, 1999; Standage et al., 2005) has linked more self-determined forms of motivation (i.e., intrinsic motivation and identified regulation) to a variety of positive motivational outcomes. The least self-determined forms of motivation (i.e., amotivation and external regulation) have typically been linked to maladaptive motivational outcomes (or negatively related to adaptive outcomes). Given the conceptual and empirical significance that self-determination theory seems to have in educational contexts, researchers have begun to explore potential antecedents of the various multidimensional behavioral regulations. To this end, a particularly fruitful avenue of research has been the link that achievement goal theory has with self-determination theory.

Achievement Goal Theory

Achievement goals are the purpose or cognitive-dynamic focus of competence-related behavior (Maehr, 1989). While different theorists have utilized slightly different nomenclature, two predominant goal orientations have persisted: mastery and performance goals (e.g., Ames, 1984; Dweck, 1986; Nicholls, 1984, 1989). Mastery goals focus individuals on development and demonstration of competence via personal improvement and learning. In contrast, performance goals focus individuals on the demonstration or proving of competence levels relative to others. These achievement goals provide the framework within which individuals interpret and react to achievement experiences and have been implicated in evoking qualitatively different patterns of cognition, affect, and behavior (Dweck & Leggett, 1988; Elliott & Dweck, 1988; Nicholls, 1989).

Furthermore, achievement goals have been proposed (e.g., Nicholls, 1989) and identified as orthogonal constructs in both educational (e.g., Meece & Holt, 1993; Pintrich, 2000a; Pintrich & Garcia, 1991) and sporting contexts (e.g., see Duda, 2001; Hodge & Petlichkoff, 2000); individuals can therefore endorse varying levels of each goal orientation. Research in PE has found that mastery goals are typically positively associated with various motivational factors including intrinsic motivation, positive affect, and the belief that effort is the cause of success (e.g., Duda, Chi, Newton, Walling, & Catley, 1995; Goudas, Biddle, & Fox, 1994; Thomas & Barron, 2006). Performance goals have been identified as maladaptive only when unaccompanied by mastery goals in PE. However, if they are pursued in conjunction with mastery goals they have been linked with various adaptive motivational constructs (Carr, 2006; Fox, Goudas, Biddle, Duda, & Armstrong, 1994; Standage & Treasure, 2002; Wang & Biddle, 2001).

Perceived Motivational Climate

Achievement goal approaches (e.g., Ames, 1984, 1992; Nicholls, 1984, 1989) have also contended that the achievement environment plays a crucial role in the regulation of motivational responses; that is, individuals' subjective perception of the motivational climate in specific contexts are partly responsible for shaping their responses toward that context. Ames (1992) contended that a perceived mastery-oriented climate is evident when individuals perceive a

situational focus on self-improvement, learning, and task mastery through the teacher's emphasis of effort and personal progression. In contrast, if individuals perceive a focus on normative criteria, social comparison, competition, and the unacceptability of mistakes, a perceived performance-oriented climate prevails (Ames, 1992).

Research has provided evidence to support conceptual links between the motivational climate and motivational responses. Specifically, a perceived mastery-oriented climate in sport and PE has been positively associated with adaptive responses such as enjoyment, satisfaction, perceived competence, effort, the belief that effort leads to success, positive attitudes, and intrinsic motivation and negatively associated with maladaptive responses such as worry, tension, and concerns over mistakes (e.g., Carpenter & Morgan, 1999; Goudas & Biddle, 1994; Kavussanu & Roberts, 1996; Ommundsen, Roberts, & Kavussanu, 1998; Ommundsen et al., 2005; Papaioannou, 1994; Treasure, 1997; Walling, Duda, & Chi, 1993; Weigand & Burton, 2002). In contrast, perceptions of a performance-oriented climate have been positively associated with maladaptive responses such as the belief that superior ability leads to success, the belief that the purpose of sport is to enhance social status, extrinsic motivation, and negative attitude and negatively associated with enjoyment and satisfaction (e.g., Ommundsen et al., 1998; Papaioannou, 1998; Solmon, 1996; Solmon & Lee, 1997).

Self-determined Motivation as a Function of Achievement Goals and Motivational Climate

Achievement goal theory has been both conceptually and empirically implicated in the development of self-determined motivation in a variety of contexts. For example, Nicholls (1989) believed that highly mastery oriented individuals are motivated into an activity for its own sake and view it as an end in itself; this is a fundamental element of intrinsic motivation (Deci & Ryan, 1985). Accordingly, intrinsically motivated individuals have been suggested as more likely to endorse mastery goals (Nicholls, 1989). In contrast, highly performance oriented individuals view achievement striving as a means to an end, usually the demonstration of superior ability relative to others (Nicholls, 1989); a feature incompatible with intrinsic motivation. Therefore, the primary concern of individuals is on obtaining favorable judgments of ability; the intrinsic benefits associated with learning and mastery are secondary or ignored. It is this dependence on comparison that reduces the likelihood that perceived competence and autonomy will be enhanced (Deci & Ryan, 1995), limiting the opportunity to foster intrinsic motivation and leading to the internalization of less self-determined motivation.

There is evidence to support these conceptual links in PE contexts: Mastery goals have been linked to intrinsic forms of motivation and performance goals have been either positively linked to extrinsic motivation or negatively related to intrinsic motivation (e.g., Brunel, 1996, 1999; Doborantu & Biddle, 1997; Goudas et al., 1994; Vlachopolous & Biddle, 1996). Furthermore, Standage and Treasure (2002) have examined the effects of goal orientations on multidimensional motivation for PE at a situational level. Results indicated that profile groups with a high mastery orientation experienced higher levels of situational intrinsic motivation and identified regulation, and lower levels of external regulation and amotivation than groups with a low mastery orientation.

However, while such studies have gone some way to implicating achievement goal theory in the development of self-determined motivation, what has not been studied is how an interaction between achievement goals and the perceived motivational climate impacts upon forms of self-determined motivation in PE. To explain how achievement goals and perceptions of the motivational climate might coalesce to influence levels of self-determined motivation, two hypotheses can be advanced. The first hypothesis stems from a traditional mastery goal

perspective and suggests that any focus on mastery goals is more likely to foster self-determined motivation and related positive responses. From this perspective, a perceived mastery climate is likely to be more adaptive for all individuals, regardless of personal goal profiles, because the increased contextual focus on mastery goals is likely to enhance the likelihood that individuals will endorse mastery goals and subsequently experience positive motivational consequences within the context. Of course, from this perspective, individuals with a strong personal mastery orientation (i.e., high mastery/low performance or high mastery/high performance orientation) in combination with strong perceptions of a mastery climate may further still enhance their likelihood of developing positive motivation because both personal and contextual variables should combine to enhance the strength of mastery goal endorsement.

A second hypothesis that may explain the influence of personal goals and perceptions of the motivational climate on self-determined motivation stems from researchers' (e.g., Biddle, 2001; Duda, 2001; Pintrich, 2000b) suggestions that there may be some utility in examining the congruence between individuals' personal achievement goals and goals emphasized by the environment. That is, for example, it may be that predominantly performance oriented individuals (i.e., low mastery/high performance orientation) who perceive the environment in a given context to be performance oriented have different motivational responses to performance-oriented individuals who perceive that the environment is predominantly mastery oriented.

In the context of self-determination theory, there may be a conceptual basis from which to investigate this personal goal and motivational climate synchronization hypothesis. For example, self-determination theorists (Deci, Ryan, & Willams, 1996; Grolnick, Deci, & Ryan, 1997) have identified that educator behavior can be classified as autonomy-supportive, competence-supportive, and relational-supportive, according to the specific need that a given behavior is assumed to support. According to Assor, Kaplan, and Roth (2002), "an educator's action is experienced as highly autonomy-supportive if that action helps children to develop and realize their personal goals and interests" (p. 263), and "an educator's action is autonomy-suppressing if it is perceived as interfering with the realization of the child's personal goals and interests" (p. 263). Assor et al. (2002) have described such autonomy-supporting behavior as reflecting teachers' active attempts to help students realize their personal goals. In contrast, they have described autonomy-suppressing behavior as those that involve compelling children to undertake activities that they may personally find boring or meaningless. Hence, educator behavior that is perceived by children as relevant to their personal goals and values may play a role in enhancing children's sense of autonomy.

Given that personal achievement goals reflect children's competence-related focus in achievement contexts, when they perceive that the achievement environment does not provide them with the opportunity to fully satisfy these personal goals (i.e., personal goals and climate are incongruent), they may well experience autonomy suppression. They are unable to readily satisfy their personal achievement goals because the motivational climate tends to center on achievement concerns that are not congruent with their personal goals. Hence, such children may be less likely to experience autonomy, to experience and pursue competence as they define it, and consequently to develop self-determined motivation within a context that they perceive emphasizes an incongruent motivational climate. They may also be more likely to experience negative affective responses such as boredom, frustration, and anger due to the lack of opportunity to satisfy their personal achievement goals.

In the context of achievement goal theory, such an argument would suggest that predominantly mastery oriented individuals (i.e., high mastery/low performance orientation)

might be most likely to develop self-determined forms of motivation when they perceive that the environment is mastery oriented and that predominantly performance oriented individuals (i.e., low mastery/high performance orientation) might benefit most when they perceive that the environment is performance oriented. However, this does not imply that such individuals would necessarily require an *exclusively* mastery or performance oriented climate respectively. For example, it may be that as long the climate is perceived to emphasize goals that are congruent with a performance-oriented individual's personal goals it is of no further consequence to the individual's motivation if the climate is also perceived to emphasize mastery goals. Additionally, such an argument raises interesting implications for individuals who endorse both mastery *and* performance goals (i.e., high mastery/high performance orientation). It may be that these individuals would be more likely to fully satisfy their personal goal profile when they perceive that the climate also emphasizes both types of achievement opportunities, as opposed to either an exclusively mastery or performance climate. It may also be that such individuals are able to develop equally adaptive motivational benefits from both mastery *or* performance oriented climates because both climates provide opportunities for such individuals to satisfy elements of their personal goal profile.

Newton and Duda (1999) have contended that such a person-environment fit hypothesis can only be adequately tested if the motivational responses of individuals in an environment that they perceive is compatible with their personal goals is compared to responses of those participating in a climate incongruent with their personal goals. The purpose of this study was therefore to explore the effects of children's personal goal profiles, perceptions of the motivational climate, and the interaction between these variables on self-determined motivation and related positive and negative affective responses in PE.

Method

Participants

The participants were 429 children (201 boys, 228 girls; *M* age = 11.2, *SD* = .39) from three schools in the northwest of England. All children were in Year 7 and 95% were Caucasians.

Procedures

Data were collected at the beginning and end of a 12-week time phase, from the beginning of October to the end of December. At the beginning of the time phase, self-report measures of children's dispositional achievement goals for PE were administered. At the end of the time phase, self-report measures of children's self-determined motivation, positive and negative affect, and retrospective perceptions of the motivational climate in PE over the 12-week time phase were administered. The first surveys took approximately 15 min to complete; the second surveys took around 25 min to complete. Children were instructed to complete the surveys in their PE classes, without conferring with peers, to be as honest as they could, and were encouraged to ask questions if confused. All procedures were approved by an Institutional Review Board and children's written assent was required (parental consent was also provided).

Children were included in the study if they had completed both data collection sessions, resulting in a final sample size of 429 (out of an original 512). Comparisons between goal orientations of children who had completed both sessions, versus those who had not completed the second session, revealed no discernable differences in goal orientations for PE.

Measures

Achievement goals. Children's orientations towards mastery and performance goals in PE were assessed using Carr's (2006) adapted form of the Patterns of Adaptive Learning Survey (Midgely et al., 1996). These scales have been reliable and valid in several classroom studies of elementary and middle school students (e.g., Middleton & Midgley, 1997; Midgely et al., 1996; Roeser, Midgley, & Urdan, 1996) and Carr (2006) has provided evidence in favor of their factor structure, validity, and reliability for assessing mastery and performance goals in PE. The scales consisted of five items assessing mastery goals (e.g., "I do PE because I'm interested in it") and five items assessing performance goals (e.g., "In PE I want to do better than others"). Children responded to the five mastery items and the five performance items on a five-point Likert-type scale, ranging from 1 (*not at all true*) through 5 (*very true*). Average orientations were obtained by summing the relevant items and dividing by the number of items.

Perceptions of PE motivational climate. Children's retrospective perceptions of the motivational climate emphasized in their PE lessons between October (when they had begun secondary school) and December (when they completed the second data collection session) were measured using a modified version of Newton, Duda, and Yin's (2000) Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2). Children were required to recall what they felt the climate had been like in their school PE lessons so far. While the PMCSQ-2 was originally designed to assess perceptions of the environmental emphasis in sport, it has been successfully adapted to PE classes (e.g., Carr, 2006; White et al., 1998). The questionnaire consists of two higher-order scales (originally referred to as task- and ego-orientations; here referred to as mastery and performance climates), each consisting of three lower-order subscales (*mastery*: emphasis on co-operative learning, emphasis on effort and improvement, and emphasizing that each person has an important role in an organization or class; *performance*: emphasis on inter-student rivalry, unequal recognition, and punishment for mistakes). The factorial validity of the two higher-order and six lower-order factors has been examined using confirmatory factor analysis and the instrument has been demonstrated as reliable and concurrently valid (Newton et al., 2000).

Participants were presented with the stem "In my PE lessons..." and, to assess perceptions of a mastery climate, responded to four items assessing an emphasis on co-operative learning (e.g., "students help each other to learn"), five items assessing an emphasis on each student playing an important role (e.g., "people of all skill levels are equally important in our PE lessons"), and eight items measuring an emphasis on effort and learning (e.g., "our PE teacher wants us to try new skills"). To assess perceptions of a performance climate, participants responded to three items measuring an emphasis on inter-student rivalry (e.g., "our PE teacher praises students only when they outperform others"), seven items measuring promotion of unequal recognition (e.g., "our PE teacher gives most of his or her attention to the best students"), and six items measuring an emphasis on punishment of mistakes (e.g., "our PE teacher gets mad when a student makes a mistake"). Average climate perceptions were obtained by summing the relevant items and dividing by the number of items.

Self-determined motivation. Children's levels of intrinsic motivation, identified regulation, introjection, external regulation, and amotivation for PE, were assessed using Goudas et al.'s (1994) adaptation of the Perceived Locus of Causality Scale. Children were presented with the stem "I take part in PE…", and responded to three items assessing intrinsic motivation (e.g., "because PE is fun"), three items assessing identified regulation (e.g., "because I want to improve at PE"), four items assessing inrojected regulation (e.g., "because I'll feel bad about

myself if I didn't"), and four items assessing external regulation (e.g., "because I'll get into trouble if I don't"). Amotivation was assessed on the same stem, using three items (e.g., "but I really feel I am wasting my time in PE") that Goudas et al. (1994) adapted from the Academic Motivation Scale (Vallerand et al., 1992). Children responded to these 17 items on a 5-point Likert-type scale, ranging from 1 (*not at all true*) through 5 (*very true*). These behavioral regulation scales have been identified as possessing adequate psychometric properties in previous PE studies (e.g., Standage et al., 2005; Wang & Biddle, 2001; Wang et al., 2002). Average motivations were obtained by summing the relevant items and dividing by the number of items.

Positive and negative affect for PE. Affect was assessed using two scales (positive and negative affect) developed by Pintrich (2000b) to assess children's affective patterns in classrooms. The four positive affect items focused on how often children felt they were happy, proud about themselves, had fun, and were in a good mood during PE lessons. The four negative affect items focused on how often they felt angry, ashamed, embarrassed, and frustrated. Children responded to these items on a 7-point Likert-type scale ranging from 1 (*not at all true*) through 7 (*very true*). Pintrich (2000b) has demonstrated the psychometric properties of these scales in an academic classroom context. Average affects were obtained by summing the relevant items and dividing by the number of items.

Results

Reliability of Instruments and Descriptive Analyses

Reliability analyses using Cronbach's (1951) alpha coefficient were conducted to determine the internal consistency of the constructs measured in this investigation. Table 1 displays the results of these analyses. All subscales demonstrated adequate internal consistency (i.e., $\alpha \geq 0.7$, Nunnally, 1978) with the exception of the introjected regulation scale, which demonstrated a marginally reliable alpha value (i.e., 0.69). Table 1 also displays means and standard deviations for all subscales.

Creation of Personal Goal Profile Groups Using Extreme Group Splits

Congruent with previous research (e.g., Duda, Fox, Biddle, & Armstrong, 1992; Fox et al., 1994), a very weak positive correlation ($r = .10$, $p < .05$) between mastery and performance-approach goals suggested an orthogonal relationship between the constructs. Consequently, an extreme (i.e., $\pm$ .5 *SD*) median split procedure was used in order to divide the sample into four goal profile groups (i.e., high mastery/low performance, low mastery/high performance, high mastery/high performance, and low mastery/low performance). This extreme split procedure was adopted in light of suggestions (e.g., Standage & Treasure, 2002; Treasure & Harwood, 2000) that profile groups derived from simple mean or median splits are likely to incorporate participants whose scores do not significantly deviate from the sample mean to the extent that they might be considered to reflect "high" or "low" scores for a given achievement goal. *Extreme* split procedures, on the other hand, eliminate this problem by including in goal profile groups only those participants whose achievement goal scores are more than .5 *SD* above or below the mean or median value. The advantage of such procedures are that researchers can be more confident that goal profile groups are statistically more reflective of the "high" and "low" labels that they are assigned. However, the disadvantage of such procedures is that large portions of the sample are often excluded as they do not exhibit scores that fall outside of the $\pm$ .5 *SD* criteria. For this study, we considered it more important to identify profile groups that were clearly reflective of "high" and "low" values for the two achievement goals. Hence, an extreme split

procedure was employed, excluding a significant proportion of the sample in later stages of data analysis.

Table 1
Descriptive Statistics and Cronbach's Alpha

Variable	*M*	*SD*	Alpha
Achievement goals			
Mastery goals	4.22	.65	.75
Performance goals	2.89	.97	.83
Motivational climate			
Mastery climate	3.89	.58	.86
Performance climate	2.28	.69	.89
Self-determined motivation			
Intrinsic motivation	3.99	.88	.81
Identified regulation	4.08	.84	.77
Introjected regulation	2.58	.87	.69
External regulation	2.33	.90	.73
Amotivation	1.67	.75	.74
Affective patterns			
Positive affect	5.29	1.29	.85
Negative affect	2.14	1.08	.73

Note. Affect scores are measured on a 7-point scale (1 = *low*, 7 = *high*). All other scores are measured on 5-point scales (1 = *low*, 5 = *high*).

Table 2
Mean Mastery and Performance Goal Scores for Personal Goal Profiles

		Mastery			**Performance**		
Profile group	*n*	*M*	*SD*	*z*	*M*	*SD*	*z*
High mastery/low performance	56	4.82	.17	.92	1.78	.45	-1.14
Low mastery/high performance	27	3.30	.47	-1.42	3.92	.36	1.06
High mastery/high performance	77	4.78	.16	.86	4.01	.49	1.15
Low mastery/low performance	56	3.33	.43	-1.37	1.91	.38	-1.01

The four goal profile groups were created using an extreme (± .5 *SD*) median split (median mastery = 4.20, median performance = 2.88) for each goal construct. Table 2 displays the descriptive statistics for mastery and performance goals for each of these four profile groups. The four extreme goal profile groups contained a total of 216 children from the original sample.

Gender Differences within the Goal Profile Groups

We conducted a chi-square test to examine gender differences among the four extreme goal profile clusters outlined above. The results of the chi-square test indicated that there were gender differences among the clusters, $\chi^2 = (3, n = 216) = 9.88$, $p < .05$; Cramer's $V = .21$, $p < .05$). Examination of observed and expected values indicated significantly more males (observed $n = 47$, expected $n = 37.1$) than females (observed $n = 30$, expected $n = 39.9$) in the high mastery/high performance goals group and significantly less males (observed $n = 19$, expected $n = 27$) and more females (observed $n = 37$, expected $n = 29$) in the low mastery/low performance group.

Creation of Climate Profile Groups Using Cluster Analysis

Examination of the bivariate correlation between perceptions of a mastery and performance oriented climate revealed a significant negative relationship ($r = -.39$, $p < .001$) between the constructs, suggesting a non-orthogonal relationship. In support of this, Duda (2001) has suggested that the PMCSQ-2 was not designed to portray an orthogonal relationship between mastery and performance climate dimensions, as the two are conceptually at odds with each other, and previous researchers (e.g., Carr, 2006; Newton et al., 2000) have also identified weak to moderate negative correlations between mastery and performance dimensions of the perceived motivational climate using the PMCSQ-2. Hence, in this study the decision was made not to partition the sample into four orthogonal groups based upon perceived motivational climate scores because this appeared both conceptually and statistically questionable. Instead, children's scores for perceived mastery and performance climate dimensions were grouped using cluster analysis procedures to identify naturally occurring groups in the data. This involved "grouping" the initial sample of children ($N = 429$) into distinct clusters based upon their perceptions of the motivational climate.

To identify homogenous subgroups of children, a two-stage method of cluster analysis was employed (Hair, Anderson, Tatham, & Black, 1998). In the first stage, a hierarchical clustering method is utilized and the most feasible solution in terms of number of clusters and cluster centers is identified (with the aid of dendrograms, agglomeration schedules, and theoretical guidance). In the second stage, the cluster centers identified in the hierarchical method are entered as the initial cluster seeds in a non-hierarchical method (i.e., k-means). If the final cluster centers generated by the non-hierarchical method are similar to those entered as the initial seed-points, then the hierarchical cluster solution is partially verified. By using this method of clustering, the non-hierarchical analysis serves both as a refinement and a verification of clusters identified in the hierarchical analysis (Hair et al., 1998).

Upon deletion of 22 univariate and/or multivariate outliers, the cluster analysis procedures were conducted on a sample of 407. In the first stage of the analysis, Ward's hierarchical method was utilized. Examination of dendrograms, agglomeration schedules, and icicle diagrams suggested that a two-cluster solution appeared to be the most suitable. In the second stage, k-means clustering was employed with the cluster center values identified from the hierarchical analysis inputted as the initial starting seeds for the clustering process. The final cluster centroids were very similar to those identified by the hierarchical method and approximately 89% of the sample remained in the same cluster over the two stages of analysis.

Table 3 displays the centers of the two identified clusters. Clusters were labeled as "high," "moderate," or "low" on the mastery and performance climate dimensions depending upon whether they exhibited *z* scores that were greater than .5 (high), less than -.5 (low), or within a $\pm$ .5 range (moderate). Table 3 also displays *z* scores for each cluster and the final semantic label attached to each cluster. Clusters were labeled "low mastery/high performance climate" and "high mastery/low performance climate," providing credence to the suggestion that the relationship between climate dimensions was non-orthogonal in nature.

Table 3

Mean Perceived Mastery and Performance Climate Scores, Standard Deviations, Z Scores, and Labels for the Climate Clusters

		Mastery			**Performance**		
Cluster label	*n*	*M*	*SD*	*z*	*M*	*SD*	*z*
Low mastery/high performance	186	3.53	.53	-1.06	2.84	.53	.81
High mastery/low performance	221	4.20	.45	.53	1.82	.41	-.62

Gender Differences within the Climate Profile Groups

We conducted a chi-square test to examine gender differences between the two perceived motivational climate clusters outlined above. The results of the chi-square test indicated that there were gender differences among the clusters (χ^2 = (1, *n* = 407) = 16.99, $p < .01$; Cramer's *V* = .20, $p < .01$). Examination of observed and expected values indicated significantly more males (observed *n* = 107, expected *n* = 86.3) than females (observed *n* = 77, expected *n* = 97.7) in the low mastery/high performance climate group and significantly less males (observed *n* = 84, expected *n* = 104.7) and more females (observed *n* = 139, expected *n* = 118.3) in the high mastery/low performance climate group.

MANOVA to Test the Effects of Goal Profiles, Climate Dimensions, and an Interaction Effect

In order to test for the effects of goal profiles, climate perceptions, and an interaction between goals and perceived climate on self-determined motivation and affective patterns in PE, a two-way MANOVA was conducted. This MANOVA was conducted on an initial sample of 216 children due to the fact that the extreme goal profiling procedures eliminated a large portion of the initial sample (as discussed above). Prior to MANOVA analysis, the data was screened for univariate and multivariate outliers, as MANOVA has been suggested to be sensitive to presence of outliers (Tabachnick & Fidell, 2001). Nine univariate outliers ($z > 3.29$, $p = .001$) were identified and deleted. Using Mahalanobis distance values for assessing multivariate outliers, with seven dependent variables and a criterion alpha of .001 (critical $\chi^2 = 24.32$), three further multivariate outliers were identified and deleted. Additionally, Tabachnick and Fidell (2001) have suggested examining F_{max} ratios as an indicator of homogeneity of variance for MANOVA cells. In samples with cell sizes of relative equality (largest to smallest cell *n* ratio of around 4 or 5:1), F_{max} ratios of less than 10 have been suggested as acceptable levels of variance

homogeneity (Tabachnick & Fidell, 2001). Examination of F_{max} ratios revealed that all ratios were acceptable according to the above criterion. Finally, collinearity diagnostics indicated that no variables exhibited multicollinearity from condition indexes (in accordance with the criteria forwarded by Belsely, Kuh, & Welsh, 1980). Hence, the final sample size for the MANOVA was 204 and the smallest cell size for the interaction effect was 10, fulfilling Tabachnick and Fidell's (2001) condition that all cell sizes contain at least as many cases as dependent variables. The significance criterion was set at alpha = .05 and all *p* values are reported as exact (as per SPSS output).

With the use of Wilks's criterion, the combined dependent variables were significantly effected by goal profile group, Wilks's lambda = .51, F (27, 570) = 5.22, p = .001, η^2 = .20, perceived motivational climate group, Wilks's lambda = .70, F (9, 188) = 9.04, p = .001, η^2 = .30, and a goal profile and perceived climate interaction, Wilks's lambda = .79, F (27, 549) = 1.68, p = .02, η^2 = .07. Subsequent follow-up univariate tests on the personal goal profile main effects revealed significant effects for intrinsic motivation, F (3, 196) = 28.73, p = .001, η^2 = .31, identified regulation, F (3, 196) = 30.63, p = .001, η^2 = .32, introjected regulation, F (3, 196) = 11.65, p = .001, η^2 = .15, external regulation, F (3, 196) = 3.89, p = .01, η^2 = .06, amotivation, F (3, 196) = 9.72, p = .001, η^2 = .13, positive affect, F (3, 196) = 23.35, p = .001, η^2 = .26, and negative affect, F (3, 196) = 4.38, p = .01, η^2 = .06. Follow-up post-hoc Tukey (HSD) pairwise comparisons were conducted to further examine the differences between the personal goal profile groups. Table 4 displays the mean values and post-hoc results for each of the goal profile groups. Typically, results indicated that the high mastery/low performance and high mastery/high performance groups had the most adaptive motivational patterns.

Table 4

Means and Standard Deviations for Goal Profile Groups, Climate Groups, and Interaction Groups Together with Post-Hoc Analyses of Main Effects

Variable	Goal profile group	Climate group	*M*	*SD*	*n*
Intrinsic motivation					
	Hi mast/low perf	Low mast/hi perf	3.67	.87	12
		Hi mast/low perf	4.62	.48	40
		Total	*4.40$_a$*	*.71*	*52*
	Low mast/hi perf	Low mast/hi perf	2.93	.67	15
		Hi mast/low perf	3.44	.58	10
		Total	*3.11$_{a,b}$*	*.67*	*25*
	Hi mast/hi perf	Low mast/hi perf	4.34	.78	35
		Hi mast/low perf	4.48	.72	37
		Total	*4.41$_b$*	*.75*	*72*
	Low mast/low perf	Low mast/hi perf	3.01	.95	29
		Hi mast/low perf	3.70	.89	26
		Total	*3.34$_{a,b}$*	*.98*	*55*
	Total	**Low mast/hi perf**	**3.59$_c$**	**1.04**	**92**
		Hi mast/low perf	**4.27$_c$**	**.80**	**112**

Identified regulation					
	Hi mast/low perf	Low mast/hi perf	3.53	.96	12
		Hi mast/low perf	4.59	.58	40
		Total	*4.35$_a$*	*.81*	*52*
	Low mast/hi perf	Low mast/hi perf	3.35	.56	15
		Hi mast/low perf	3.96	.48	10
		Total	*3.57$_{a,b}$*	*.60*	*25*
	Hi mast/hi perf	Low mast/hi perf	4.34	.62	35
		Hi mast/low perf	4.65	.38	37
		Total	*4.50$_b$*	*.53*	*72*
	Low mast/low perf	Low mast/hi perf	3.30	.82	29
		Hi mast/low perf	3.55	.79	26
		Total	*3.42$_{a,b}$*	*.81*	*55*
	Total	**Low mast/hi perf**	**3.73$_c$**	**.86**	**92**
		Hi mast/low perf	**4.32$_c$**	**.73**	**112**
Introjected regulation					
	Hi mast/low perf	Low mast/hi perf	2.35	.85	12
		Hi mast/low perf	2.25	.92	40
		Total	*2.27$_b$*	*.90*	*52*
	Low mast/hi perf	Low mast/hi perf	2.67	.61	15
		Hi mast/low perf	2.31	.50	10
		Total	*2.54*	*.59*	*25*
	Hi mast/hi perf	Low mast/hi perf	3.20$_{a,b}$	.85	35
		Hi mast/low perf	2.85	.92	37
		Total	*3.02*	*.90*	*72*
	Low mast/low perf	Low mast/hi perf	2.43$_b$	.83	29
		Hi mast/low perf	2.03	.66	26
		Total	2.24	.78	55
	Total	**Low mast/hi perf**	**2.76$_c$**	**.88**	**92**
		Hi mast/low perf	**2.40$_c$**	**.89**	**112**
External regulation					
	Hi mast/low perf	Low mast/hi perf	2.40	.81	12
		Hi mast/low perf	1.76	.61	40
		Total	*1.90$_{a,b,c}$*	*.70*	*52*
	Low mast/hi perf	Low mast/hi perf	2.94	.74	15
		Hi mast/low perf	2.44	.92	10
		Total	*2.76$_a$*	*.83*	*25*
	Hi mast/hi perf	Low mast/hi perf	2.54	.63	35
		Hi mast/low perf	2.05	.99	37
		Total	*2.29$_b$*	*.87*	*72*
	Low mast/low Perf	Low mast/hi perf	2.69	.87	29
		Hi mast/low perf	2.38	.83	26
		Total	*2.54$_c$*	*.86*	*55*
	Total	**Low mast/hi perf**	**2.63$_d$**	**.76**	**92**
		Hi mast/low perf	**2.05$_d$**	**.86**	**112**
Amotivation					

	Hi mast/low perf	Low mast/hi perf	1.78	.66	12
		Hi mast/low perf	1.22	.39	40
		Total	*1.35$_a$*	*.52*	*52*
	Low mast/hi perf	Low mast/hi perf	2.36	.68	15
		Hi mast/low perf	1.74	.62	10
		Total	*2.13$_{a,b}$*	*.71*	*25*
	Hi mast/hi perf	Low mast/hi perf	1.83	.78	35
		Hi mast/low perf	1.27	.39	37
		Total	*1.54$_b$*	*.67*	*72*
	Low mast/low perf	Low mast/hi perf	2.46	.80	29
		Hi mast/low perf	1.56	.64	26
		Total	*2.03$_{a,b}$*	*.85*	*55*
	Total	**Low mast/hi perf**	**2.11$_c$**	**.80**	**92**
		Hi mast/low perf	**1.35$_c$**	**.51**	**112**
Positive affect					
	Hi mast/low perf	Low mast/hi perf	4.92	1.32	12
		Hi mast/low perf	6.11	.93	40
		Total	*5.83$_a$*	*1.14*	*52*
	Low mast/hi Perf	Low mast/hi perf	4.02	1.06	15
		Hi mast/low perf	4.83	.70	10
		Total	*4.31$_{a,b}$*	*1.01*	*25*
	Hi mast/hi perf	Low mast/hi perf	5.68	1.14	35
		Hi mast/low perf	6.00	.76	37
		Total	*5.84$_b$*	*.97*	*72*
	Low mast/low perf	Low mast/hi perf	3.97	1.34	29
		Hi mast/low perf	4.80	1.30	26
		Total	*4.36$_{a,b}$*	*1.39*	*55*
	Total	**Low mast/hi perf**	**4.75$_c$**	**1.44**	**92**
		Hi mast/low perf	**5.67$_c$**	**1.11**	**112**
Negative affect					
	Hi mast/low perf	Low mast/hi perf	2.19	.96	12
		Hi mast/low perf	1.64	.72	40
		Total	*1.77$_{a,b}$*	*.80*	*52*
	Lowe mast/hi Perf	Loe mast/hi perf	2.16	.81	15
		Hi mast/low perf	3.11	1.59	10
		Total	*2.50$_a$*	*1.21*	*25*
	Hi mast/hi perf	Low mast/hi perf	2.20	1.02	35
		Hi mast/low perf	1.68	.70	37
		Total	*1.93*	*.90*	*72*
	Low mast/low Perf	Low mast/hi perf	2.90	1.44	29
		Hi mast/low perf	1.84	1.01	26
		Total	*2.40$_b$*	*1.36*	*55*
	Total	**Low mast/hi perf**	**2.41**	**1.17**	**92**
		Hi mast/low perf	**1.82**	**.95**	**112**

Note. For each dependent variable, means sharing the same subscript are significantly different at the $p <$ .05 level.

Follow-up univariate tests on the perceived motivational climate main effects revealed significant effects for intrinsic motivation, F (1, 196) = 22.80, p = .001, η^2 = .10, identified regulation, F (1, 196) = 28.97, p = .001, η^2 = .13, introjected regulation, F (1, 196) = 5.27, p = .03, η^2 = .03, external regulation, F (1, 196) = 14.22, p = .001, η^2 = .07, amotivation, F (1, 196) = 44.42, p = .001, η^2 = .19, and positive affect, F (1, 196) = 20.33, p = .001, η^2 = .09. Table 4 also displays the mean values for the two perceived climate groups. Generally, a perceived mastery climate (i.e., the high mastery/low performance climate group) appeared to evoke more adaptive motivational patterns than a perceived performance climate (i.e., low mastery/high performance climate group).

Of particular interest to the current study was the significant interaction between personal goal profiles and perceived motivational climate. Follow-up univariate examinations of this multivariate interaction effect revealed significant interaction effects for intrinsic motivation, F (3, 196) = 2.81, p = .04, η^2 = .04, identified regulation, F (3, 196) = 3.52, p = .02, η^2 = .05, and negative affect, F (3, 196) = 5.41, p = .002, η^2 = .08. Figure 1 displays the interaction effect for intrinsic motivation and reveals that the high mastery/high performance goal group appears to have similarly high levels of intrinsic motivation in both perceived mastery and performance motivational climates. This is in contrast to the three other goal profile groups, who show more adaptive levels of intrinsic motivation in a perceived mastery climate compared to a perceived performance climate.

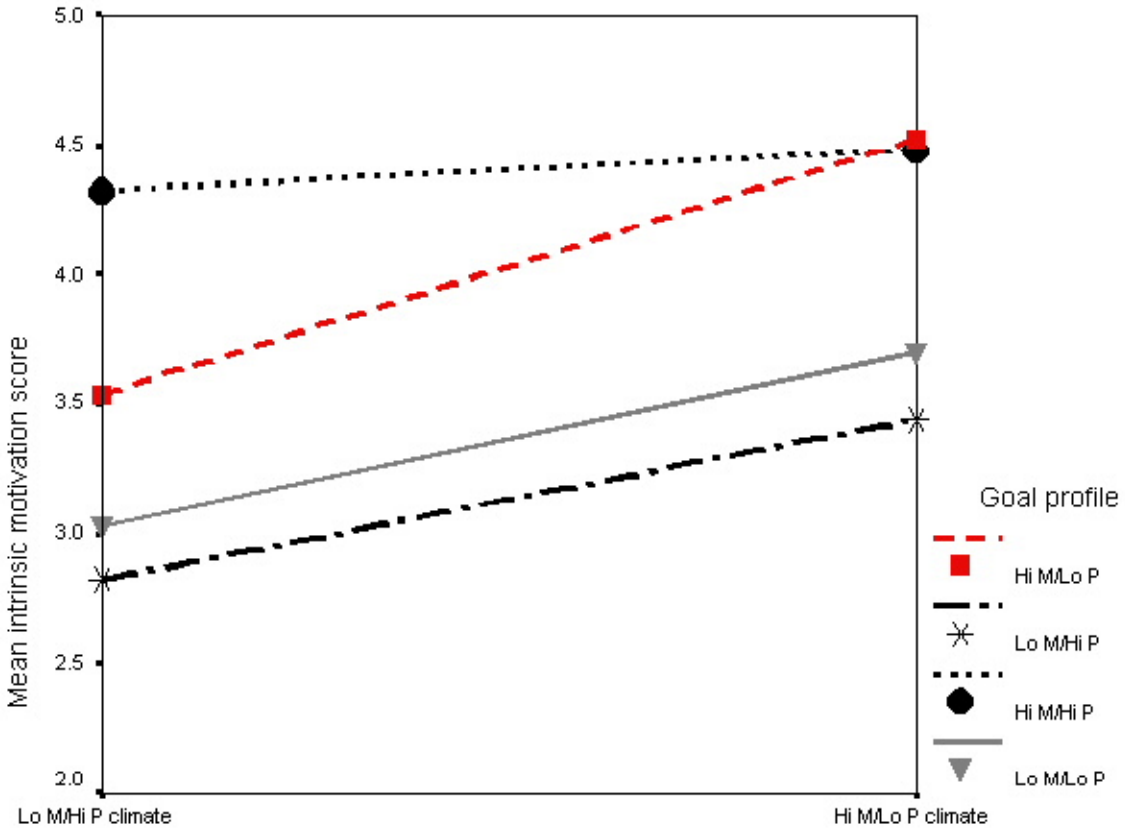

Figure 1. Interaction effect for intrinsic motivation

Figure 2 displays the interaction effect for identified regulation and also reveals a similar pattern. Specifically, the high mastery/high performance and low mastery/low performance groups appear to have similar levels of identified regulation in either a perceived mastery or a perceived performance climate, compared to the other two profile groups who appear to develop higher levels of identified regulation from exposure to a perceived mastery climate.

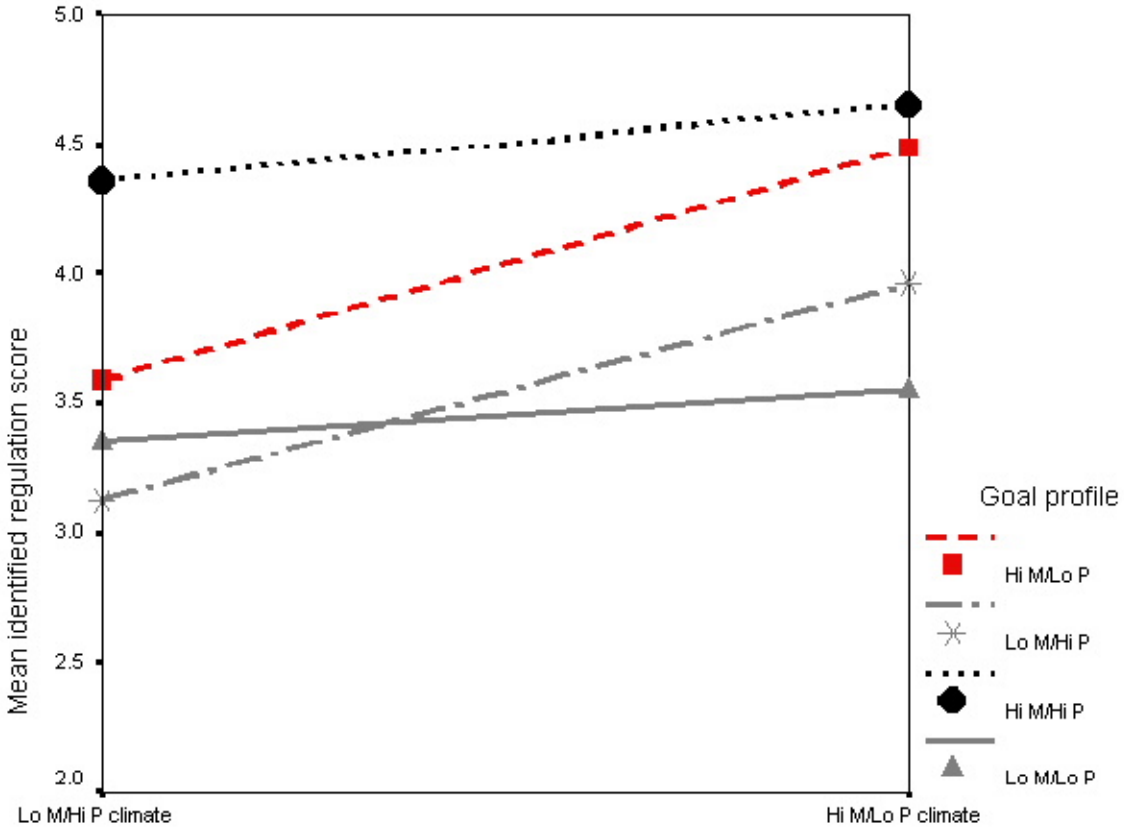

Figure 2. Interaction effect for identified regulation

Finally, Figure 3 displays the interaction effect for negative affect in PE and reveals that the low mastery/high performance goal group experienced higher levels of negative affect when exposed to a perceived mastery climate as opposed to a perceived performance climate. In contrast, the other three profile groups appear to experience higher levels of negative affect when exposed to a perceived performance climate.

Discussion

The purpose of this study was to examine the link between children's personal goal profiles, perceptions of the motivational climate, and an interaction between these variables with the development of self-determined motivation and affective patterns in PE. Firstly, main effect results provided further credence to previous research (e.g., Carr, 2006; Dorobantu & Biddle, 1997; Fox et al., 1994; Standage & Treasure, 2002; Vlachopoulos & Biddle, 1996) supporting the adaptive consequences of both high mastery/low performance and high mastery/high performance personal goal profiles in PE. Specifically, these two goal profile groups exhibited more adaptive patterns of intrinsic motivation, identified regulation, amotivation, and positive

and negative affect than low mastery/high performance and low mastery/low performance groups.

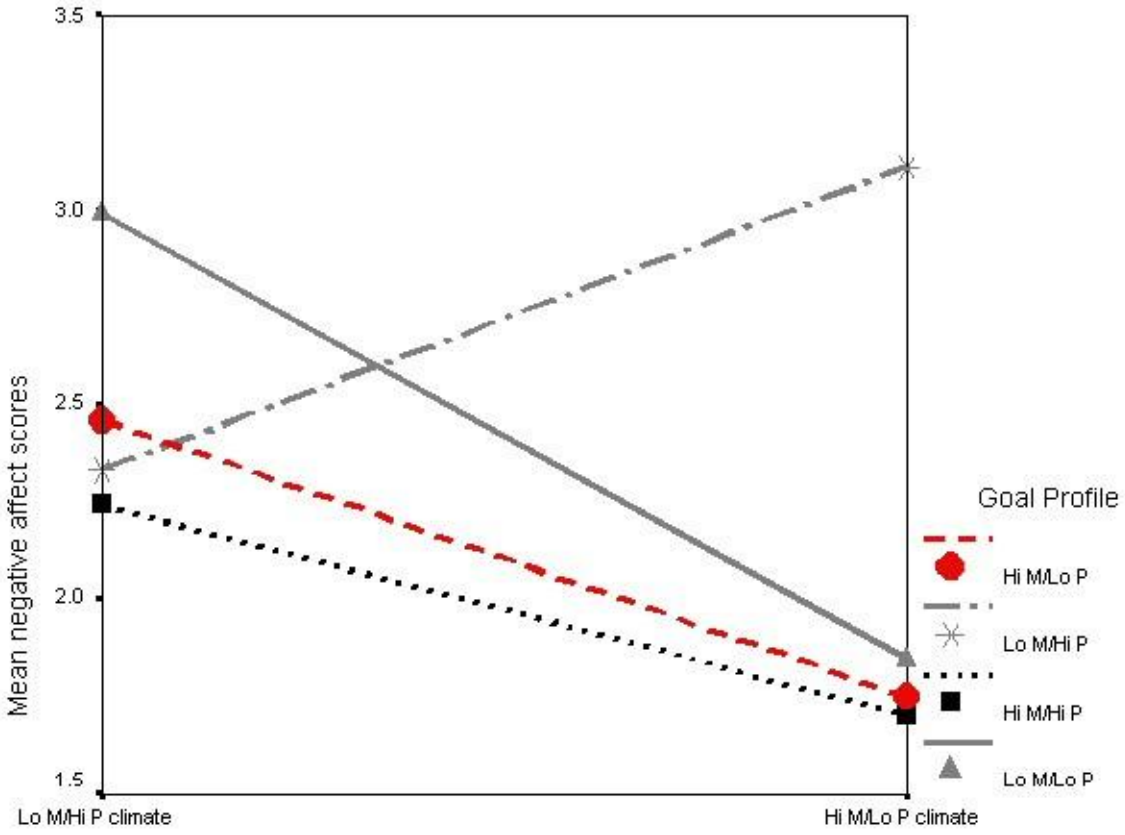

Figure 3. Interaction effect for negative affect

These findings support the contention that endorsement of performance goals should not be considered maladaptive if mastery goals are subsequently endorsed. Duda (1997) has suggested that high mastery/high performance profiles are adaptive goal profiles because such individuals may be motivated "over the long haul" as "they have a strong mastery orientation to fall back on when their sense of normative ability is in jeopardy" (p. 309). In addition, main effects also supported research (e.g., Carpenter & Morgan, 1999; Carr, 2006; Ommundsen et al., 2005) advocating the adaptive consequences of a predominantly mastery oriented perceived motivational climate and the maladaptive consequences of a predominantly performance-oriented climate. Specifically, a perceived mastery climate was associated with more adaptive patterns of self-determined motivation and affective patterns than a perceived performance oriented climate in PE.

However, of most interest to the current study was the interaction between personal goals and perceived motivational climate. Some caution should be exercised when interpreting these results. Firstly, it should be remembered that children's dispositional goals were measured at the beginning of the term and their motivational responses were assessed at the end of the term. This was in order to assess how a pursuit of these dispositional constructs over the term might

associate with responses at the end of the term. Of course, it could be argued that goals *might* change over the course of the term. However, we worked from the premise that Nicholls (1989) identified these constructs as dispositional in nature and therefore relatively stable. Previous studies in educational psychology (e.g., Pintrich, 2000b) have identified that dispositional goals measured at a single point in time are effective predictors of motivational responses over a period of years. Hence, while some speculation may be evident over the stability of the goals assessed at the beginning of the term in this study, there are arguments to support why such goals might be considered as relatively stable and likely to influence children's patterns of thinking over a period of time.

Additionally, some caution should also be exercised with regards to children's perceptions of the motivational climate, given that retrospective perceptions of the climate were obtained in this study. It is important to note that children were asked to think about and remember a whole term of PE in recounting their perceptions of the general class climate. Firstly, there needs to be acknowledgement of the fact that such reflections could be relatively inaccurate accounts of the term as a whole. For example, children may have based their perceptions on the latter part of the term, given that this is likely to be more "fresh" in their memory. Additionally, it could be that the climate fluctuated quite radically over the course of the term and such fluctuations are unlikely to be reflected in such a generalized retrospective measure of perceived climate. However, the practicality of gaining access to perceived climate and achievement goal measures at shorter-term intervals throughout this study was not feasible, given the restricted time that PE teachers had to deliver an increasingly demanding and challenging curriculum to children.

Specifically, significant interaction effects were identified for intrinsic motivation, identified regulation, and negative affect. For intrinsic motivation and identified regulation, the most self-determined forms of motivation, interaction plots revealed that the high mastery/high performance goal profile group appeared to have similarly high levels of intrinsic motivation and identified regulation in *either* the perceived mastery or the perceived performance climate. Whereas the high mastery/low performance and low mastery/high performance groups had higher levels of these self-determined forms of motivation when they perceived a mastery climate and lower levels when they had perceived a performance climate. To explain this, two explanations might be advanced. Firstly, it might be suggested that the high mastery/high performance group had equally high levels of self-determined motivation in a perceived performance climate because such individuals' strong personal endorsement of mastery goals in PE ensures that they have some self-referent evaluation to fall back on when they are unable to satisfy the normative criteria that is emphasized within a performance climate. However, this explanation can be partially discounted on the grounds that the high mastery/low performance goal profile group experienced much higher levels of self-determined motivation in a perceived mastery climate as opposed to a performance climate. If endorsement of mastery goals in PE does ensure that individuals have some element of mastery criteria to fall back on when they are unable to satisfy the demands of a performance oriented environment, it would be expected that individuals with both high mastery/high performance *or* high mastery/low performance goal profiles would display high levels of self-determined motivation within performance climates, because both groups of individuals personally endorse mastery goals. However, this was not the case in the current study because the high mastery/low performance profile group did not have equal levels of self-determined forms of motivation in both motivational climates.

Alternatively, a second explanation for why the high mastery/high performance profile group had high levels of self-determined motivation in either a perceived mastery or performance climate stems from a matching hypothesis contention. That is, given that such individuals define achievement according to both performance and mastery oriented criteria, they may be able to experience competence and autonomy in both perceived mastery *or* performance oriented climates because both climates provide opportunities for such individuals to readily attempt to satisfy elements of their personal goal profile. In essence, both mastery and performance climates may be relevant to the personal achievement concerns of these individuals. However, for such an argument to remain feasible, it should be expected that individuals endorsing a low mastery/high performance goal profile might also show higher levels of self-determined motivation when exposed to a perceived performance climate because opportunities for such individuals to experience success as they define it (in normative terms) are more likely to be provided within a performance climate. In this study, results suggested that the low mastery/high performance group experienced higher levels of self-determined motivation in a perceived mastery climate as opposed to a perceived performance climate, which somewhat confounds a matching hypothesis argument.

Hence, the most likely explanation for the above interaction effect might originate from a combination of both of the above explanations. That is, it may be that high mastery/high performance oriented individuals are able to satisfy an element of their goal profile in either perceived mastery *or* performance climates because both climates emphasize achievement concerns that are relevant to the personal goal profile of these individuals. Here, such individuals have an advantage over high mastery/low performance individuals because they partly define achievement in normative terms and can therefore develop feelings of competence from the performance-oriented experiences emphasized within a performance climate. In addition to this, and given that the likelihood of experiencing competence is decreased when employing normative criteria, high mastery/high performance individuals also have strong personal mastery goals to fall back on in situations when normative ability is jeopardized. High mastery/high performance individuals have an advantage over low mastery/high performance individuals here because despite the fact that both groups may have opportunities to satisfy their achievement definitions within a performance climate, only high mastery/high performance individuals have a sense of mastery-oriented criteria to employ when normative ability is threatened. Hence, high mastery/high performance individuals are able to satisfy elements of their achievement goal profile when exposed to either perceived mastery or perceived performance climates *and* they also have an element of "protection" from the potential maladaptive concomitants of performance goals/climates because they also endorse personal mastery goals. Such findings have interesting implications for researchers debating the effects of multiple goals (e.g., Carr, 2006; Midgley, Kaplan, & Middleton, 2001; Pintrich, 2000b) on children's motivation. Specifically, results of this study suggest that children with a multiple (i.e., high mastery/high performance) goal profile may essentially be more motivationally "hardy" as they display high levels of self-determined motivation when exposed to environments that may be perceived as either mastery *or* performance oriented in nature. Ostensibly, as children mature they are likely to be exposed to naturally occurring PE environments that emphasize contrasting and varying motivational climates, some of which may be more performance-oriented in emphasis than others. A personal goal profile that ensures that children's levels of self-determined motivation are more resilient to such environmental changes could be considered a motivational advantage.

Results also suggested that there was no discernable difference in levels of identified regulation of the low mastery/low performance goal profile group when exposed to either a perceived mastery or a perceived performance climate. Specifically, this profile group exhibited relatively low levels of identified regulation in either perceived motivational climate. Considering that such individuals have relatively low personal mastery and performance-approach achievement concerns, it is perhaps not surprising that their levels of more self-determined forms of motivation are not greatly elevated in perceived mastery *or* performance climates. Low mastery/low performance individuals generally do not define achievement in accordance with either mastery *or* performance-approach criteria and hence, when exposed to learning opportunities that are fashioned into either a mastery *or* a performance climate, such individuals may be less likely to seek out competence-related experiences. In essence, both motivational environments would appear to focus such individuals on achievement concerns that they do not personally value and are incongruent with their personal goals. In such instances, suppression of autonomy is perhaps more likely because children are required to undertake activities that they may personally find boring or meaningless (Assor et al., 2002), limiting the opportunity to foster more self-determined forms of motivation where either motivational climate is emphasized.

Finally, results also revealed a significant interaction effect for the construct of negative affect. Specifically, the low mastery/high performance profile group exhibited higher levels of negative affect in a perceived mastery climate compared to a perceived performance climate. In contrast, the other three profile groups exhibited higher levels of negative affect in a perceived performance climate. This finding provides some credence to a matching hypothesis, suggesting that low mastery/high performance individuals are likely to experience increased levels of negative affective responses such as frustration, anger, and boredom, when they are exposed to a motivational climate that they perceive is incongruent with their personal goals. However, results do not suggest that such negative affect in low mastery/high performance individuals stems from inhibited development of self-determined motivation in an incongruent motivational climate. That is, the low mastery/high performance group developed *higher* levels of self-determined motivation when exposed to a perceived mastery climate (i.e., a climate incongruent with personal goals). Hence, the higher levels of negative affect experienced by these individuals in a perceived mastery climate were unlikely to stem from depressed self-determined motivation because self-determined motivation was actually elevated where they perceived a mastery climate. In conclusion, results suggested that although low mastery/high performance individuals experienced higher levels of self-determined motivation within a perceived mastery climate (perhaps due to the increased mastery focus enabling enhanced likelihood of experiencing competence and autonomy) (Deci & Ryan, 1995), they tended to experience negative affect more frequently in such environments. Congruent with the arguments of Assor et al. (2002), this may be because low mastery/high performance individuals at times perceive a mastery climate as somewhat meaningless within the framework of their personal achievement concerns.

Although it was not the purpose of this study to examine gender as a significant motivational influence, in light of suggestions (e.g., Nien & Duda, 2008) that gender might play a role in achievement goal studies we examined the link between gender, goal profile groups and perceived climate profile clusters. It is worth highlighting that the data from this study suggested that significantly more males endorsed achievement goals high in both mastery and performance orientations and significantly more females endorsed goals that were low in both orientations. Given the adaptive effects of a high mastery/high performance profile and the maladaptive

effects of a low mastery/low performance goal profile this finding is potentially worrying with regards to females' PE motivation. Future research would benefit from an examination of the factors that might be responsible for such gender bias within achievement goal profile groups.

In conclusion, this study has provided an indication that it may be important for researchers to consider the interactive effects of achievement goals and perceptions of the motivational climate on children's motivation for PE. It is interesting that individuals with a high mastery/high performance goal profile appear to develop equally high levels of self-determined forms of motivation in both perceived mastery and performance climates. This finding provides an indication that a personal endorsement of multiple goals may enable individuals to develop more resilient levels of self-determined motivation in the context of PE. To substantiate this claim, future research of a longitudinal nature is needed in order to examine how such individuals respond to fluctuations in the contextual motivational climate over time. Furthermore, qualitative examinations might enable more enriched identification and substantiation of the reasons behind the apparent resilience of high mastery/high performance individuals. Additionally, this study also hinted at the possibility that a perceived motivational climate that is incongruent with personal goals may render individuals susceptible to experiencing negative affective patterns in PE. However, further research is needed to shed light on the utility of a matching hypothesis. It may be that longitudinal considerations are necessary when investigating personal goal-motivational climate congruence whereby longer-term exposure to environments perceived as incongruent with personal goals amplifies negative motivational responses.

References

Ames, C. (1984). Competitive, cooperative, and individualistic goal structures: A motivational analysis. In R.E. Ames and C. Ames (Eds.), *Research on motivation in education: Vol. 1. Student motivation* (pp. 177-207). New York: Academic Press.

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84,* 261-271.

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviours predicting students' engagement in schoolwork. *British Journal of Educational Psychology, 72,* 261-278.

Belsely, D. A., Kuh, E., & Welsh, R. E. (1980). *Regression diagnostics: Identifying influential data and sources of collinearity.* New York: John Wiley & Sons.

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. F., & Cavill, N. (Eds.). (1998). *Young and active? Young people and health-enhancing physical activity: Evidence and implications*. London: Health Education Authority.

Brunel, P. C. (1996). Relationship of task and ego orientation to intrinsic and extrinsic motivation. *Journal of Sport & 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 and Sciences in Sports, 9,* 365-374.

Carpenter, P. J., & Morgan, K. (1999). Motivational climate, personal goal perspectives, and cognitive and affective responses in physical education classes. *European Journal of Physical Education, 4*, 31-44.

Carr, S. (2006). An examination of multiple goals in children's physical education: Motivational effects of goal profiles and the role of perceived climate in multiple goal development. *Journal of Sports Sciences*, 24, 281-297.

Chatzisarantis, N., 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. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*, 297-334.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

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.

Deci, E. L., Ryan, R. M., & Williams, G. C. (1996). Need satisfaction and the self-regulation of learning. *Learning and Individual Differences, 8*, 165-183.

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. (1996). Maximising motivation in sport and physical education among childrenand adolescents: The case for greater task involvement. *Quest*, *48*, 290-302.

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). Achievement goal research in sport: Pushing the boundaries and clarifying some misunderstandings. In G.C. Roberts (Ed.), Advances in motivation in sport and exercise *(pp. 101-127). Champaign, IL: Human Kinetics.*

Duda, J. L., Fox, K., 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.

Duda, J. L, Chi, L., Newton, M., Walling, M. D, & Catley, D. (1995). Task and ego orientation and intrinsic motivation in sport. *International Journal of Sport Psychology*, *26*, 40-63.

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist*, *41*, 1040-1048.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. Psychological Review, 95, *256-273.*

Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, *54*, 5-12.

Fehily, A. (1999). Epidemiology of obesity in the UK. In British Nutrition Foundation (Ed.), *Obesity* (pp. 23-36). Oxford: Blackwell Scientific.

Fox, K., Goudas, M., Biddle, S., Duda, J. L., & Armstrong, N. (1994). Children's task and ego goal profiles in sport. *British Journal of Educational Psychology*, *64*, 253-261.

Goudas, M., & Biddle, S. J. H. (1994). Perceived motivational climate and intrinsic motivation in school physical education classes. *European Journal of Psychology of Education, 9*, 241-250.

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.

Grolnick, W. S., Deci, E. I., & Ryan, R. M. (1997). Internalization within the family: The self-determination theory perspective. In J. E. Grusec & L. Kucynski (Eds.), *Parenting and children's internalization of values: A handbook of contemporary theory.* New York: Wiley.

Hair, J. F. J., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis*. Englewood Cliffs, NJ: Prentice-Hall.

Hodge, K., & Petlichkoff, L. (2000). Goal profiles in sport motivation: A cluster analysis. *Journal of Sport & Exercise Psychology, 22*, 256-272.

Kavussanu, M., & Roberts, G. C. (1996). Motivation in physical activity contexts: The relationship of perceived motivational climate to intrinsic motivation and self-efficacy. *Journal of Sport & Exercise Psychology, 18*, 264-280.

Kowal, J., & Fortier, M. S. (1999). Motivational determinants of flow: Contributions from self-determination theory. *Journal of Social Psychology, 139*, 355-368.

Maehr, M. L. (1989). Thoughts about motivation. In C. Ames and R. Ames (Eds.), *Research on motivation in education* (Vol. 3, pp. 299-315). New York: Academic Press.

Meece, J. L., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of Educational Psychology, 85*, 582-590.

Middleton, M. J., & Midgley, C. (1997). Avoiding the demonstration of lack of ability: An underexplored aspect of goal theory. *Journal of Educational Psychology, 89*, 710-718.

Midgley, C., Kaplan, A., & Middleton, M. J. (2001). Performance-approach goals: Good for what, for whom, under what circumstances, at what cost? *Journal of Educational Psychology, 93*, 77-86.

Midgley, C., Maehr, M., Hicks, L., Roeser, R., Urdan, T., Anderman, E., & Kaplan, A. (1996). *Patterns of Adaptive Learning Survey (PALS).* Ann Arbor, MI: Center for Leadership and Learning.

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.

Newton, M., & Duda, J. L. (1999). The interaction of motivational climate, dispositional goal orientations, and perceived ability in predicting indices of motivation. *International Journal of Sport Psychology, 30*, 63-82.

Newton, M., Duda, J. L., Yin, Z. (2000). Examination of the psychometric properties of the Perceived Motivational Climate in Sport Questionnaire-2 in a sample of female athletes. *Journal of Sports Sciences, 18*, 275-290.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective, experience, task choice, and performance. *Psychological Review, 91*, 328-346.

Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.

Nien, C. & Duda, J. L. (2008). Antecedents and consequences of approach and avoidance goals: A test of gender invariance. *Psychology of Sport and Exercise,* 9, 352-372.

Ntoumanis, N. (2001). A self-determination approach to the understanding of motivation in physical education. *British Journal of Educational Psychology, 71* 225-242.

Nunnally, J. C. (1978). *Psychometric Theory*. New York: McGraw-Hill.

Ommundsen, Y., Roberts, G. C., & Kavussanu, M. (1998). Perceived motivational climate and cognitive and affective correlates among Norwegian athletes. *Journal of Sports Sciences, 16*, 153-164.

Ommundsen, Y., Roberts, G.C., Lemyre, P., & Blake, W.M. (2005). Peer relationships in adolescent competitive soccer: Associations to perceived motivational climate, achievement goals, and perfectionism. *Journal of Sports Sciences,* 23, 977-989.

Papaioannou, A. (1994). Development of a questionnaire to measure achievement goals in physical education. *Research Quarterly for Exercise and Sport, 65,* 11-20.

Papaioannou, A. (1998). Goal perspectives, reasons for being disciplined, and self-reported discipline in physical education lessons. *Journal of Teaching in Physical Education, 17,* 421-444.

Pintrich, P. R. (2000a). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92,* 544-555.

Pintrich, P. R. (2000b). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology, 25,* 92-104.

Pintrich, P. R. & Garcia, T. (1991). Student goal orientation and self-regulation in the college classroom. In M.L. Maehr & P.R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 7, pp. 371-402). Greenwich, CT: JAI press.

Roeser, R., Midgley, C., & Urdan, T. (1996). Perceptions of the school psychological environment and early adolescents' psychological and behavioral functioning in school: The mediating role of goals and belonging. *Journal of Educational Psychology, 88,* 408-422.

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. (2000a). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25,* 54-67.

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55,* 68-78.

Sallis, J. F., Simmons-Morton, B., Stone, E., Corbin, C., Epstein, L. H., Faucette, N., Iannotti, R., Killen, J., 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.

Solmon, M. A. (1996). Impact of motivational climate on students' behaviors and perceptions in a physical education setting. *Journal of Educational Psychology, 88,* 731-738.

Solmon, M. A., & Lee, A. M. (1997). Development of an instrument to assess cognitive processes in physical education classes. *Research Quarterly for Exercise and Sport, 68,* 152-160.

Standage, M., Duda, J.L., & Ntoumanis, N. (2005). A test of self-determination theory in school physical education. *British Journal of Educational Psychology,* 75, 411-433.

Standage, M. & Treasure, D.C. (2002). Relationship among achievement goal orientations and multidimensional situational motivation in physical education. *British Journal of Educational Psychology, 72,* 87-103.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Needham Heights, MA: Allyn & Bacon.

Thomas, J. & Barron, K. E. (2006). A test of multiple achievement goal benefits in physical education activities. *Journal of Applied Sport Psychology,* 18, 114-135.

Treasure, D. (1997). Perceptions of the motivational climate and elementary school children's cognitive and affective responses. *Journal of Sport & Exercise Psychology, 19,* 278-290.

Treasure, D. C. & Harwood, C. J. (2000). *Point, counter-point: Goal profiling*. Association for the Advancement of Applied Sport Psychology, Newsletter, 15, 7–12.

Vallerand, R. J. (2001). A hierarchical model of intrinsic 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., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, S., & Vallieres, E. F. (1992). The Academic Motivation Scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement, 52*, 1003-1017.

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. J. H. (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., & Chi, L. (1993). The Perceived Motivational Climate in Sport Questionnaire: Construct and predictive validity. *Journal of Sport & Exercise Psychology*, *15*, 172-183.

Wang, J. C. K., & Biddle, S. J. H. (2001). Young peoples' motivational profiles in physical activity: A cluster analysis. *Journal of Sport & Exercise Psychology*, *23*, 1-22.

Wang, J. C. K., Chatzisarantis, N. L., Spray, C. M., & Biddle, S. J. H. (2002). Achievement goal profiles in school physical education: Differences in self-determination, sport ability beliefs, and physical activity. *British Journal of Educational Psychology*, *72*, 433-445.

Weigand, D. A., & Burton, S. (2002). Manipulating achievement motivation in physical education by manipulating the motivational climate. *European Journal of Sport Science, 2(1)*, http://www.humankinetics.com/ejss.

White, S. A., Kavassanu, M., & Guest, S. (1998). Goal orientations and perceptions of the motivational climate created by significant others. *European Journal of Physical Education*, *3*, 212-228.

The ***Journal of Social, Behavioral, and Health Sciences*** is an open-access, peer-reviewed, online interdisciplinary journal focusing on research findings that address contemporary national and international issues. Its objectives are to (a) encourage dialogue between scholars and practitioners in the social, behavioral, and health sciences that fosters the integration of research with practice; (b) promote innovative models of interdisciplinary collaboration among the social, behavioral, and health sciences that address complex social problems; and (c) inform the relationship between practice and research in the social, behavioral, and health sciences.

Walden University Publishing: http://www.publishing.waldenu.edu