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Motivational Climate and the impact on Health-Related Fitness Outcomes of Youth Participants

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Abstract: Achievement goal theory research presumes that a classroom goal structure influences students' adoption of achievement goals and related cognitions and behaviors. Motivational climate plays a significant role as a determinant of sports participation and behavioral patterns in relation to reasons for continuing to contribute to a task or sport. The purpose of this study was to evaluate the effect of motivational climate on boys' and girls' heath-related fitness scores. The research hypothesis stated that youth in a mastery-oriented climate would have greater positive changes in health-related fitness scores than youth in a performance-oriented climate when controlling for gender, age, and goal orientation. The study assessed 206 fourth through eighth grade physical education classes in four North Alabama schools. Classes were randomly assigned to a mastery- or performance-climate. Mastery climates focused on individual improvement while performance climate emphasized performance. The study utilized a randomized control group pretest-posttest design using measurements of motivational style as described in the Task and Ego Orientation in Sport Questionnaire, the Perceived Motivational Climate in Sport Questionnaire, the Children's Attitudes towards Physical Activity Questionnaire, and the Presidential Challenge test. Multiplicative interaction terms were constructed using the variable representing the groups, age, gender, goal orientation, physical activity attitude, and pretest score. The extent to which there were interaction effects was tested using hierarchical regression. Unstandardized partial regression coefficients and their level of significance were examined to assess the contribution of the main effects. R^2 and the effects of the independent variables were considered statistically significant at $p < 0.05$. Conclusions revealed that improvement in health-related fitness measures might be more dependent upon school than motivational climate. In this study neither motivational climate, participant's attitude toward physical activity, or individual goal orientation had a significant effect on posttest Presidential Fitness scores. The participants demonstrated improved scores on mile run, shuttle run, push ups, curl ups, and percentile rankings. Determining the contribution of motivational climate to exercise performance is pertinent in developing programs that develop optimal motivation to be physically active.

1. Introduction

For the past several decades, the average American adult has become less active, less physically fit, and more obese and, subsequently, children have adapted to this adult stereotype and are also becoming less active and more obese (HHS, 2004). Calorie consumption and physical inactivity have been named as the primary indicators directly related to obesity (CDC, 2004). A survey done by the CDC of American schools found that only six percent of high schools nationwide require their seniors to take physical education (Curriculum Review, 2002). Even children in primary and middle schools are participating in less and less school-based physical education as

other curriculum pressures take precedence (Boreham & Riddoch, 2001). Therefore, identifying factors relevant to an individual's decision to begin and maintain regular physical exercise is considered important information for researchers to study (Dzewaltowski, 1989) in an effort to help change these statistics.

Minimal research has been undertaken to examine the psychological aspects of participation in physical education in public school despite such classes being presented to almost all children and youths (Goudas et al., 2001). At the same time, many factors, such as the malleability of children's attitudes compared to that of adults, have been identified that support the need to study health-related behaviors in children, (Stucky-Ropp & DiLorenzo, 1993). Additionally, it appears that many health-related behavior patterns that have significant implications over a lifetime are formed during childhood; therefore, successful efforts to influence health-related behavior in positive ways early in life may have significant long-term payoffs (Stucky-Ropp & DiLorenzo, 1993).

Consequently, it is important to study motivational factors that promote participation in school physical education by children (Goudas et al., 2001). Often it is the enjoyment that children receive from their physical education experiences that compels them to join sports clubs later in life, remain active as adults, and extend their sporting interests (White, Kavussanu, & Guest, 1998). Duda (1996) contends that these types of positive results are compelling reasons for researchers to develop deeper insight into what is important about physical education in the minds of youths.

This section has introduced the issue of physical education and childhood obesity. In the following section, the past, present, and future of the motivational research is discussed. Focus will be placed on motivational theory and the leading researchers in the field. Achievement goal theory will be examined in depth, along with the three different theories that have been researched and discussed in the literature.

1.1 The Past, Present, and Future of Motivational Studies

Motivational studies have long focused on factors that initiate, influence, and modify behavior (Whitehead, n.d.). Early theorists focused on intellectual drives (Freud, 1923/1962), physiological drives (Hull, 1943), or environmental influences (Skinner, 1971). Although each of these theorists made significant contributions, their view of people as passive beings gave rise to concerns among motivational theorists (Whitehead, n.d.). The works of applied motivational researchers such as Heider, White, and McVicker-Hunt (Roberts, 1992), leaders in addressing the issue of the person as passive being, were important in the emergence of the field of extrinsic and intrinsic motivation as a cognitive approach to motivation and distinct from the older behavioralistic traditions.

In recent years, in an effort to determine factors that motivate youth sports participants, a more theoretical slant has been adopted toward the study of motivation in children's sport and physical activity (Xiang, McBride, Guan, & Solmon, 2003). Current theoretical approaches such as self-efficacy (Bandura, 1997), competence motivation theory (Harter, 1978), and achievement goal

theory (Nicholls, 1984) have attracted the attention of youth sports researchers. These frameworks have provided valuable insight into increasing student motivation (Xiang et al., 2003).

Achievement Goal Theory

Since the early 1990s, sport researchers have dedicated much time and energy to motivational research (Duda, 1989a/1989b; Duda & Nicholls, 1992; Goudas & Biddle 1994b; Seifriz, Duda & Chi, 1992; Solomon, 1996; Theeboom, De Knop, & Weiss, 1995; Treasure & Roberts, 1995). This interest was initiated by the works of Maehr and Nicholls (1980), who proposed that motivation was contingent on individual thoughts and perceptions about success and failure instead of concrete events.

Within the area of achievement motivation theory, three kinds of motivation were found to exist (Harwood & Biddle, 2002): ability-, task-, and social-oriented motivation. For the purposes of this study, only two, ability-oriented motivation and task-oriented motivation, were examined. These constructs were found to represent different foundations for approaching and engaging in achievement activity and to involve different ways of thinking about oneself, one's task, and task outcomes (Ames, 1992b).

Ability-oriented motivation Ability-oriented motivation, renamed in 1984 to ego-involvement (Nicholls, 1984), is exhibited when the goal of a behavior is to maximize the subjective probability of attributing high ability to oneself. The individual who is ego-involved is said to be ego-oriented. Ego orientation is associated with motivational difficulties and maladaptive motivational patterns, including avoidance of challenging tasks (Duda, 1992; Duda & Nicholls, 1992).

For the ego-oriented person, success is defined as the demonstration of superiority over others (Duda, 1993). Of utmost importance to the ego-involved person is public recognition that one has done better than others or performed in a superior manner (Meece, Blumefeld, & Hoyle,1988); as a result, learning itself is viewed only as a way to achieve a desired goal (Nicholls, 1989). Consequently, the ego-oriented individual may be at risk for suffering long-term motivational problems (White & Zellner, 1996), because gratification comes from without and not from within the person (D. Adelman, personal communication, February 1, 2005).

Task-oriented motivation. Central to task-oriented motivation is the production of an adequate product or the resolution of a problem for its own sake rather than to demonstrate ability (Maehr & Nicholls, 1980). The individual who is task-involved is said to be task-oriented. For the task-oriented person, ones sense of efficacy is based on the belief that effort will lead to success or a sense of mastery (Ames, 1992b; Bandura, 1997). These individuals are oriented toward developing new skills, understanding their work, and improving their level of competence (Ames, 1992b). Recent research suggests that an adaptive motivational pattern is more likely to evolve when task-oriented individuals adopt a mastery-goal orientation, which is a motivational environment that promotes self-improvement (Dweck, 1986) and results in facilitation of intrinsic motivation (Goudas & Biddle, 1994a).

Major Concepts Behind Achievement Goal Theory

The major tenet of achievement goal theory is that individuals will be predisposed to task and ego orientations as a result of their sport environment and these orientations will subsequently influence whether an individual will adopt a task or ego goal in a specific situation. Additionally, it is considered apparent that the motivational climate in an achievement setting has the potential to enhance or constrain individual goals (Ames, 1992a). Dweck (1986) maintained that the probability of adopting a particular goal disposition in a specific setting is determined by individual-difference variables, but others believe that situational factors have the potential to alter that probability (Solmon, 1996).

Ames (1992a) using the acronym TARGET (Epstein, 1989), conceptualized the broad constellation of classroom processes that contribute to a mastery- or performance-focused learning environment (Midgley, Anderman, & Hicks, 1995). Research utilizing these dimensions concluded that mastery-oriented climates are associated with the use of effective learning strategies, preference for challenging tasks, positive attitudes about the class, and a belief that success is due to effort (Ames & Archer 1988).

Performance-oriented climates center on ability rather than effort and are more likely to evaluate ability using norm-referenced criteria (Ames & Archer, 1988). From this perspective, it is important to explore the correlation between motivational climate and achievement related cognitions and behaviors (Solmon, 1996). Initial studies manipulating motivational climates in field settings (Theeboom et al., 1995; Treasure & Roberts, 1995) supported the belief that mastery-oriented climates encourage adaptive motivational patterns. As promising as it is for individuals to say they are more willing to persist or exert effort in challenging situations when exposed to a mastery-oriented climate, virtually no data exist concerning what these individuals actually do so in physical activity settings (Theeboom et al., 1995).

In regards to the relationship between gender and motivational climate, several studies (Newton & Duda, 1993; Paulson, 1999; White & Zellner, 1996) suggested that males are more inclined to achieve success in a performance-oriented climate than are females. Furthermore, Xiang, McBride, and Bruene (2004) proposed that gender-stereotyped tasks might also play an integral part in the success of the participants. His research suggests that the gender for which the activity is stereotyped may be more successful when participating in those activities than will be the opposite gender, regardless of the motivational climate.

Statement of the Problem

There is a lack of research addressing the specific domain of youth physical education and the implications that manipulated motivational climates have on health-related fitness outcomes (Theeboom et al., 1995; Treasure & Roberts, 1995). (See Chapter Two for an in-depth review of the literature in this area.) At a time when the nation's health is at risk due to an identified obesity epidemic (CDC, 2004), it is essential that physical education instructors incorporate into the classroom the most effective motivational tools designed for encouraging students to be

physically active on a regular basis. These motivational tools should be appropriate for boys and girls of different ages.

Purpose of the Study

This study was undertaken in an attempt to provide empirical evidence supporting the benefits of incorporating new and innovative motivational strategies into youth physical education. This purpose was accomplished through evaluating the effect of motivational climate on children's heath-related fitness scores. The following section addresses the specific objectives of this research study.

Research Question

The study's research question was: When controlling for gender, age, physical activity attitude, and initial fitness scores, to what extent does the motivational climate influence the health-related fitness outcomes of youth participating in a strength-training regimen.

Two directional hypotheses were addressed. Hypothesis one stated that youth in a mastery climate will have better health-related fitness scores than youth in a performance climate when controlling for goal orientation (TEOSQ), attitude toward physical activity (CATPA), age, gender, and initial performance score. Hypothesis two stated that, when controlling for goal orientation (TEOSQ), attitude toward physical activity (CATPA), initial performance score and age, male participants will demonstrate larger gains in health-related fitness measures than will females.

2. State of the Art

Motivational studies have long focused on factors that initiate, influence, and modify behavior (Whitehead, n.d.). Early theorists focused on intellectual drives (Freud, 1923/1962), physiological drives (Hull, 1943), or environmental influences (Skinner, 1971). Although each of these theorists made significant contributions, their view of people as passive beings gave rise to concern (Whitehead, n.d.) among later motivational theorists. The works of Heider, White, and McVicker-Hunt as reported by Roberts (1992) held importance in the emergence of the terms extrinsic and intrinsic motivation being utilized to distinguish the new cognitive approach from the older behavioralistic traditions.

In recent years, in an effort to determine factors that motivate youth sports participants, a more theoretical slant has been adopted toward the study of motivation in children's sport and physical activity (Xiang et al., 2003). Current theoretical approaches such as self-efficacy (Bandura, 1997), competence motivation theory (Harter, 1978), and achievement goal theory (Nicholls, 1984) have attracted the attention of youth sports researchers. These frameworks have provided valuable insight into strategies used to increase student achievement motivation (Xiang et al., 2003) and were discussed in the introduction.

2.1 Review of Literature

Of particular interest to this study is achievement goal theory (Nicholls, 1984). The primary belief of achievement goal theory is that individuals engage in achievement contexts for the primary purpose of demonstrating competence (Nicholls, 1984), demonstrating high ability and avoiding showing low ability (Theeboom et al., 1995). However, such competence is interpreted in different ways in accordance with the goal orientation that individuals adopt (Nicholls, 1984) in specific situations.

Achievement goal theory implies that dispositional achievement goal orientations influence sport motivation (Duda, 1993). According to achievement goal theory individuals may conceive their ability based on two types of goals (Nicholls, 1984), norm-referenced or self-referenced. For some, competence is assessed through norm-referenced means (e.g., social comparison), while others consider competence to be an outcome of self-referenced goals (e.g., personal improvement) (Theeboom et al., 1995). These goal orientations have been labeled by several researchers, with the norm-referenced focus variously termed ego (Nicholls, 1984), performance (Dweck, 1986), and ability (Ames, 1992a) goals, whereas the self-referenced orientation has been labeled as task (Nicholls, 1984), learning (Dweck, 1986), and mastery (Ames, 1992b) goals.

For individuals who are task-oriented the execution of the task at hand is of major concern, and subjective success is based on personal improvement and learning (Duda, Chi, Newton, Walling, & Catley, 1995). Task-oriented individuals emphasize the importance of effort in an achievement context, try hard in the face of difficult challenges, show intrinsic interest in the undertaking at hand, and persist in the undertaking over time (Roberts, 1992). Nicholls (1984) states that an individual who is task-oriented will exert maximal effort on moderately challenging tasks and be more likely to perform up to his or her potential.

In contrast, individuals exhibiting an ego-orientation compare their performance and exerted effort to others in judging their own ability (Duda et al., 1995). For the ego-oriented individual, the focus, while performing, is on the adequacy and presentation of one's athletic ability resulting in feelings of success when they have outperformed others (Duda et al., 1995). Additionally, ego-oriented individuals are concerned with reaching success while exhibiting very little effort (Ames, 1992a). Nicholls (1984) states that these individuals tend to demonstrate lack of effort, poor performance, and a lack of persistence.

It has been argued that task-orientation corresponds to positive achievement behaviors and the enhanced probability that a person will view him- or herself as competent, while maladaptive behaviors are predicted to correlate with an ego-orientation (Duda, 1989b; Goudas, 1998). In a study of the importance of education (Nicholls, Patashnick, & Nolen, 1985), results indicated that there was a strong relationship between ego-orientation and the belief that education should lead to wealth and status, whereas task-orientation individuals exhibited beliefs that school should enhance one's social commitment, understanding, and motivation to continue learning.

The following section will address research specific to the academic field. There is a multitude of motivational research in the academic context. A minimal number of those studies will be discussed in order to provide an introduction to motivational research in the sporting and physical activity context.

Research in the Academic Setting

Goal achievement theory holds that an individual's situational task- or ego-orientation is a function of environmental factors (Duda et al., 1995) such as motivational climate [Ames 1992a; Ames 1992b]). Nicholls (1989) suggested that an environment (performance-oriented climate; Ames 1992a; Ames 1992b), promoting competition, norm-referenced feedback, and social comparison are likely to evoke ego-orientation, while situations (mastery-oriented climate [Ames 1992a; Ames 1992b]) focusing on the importance of learning and personal improvement tends to result in a state of task-orientation. In an attempt to maximize the benefits available in a mastery climate, several authors have called for research that explores ways to create a mastery motivational climate when working with children (Duda, 1992; Roberts, 1992) and subsequent research on motivational climate was initiated by Ames (1992a, 1992b) in an academic setting. Ames (1992b; Ames & Archer, 1988) termed the situational goal structure seen in the classroom as motivational climate and adopted the terms mastery and performance to refer to task- and ego-oriented achievement situations, respectively. Specific dimension in the motivational climate of a context determine if a climate is considered mastery-oriented, performance-oriented, or both (Kavussanu & Roberts, 1996). These dimensions are known as TARGET (Ames, 1992b).

Ames (1992b) used the acronym TARGET (Epstein, 1989) to conceptualize the broad constellation of classroom processes that contribute to a mastery- or performance-oriented learning environment (Midgley, Anderman, & Hicks, 1995). These categories are represented by the acronym TARGET and their foci are: (a) Task (Are class activities meaningful, challenging and interesting?); (b) Authority (Do students have some autonomy and share responsibility for rules with the teacher?); (c) Recognition (Are all students recognized, for what reasons are they recognized, and is this recognition private or public?); (d) Grouping (Are students exposed to a variety of grouping orders and what is the basis of the grouping?); (e) Evaluation (Are grades and tests emphasized, made public, and what is the basis for grading?); and (f) Time (Is the scheduling of activities rigid?) (Ames, 1992b). Each of these TARGET areas is implemented in the classroom through various motivational strategies. The TARGET dimensions can be used as a structure for conceptualizing strategies recommended by youth sport researchers utilizing task, grouping, and time dimensions as instructional organization and authority, recognition, and evaluation as teacher behaviors (Theeboom et al., 1995).

In classroom studies associated with motivational climate, students' perceptions that their learning environment emphasizes a mastery-orientation has been related significantly to a personal mastery goal orientation (Midgley, Anderman, & Hicks, 1995) and also to adaptive patterns of engagement and learning (Ames & Archer, 1988). In comparison, student's who viewed their learning environment as performance-oriented have been associated with a personal performance goal orientation (Midgley et al., 1995) and with maladaptive learning and engagement patterns (Kaplan & Midgley, 1999).

Meece (1991) found that the goal engagement displayed by members of a science class was largely due to the instructional approach of the teacher. When the teacher promoted meaningful learning, provided relevance to learning, and allowed more student independence, students were more mastery oriented and involved in lessons. Thus, the maladaptive learning and engagement patterns seen by Kaplan & Midgley (1999) could be avoided in the classroom by altering the teacher's instructional strategies.

Xiang and Lee (2002) assessed 308 fourth, eighth, and eleventh grade students to examine relationships between achievement goals and perceived motivational climate. Analysis revealed that there were significant age-related differences between the two constructs; the older students appeared to be more inclined toward the ego-orientation and performance-oriented climate, whereas the younger students appeared to be more inclined toward the task-orientation and mastery-oriented climate. All students, except for the eighth grade students, reporting a task-orientation tended to see their motivational climate as mastery-oriented, whereas students reporting an ego-orientation viewed their classroom climate as performance-oriented.

While this research is interesting, there are relatively few studies applying Ames' (1992b) conceptual model to the physical education domain (Goudas & Biddle, 1994b). However, Ames (1992a) argues that sport and academic settings share many structural features. This argument made by Ames (1992a) was confirmed by Duda (1989) who found a conceptually coherent relationship between how a student defines success and failure in the achievement domain of physical activity with academic attitudes toward success and failure.

Research in a Sporting Context

In an attempt to link the sporting and academic environment, Duda and Nicholls (1992) assessed beliefs about the causes of success in school and in sport of 207 male and female high school students. Their assessment revealed that the dimensions of personal goals and world beliefs extended across the academic and sport domain. Their research confirmed that beliefs about causes of success in school and sport were found to be logically related to students' personal goals. However, in regard to perceptions of ability and intrinsic satisfaction, the research found little cross-domain generality. The observed similarities and differences suggest the need for more comparative studies between the academic and social context.

Solmon and Boone (1993) studied 90 volunteer college students who were enrolled in five different beginning tennis classes. They examined the impact that goal perspective has in physical education classes and found that goal perspective did in fact have an effect on student's measures of thought and action as well as anxiety level using the Cognitive Sports Questionnaire to study these college students.

Analysis from Solomon and Boone's (1993) revealed that task-orientation correlated with positive scores on measures of student thought and action. Task-oriented students selected more challenging tasks, whereas ego-orientated participants had a negative association in these areas. Task-orientation was positively, and ego-orientation negatively, associated with scores on the

Cognitive Processes Questionnaire, where higher scores reflected lower anxiety levels, higher levels of interest and attention and more positive attitudes. These findings contribute to the growing body of research that suggests that adaptive behaviors can facilitate skill development in physical education class and that an ego-orientation may impede skill acquisition or achievement.

Fox and colleagues (Fox, Goudas, Biddle, Duda, & Armstrong, 1994) examined 115 boys and 116 female students aged 13 to 15 years of age in order to determine the combined effects of task and ego goal orientations on children's sport motivation. Based on the mean splits of the Task and Ego scales of the Task and Ego Orientation in Sport Questionnaire [TEOSQ] four groups were created. There were low task/low ego, low task/high ego, high task/low ego, and high task/high ego. In measures of sport enjoyment and perceived sport competence the high/high groups emerged as the most motivated and the low/low group as the least motivated. Similar to previous studies (Goudas, 1998; Goudas & Biddle, 1994a/1994b) the researchers concluded that mastery-oriented climate scores significantly enhanced the prediction of intrinsic motivation; yet, this was not the case for performance-oriented climate scores. Results also suggested that a high mastery-oriented climate is more favorable than a performance-oriented climate; however, having a performance-oriented climate is not detrimental to the student providing it is accompanied by a high mastery-oriented climate. Fox et al. (1994) suggest that more is needed to be known about the influence between teaching style, perceived class climate, and intrinsic motivation, particularly in combination with individual goal orientations.

Goudas and Biddle (1994b) analyzed the relationship between the perceived climate of physical education classes and subsequent motivation. Participants were 254 boys and girls aged 13-15 years. Results indicated that students viewed a mastery climate to be one that was high in teacher support, encouraged student choice, define success as self-improvement and reward exerted effort instead of ability. Results also indicated that students viewed a mastery-oriented climate to be high in teacher support and students' perceptions of choice alongside defining success as self-improvement and rewarding exerted effort instead of normative ability. The researchers stated that further evidence is required about gender and age differences across the class climate dimension profile groups.

Goudas and colleagues (Goudas, Biddle, Fox, & Underwood, 1995) assessed 24 12- and 13-year old girls who were students in a single intact physical education class. The purpose of this study was to examine the motivational effects of two different teaching styles in one sport activity. Track and field lessons were taught for ten weeks by a male professor using two different teaching styles direct or differentiated, which are teaching styles that are similar to a performance- and mastery-oriented climate, respectively. Results from this study (Goudas et al., 1995) were that adolescent girls exposed to a differentiated teaching style in physical education reported higher levels of intrinsic motivation, were more task involved in the lessons, and appeared to be highly motivated as opposed to those students taught using a direct teaching style.

The researchers concluded that individual goal disposition and manipulation of teaching style had independent effects on motivation. Goudas et al. (1995) did not find an interaction between

teaching style and goal disposition, but analysis did support that students low in either perceived competence, autonomy, or task orientation could still be motivated through a differentiated teaching style.

Goudas (1998) examined the relationship between motivational climate and intrinsic motivation for athletes with high and low perceived confidence. Goudas (1998) found that perceptions of a mastery-oriented climate were significantly and positively related to intrinsic motivation, ratings of enjoyment and effort whereas perceptions of a performance-oriented climate were not. However, Goudas (1998) did not find a relationship between perceptions of perceived competence and intrinsic motivation. These results, along with those of previous studies (Theeboom et al., 1995; Xiang et al., 2004) underscore the importance of implementing mastery-oriented climates, where patterns of personal improvement are promoted, in the sport and physical activity environment.

Paulson (1999) investigated the goal orientation and perception of motivational climate exhibited by female basketball and cross-country intercollegiate athletes. Findings suggested that although the basketball and cross-country athletes did not differ in their goal dispositions, they did have a different perception of their sports motivational climate. The basketball players perceived their climate to be more performance-oriented than did the cross-country athletes. Cross-country athletes perceived their climate to be more mastery-oriented than did the basketball players. However, despite this perception of mastery-orientation in cross-country athletes, both groups viewed their climate to be more mastery-oriented than performance-oriented. Paulson (1999) attributed these outcomes to the differences in competitive climates of the two sports. Cross country athletes' function in a more solitary manner than do basketball players, a sport that requires effort and cooperation from teammates. Results from this study suggest that the degree of competitiveness associated with particular sports and activities is capable of contributing to perceptions of a mastery- or performance-oriented climate.

It is clear, from the research reviewed in this section that students in physical activity settings define mastery- and performance- oriented climates similarly to those students studied in the academic setting. Furthermore, a physical activity environment perceived as mastery-oriented is conducive to adaptive motivational patterns. In the next section, research relating to gender differences in sports will be examined.

Research Concerning Gender Related Differences in the Sporting Context

This section will contain studies related to the effects of gender on perception of motivational climate and dispositional goal orientation. It will be shown that male sports participants have generally been found to emphasize performance orientation, while female sports participants emphasized mastery orientation (Xiang et al., 2004).

Newton and Duda (1993) examined the perceived causes of success among elite adolescent tennis players and investigated the function of gender in the interdependence of goal orientation and beliefs concerning tennis achievement. Study participants were 121 male and female adolescent elite tennis players who attended a summer tennis camp. Analysis revealed that tennis

players tend to be primarily task-oriented in sports, with females possessing a stronger task-orientation than males. Although most tennis players believed that effort played a key role in tennis success, females held this belief more strongly than males. Male athletes were more inclined than females to believe that external factors were predominant causes of success and males also emphasized the beliefs that creating a positive impression with the coach and being competent in tennis were causes of success to a greater extent than did females. Newton and Duda (1993) suggested that this area of inquiry would benefit from further analysis regarding the social-psychological mechanisms that influence the reported gender differences in goals and beliefs.

White and Duda (1994), in order to provide further support for the Task and Ego in Sport Questionnaire (TEOSQ) reliability and validity, studied 235 male and female volunteer sports participants. Age groups consisted of youth, high school, intercollegiate, and adult recreational sport participants. In addition to lending support to the validity and reliability of the TEOSQ, White and Duda (1994) found that athletes involved in the highest level of competition were significantly higher in ego-orientation than their adult counterparts who were participating in recreational activities or at a lower level of sport involvement. Conclusions related to gender were that male athletes were higher in ego-orientation than were female athletes regardless of level of competition. Additionally, male interscholastic or recreational sport participants were less task-oriented than high school or recreational female participants as well as males who were just beginning their involvement in competitive sport. This study suggests that gender as well as level of competition may be related to dispositional goal orientation.

Kavussanu and Roberts (1996) studied the relationship between perceived motivational climate and intrinsic motivation and self-efficacy and attempted to determine the role of goal orientation and perceived motivational climate in predicting intrinsic motivation and self-efficacy. In their study, the researchers assessed 285 male and female college student attending seventeen beginning level tennis classes. Analysis revealed that the perception of a mastery-oriented climate positively related to enjoyment, effort and perceived competence, and inversely related to tension. Gender differences emerged, also. For females, a performance-oriented climate is a negative predictor of intrinsic motivation. For males, a task-orientation and performance-oriented motivational climate emerged as equally important predictors of overall levels of intrinsic motivation, whereas perceptions of a mastery-oriented motivational climate contributed minimally to the prediction of intrinsic motivation. Kavussanu and Roberts (1996) suggest that longitudinal field experiments are needed encompassing the manipulation of the environment to determine its effect on motivational processes and behavior.

White and Zellner (1996) examined the link between an individual's personal goals, views about sport operation, and trait anxiety level prior to or during competition as well as the relation of gender and sport group to goal orientations. Participants were 251 male and female high school varsity athletes, Division I intercollegiate athletes, and individuals involved in organized college-age recreational sport. Analysis revealed that overall subjects in the study were higher in task orientation than ego orientation. Follow-up univariate *F* tests on the gender main effect indicated

that women were higher in task orientation than men. High school athletes were more ego-oriented than were intercollegiate athletes. The college-age recreational males reported that effort led to success in sport indicating an ego orientation, whereas intercollegiate males and high school did not have this belief. High school male sport participants believed that using an illegal advantage led to success in sport, indicating an ego orientation, however intercollegiate males and all female athletic groups did not. In all three different sport groups, personal improvement and task mastery appeared more prominent in women than men.

Xiang and colleagues (Xiang, McBride, & Bruene, 2004) studied the effect of motivational climate on gender differences in elementary aged children participating in a physical education running program. In this study, 119 boys and girls completed questionnaires to access their dispositional goal orientation, expectancy related beliefs, subjective task values, and intention for future participation in running. They were also timed in a 1-mile run test.

Analysis of the data by Xiang et al. (2004) revealed the students who reported a mastery goal tended to feel competent in the running program and see it as useful, important and interesting. Perceptions of interest were positively related with intention for future participation. Contrary to the view that performance goals lead to maladaptive motivational patterns, students whose goal was to outperform classmates and run the most number of laps tended to perform better in the run than did those who did not endorse the performance goal.

The researchers (Xiang et al., 2004) suggested that more research is needed to confirm or refute this finding. In regards to gender, there were no differences on the mean scores. The researchers posit that the lack of gender differences is due to the gender-neutral stereotype associated with running, which is not considered a masculine or feminine activity. Furthermore, Xiang, McBride, and Bruene (2004) proposed that gender-stereotyped tasks might also play an integral part in the success of the participants. His research suggests that the gender for which the activity is stereotyped may be more successful when participating in those activities than will be the opposite gender, regardless of the motivational climate. The researchers further suggest that simple comparisons between boys and girls should be avoided and, instead, future research should examine differential relations between motivational variables by gender.

In general, the previous studies reveal that male sports participants have been found to emphasize performance orientation, while female sports participants emphasized mastery orientation (Xiang et al., 2004). Males can be intrinsically motivated in a performance- or mastery-oriented climate whereas females tend to be intrinsically motivated in a mastery-oriented climate. There were no clear indications about gender related differences for youth involved in physical activities reported in any of the studies.

Literature on Manipulated Motivational Climates

A review of the motivational literature on the topic of manipulated motivational climate in youth physical education classes produced only three published articles (Solmon, 1996; Theeboom et al., 1995; Treasure & Roberts, 1995) that addressed interventions in which the physical

education environment was manipulated in order to operate as either a mastery climate or a performance climate.

Treasure and Roberts (1995) summarized Treasure's 1993 doctoral dissertation study in their research. Treasure's (Treasure & Roberts, 1995) dissertation study was the first recorded attempt found in the literature to manipulate the motivational climate of a physical education class utilizing Ames' (1992b) TARGET dimensions. Treasure (Treasure & Roberts, 1995) hypothesized that if the motivational climate were manipulated so that it was either strongly mastery-oriented or performance-oriented it would override the individual dispositional goal orientations of the participants and be more predictive of children's cognitive and affective responses.

The participants in Treasure's study (Treasure & Roberts, 1995) were 111 male and female sixth and seventh grade children with a mean age of 12.1 years who were randomly assigned to a mastery- or performance-oriented climate. The study period lasted ten successive days during which a unit on soccer was taught. Treasure's findings (1993) clearly demonstrated that those children who were exposed to the mastery-oriented climate perceived a mastery-oriented motivational climate and those children exposed to the performance-oriented climate perceived a performance-oriented climate. Furthermore, Treasure (1993) found that by manipulating the physical education climate a physical education teacher can influence the motivational climate of the achievement context to supersede the dispositional goal orientations of students.

Consistent with previous research (Ames, 1992b) students in the mastery-oriented environment indicated that they preferred challenging tasks, believed success was the result of effort, and experienced more satisfaction than that of the participants in the performance-oriented climate. Results from this study suggest that teachers may significantly enhance a child's physical education environment by achieving a particular achievement goal.

Theeboom et al. (1995) examined the effectiveness of a performance- versus mastery-oriented teaching program on children's enjoyment, perceived competence, intrinsic motivation, and motor skill development. In doing so, Theeboom et al. (1995) manipulated the motivational climate in a physical activity setting and measured change in motor skill development as a result of exposure to the different motivational climates. In this study, children aged eight to twelve years were assigned to a mastery- or a performance-oriented climate applying Ames' (1992b) TARGET dimensions. Students were taught the martial art sport of Wushu for six weeks during a summer sports program.

Results concerning enjoyment (Theeboom et al., 1995) indicated that participants in the mastery group reported significantly higher enjoyment levels than those in the traditional groups. The effect size was 0.48, indicating a moderately strong finding with respect to enjoyment differences. Analysis of motor skill development (Theeboom et al., 1995) revealed that children in the mastery group scored higher on the Wushu skill than did those in the traditional group. The effect size was 0.50, indicating a moderately strong effect of the intervention on motor skill

development. Theeboom et al. (1995) suggested that more research pertaining to the effect of the motivational climate on motor skill development be conducted in order to determine if these findings can be generalized to similar and different sport settings.

Unlike the previously mentioned studies, Solmon (1996) analyzed the effect of gender on the perception of motivational climate. Solmon (1996) investigated differences in students' practice behaviors and perceptions of the motivational climate in physical education classes that were manipulated to be mastery- or performance-oriented. Participants included 109 male and female seventh and eighth grade students who were enrolled in physical education class. Participants were randomly assigned to a mastery or performance instructional group in which Ames' (1992b) TARGET dimensions were implemented. Boys and girls were not combined for the intervention. Students participated in two 30-minute juggling lessons.

Analysis (Solmon, 1996) indicated that the instructors did effectively create the intended motivational climates. Similar to previous results (Goudas et al., 1995; Theeboom et al, 1995; Treasure & Roberts, 1995) analysis indicated that students in the mastery-oriented climate perceived a higher level of task involvement than did those in the performance-oriented climate and students in the performance-oriented climate perceived a higher level of ego-orientation than did those in the mastery-oriented climate.

Solmon (1996) did note a number of gender differences. Gender differences were not noted in regard to perception of a mastery-oriented climate. Boys tended to perceive a higher level of performance-orientation than did girls. Boys were more likely to attribute success to ability, than were girls. There were no gender related differences related to persistence.

Solmon (1996) summarizes the research by writing that the results of this study are evidence of the applicability of a goal-perspective approach to studying ways to optimize learning environments. This is especially promising for they physical education context in which competitive factors are inherently associated with motor skills.

Results from the previously reviewed studies support the speculation that a physical activity setting can, through careful manipulation, be perceived by students as a mastery-oriented or performance-oriented climate. Furthermore, these studies support the notion that a manipulated mastery-oriented climate facilitates adaptive motivational patterns, improves skill acquisition, and result in gender differences similar to those in a naturally occurring mastery-oriented climate.

Summary of literature review

A review of the literature confirms that motivational research can be applied to physical education. First, convincing research has been identified that demonstrates that a correlation exists between results from motivational studies in the academic setting and those from a sport or physical education context (Duda & Nicholls, 1992). Relationships between perception of a mastery- or performance-oriented climate and a number of motivational variables have been

examined in physical activity settings, and the results have been consistent with those reported in the classroom environment (Nicholls, et al., 1985; Solomon, 1996). Gender differences have been noted in high school and college students' achievement goals (Xiang et al., 2004). In general, male sports participants have been found to emphasize performance orientation, while female sports participants emphasized mastery orientation (Xiang et al., 2004). Furthermore, the ability to successfully manipulate the physical education environment and thus override dispositional goal orientation has also been addressed by researchers Solmon, & Boone, 1993; Theeboom, De Knop, & Weiss, 1995; Treasure & Roberts, 1995). However, there remains a wide gap in the literature.

Initial studies manipulating motivational climates in field settings (Solmon, 1996; Theeboom et al., 1995; Treasure & Roberts, 1995) support the presumption that a mastery-oriented climate facilitates adaptive motivational patterns. As promising as it is for individuals to say they are more willing to persist or exert effort in challenging situations when exposed to a mastery-oriented climate, virtually no data exist concerning what these individuals actually do in physical activity settings, specifically, what the impact of a manipulated motivational climate on health-related fitness outcomes in youth physical education classes really is.

3. Methodology

3.1 Research Design

The research utilized a quasi-experimental design in order to examine the hypotheses and research question. Utilizing the quasi experimental designs allows the researcher to gain insight into methods of instruction, have control over variables, determine what is best for a population, and provide greater transferability than anecdotal research (Thomas & Nelson, 2001). The specific approach utilized for this research was a randomized control group/pretest-posttest design.

In the control group/pretest posttest group design, groups are randomized to a control or intervention group and are then tested before treatment to determine prior state. Following the intervention being applied to the intervention group, both groups are retested in order to compare change. Advantages of this particular design are that the researcher can measure the effects of the pretest, expand the research to compare more than one treatment, allow many comparisons, and use statistical power to equate the groups (Thomas & Nelson, 2001). One noted disadvantage of a control group pretest posttest design is the effect of testing. The testing effect is caused by the participant’s behavior being changed due to taking the pretest and may result in the participant being sensitized to the purpose of the study or making them more proficient at the skill being tested (Thomas & Nelson, 2001).

The treatment status of the participants in this study was categorized as intention-to-treat. Categorizing the research participants as Intention-to-treat helped guard against attempts to influence the results of the study by eliminating outliers, avoiding bias related to drop out rate, preserving baseline comparability between treatment groups that was initially achieved by randomizing the groups, and helping to ensure an accurate reflection of the way treatments were performed in the general population (Dallal, 2004).

3.2 Instrument Design and Development

In the following section, the instrument design and development will be described. The first section discusses how the instruments were identified and chosen from the research literature. The second section covers the issue of the instruments' validity and the third section covers the instruments' reliability.

Instrument Development

A search of the literature revealed that the following instruments best suit the purposes of this study: The Task and Ego Orientation in Sport Questionnaire (TEOSQ), the Perceived Motivational Climate in Sport Questionnaire (PMCSQ), Children's Attitude Toward Physical Activity Inventory (CATPA); and the President's Challenge Physical Fitness Test.

Task and Ego Orientation in Sport Questionnaire

A modified, sport-specific version of the 13-item TEOSQ (Duda & Nicholls, 1992) was used to assess dispositional goal orientation. (See Appendix B.) Although the TEOSQ has been used most frequently with competitive sports participants, the underlying psychological constructs are considered to be shared by individuals involved in any achievement related physical activity (Duda, 1992). The TEOSQ requested that the participants think about when they felt most successful in physical education class and respond to 13 items designed to assess task-orientation (e.g., "I feel most successful in physical education class when I learn something that is fun to do.") and ego-orientation (e.g., "I feel most successful in physical education class when I can do better than my friends."). The participant's responses were indicated on a 5-point Likert-type scale (1 = strongly disagree; 5 = strongly agree). For analyses purposes indexes were created for α survey items representing ego and task orientations, respectively.

Validity. Duda (Chi & Duda, 1995; Duda, 1992; Duda et al., 1995; Li, Harmer, & Acock, 1996; Solmon & Boone, 1993) reports substantial evidence to support the internal consistency of the TEOSQ (Chronbach's α = 0.81 - 0.86, for task scale; /Chronbach's α = 0.79 - 0.90 for ego scale). The TEOSQ has been shown to be both valid and reliable (Duda, 1989b, 1992; Newton & Duda, 1993).

Reliability. Duda (1992) reports substantial evidence to support test-retest reliability following a 3-week period (r = 0.68, for task scale; r = 0.75, for ego scale) for the TEOSQ. The TEOSQ has been shown to be both valid and reliable (Duda, 1989b, 1992; Newton & Duda, 1993).

Scoring. The TEOSQ (Duda & Nicholls, 1992) was comprised of two subscales, one measuring task orientation and the other measuring ego orientation. Participants indicated answers on a 5 point Likert-type scale where one was equal to strongly disagree and five was equal to strongly agree. A mean score was calculated for each participant by adding the scores for the task orientation items together and dividing by seven and adding the ego orientation items together and dividing by six. This resulted in a mean score between one and five where one represented a low score and five a high score for the perspective goal orientation. All missing data were coded as negative nine.

Perceived Motivational Climate in Sport Questionnaire

The PMCSQ (Seifriz, Duda, & Chi, 1992) was chosen to serve as a manipulation check to ensure that the mastery- and performance-oriented climates were perceived as planned by the researcher. (See Appendix B.) This 21-item inventory was developed to assess perceptions of the motivational climate in the sport setting. Similar to previous research (Kavussanu & Roberts, 1996) undertaken using this questionnaire, for this study, the inventory was slightly modified to fit the physical education context. Two inventory items that were only applicable to the sport context (e.g., "Most players get to play in the game.") were deemed inappropriate for this study and were therefore excluded. Examples of remaining inventory items are: "In my physical education class everyone feels that they have an important role in the class" and "In my physical education class everyone wants to score the most points" for the mastery and performance subscales, respectively. The subject's responses will be placed on a 5-point Likert-type scale (1 = strongly disagree; 5 = strongly agree). Mean index scores were calculated for both the mastery-orientation and performance-orientation.

Validity. Confirmatory Factor Analysis was used to determine the validity of the PMCSQ (Seifriz, Duda, & Chi, 1992) inventory. The Goodness of Fit Index (GFI) scored a value of 0.77. This suggests an acceptable fit of the data by the model (Walling et al.,1993).

Reliability. Both performance and mastery subscales performed well and demonstrated acceptable internal consistency for performance (Chronbach's $\alpha = 0.84$) and mastery (Chronbach's $\alpha = 0.80$) (Seifriz et al., 1992). This has been the case throughout the various research studies that have used the PMCSQ (Seifriz et al., 1992).

In another study that tested the reliability of the PMCSQ (Seifriz et al.,1992), Cronbach's alpha reliability coefficients were calculated for each of the two scales. Alphas of 0.82 and 0.80 were found for the mastery and performance scales, respectively (Seifreiz et al., 1992).

Scoring. The PMCSQ (Seifreiz et al., 1992) was comprised of two subscales, one measuring the perception of a mastery-orientated climate and the other the perception of a performance-oriented climate. Participants indicated answers on a 5 point Likert-type scale where one was equal to strongly disagree and five was equal to strongly agree. A mean score was calculated for each participant by adding the scores for the mastery-orientation items together and dividing by eight and adding the performance-orientation items together and dividing by eleven. This resulted in a mean score between one and five where one represented a low score and five a high score for the perspective climate. Missing data were coded as negative nine.

Children's Attitudes toward Physical Activity

This study employed Schutz et al's (Schutz, Smoll, Carre, & Mosher, 1985) revised CATPA inventory to measure students' attitudes toward physical activity. (See Appendix B.) The inventory is based on Kenyon's (1968) Attitudes Toward Physical Activity (ATPA) and Simon and Smoll's (1974) CATPA inventories. The revised CATPA (Schutz et al., 1985) assesses children and adolescents' attitudes toward seven physical activity sub domains: social growth,

social continuation, health and fitness, vertigo, aesthetic, catharsis, and ascetic. The inventory uses statements that children are asked to indicate how they feel in response to the statements. There are five word pairs per statement, one negative and one positive word in each, and the scale for each pair goes from one to five, with five representing the positive word in the pair.

Validity. The inventory has been shown to possess high construct validity through research with both the ATPA and the CATPA (Schutz et al., 1985). However, the ability of the CATPA alone to predict behavior is moderate (Meyers, Pendergast & DeBacy, 1978; Smoll, Schutz, & Keeney, 1976). According to Ajzen's (1985) Theory of Planned Behavior, attitude inventories need to be coupled with subjective norm and perceived behavioral control to be able to predict intent and behavior.

Reliability. The revised CATPA inventory, with the exception of the health and fitness sub domain, possesses moderately high test-retest reliability (Schutz, Smoll, & Gessaroli, 1983) with mean reliability coefficients of 0.71 and 0.67. The health and fitness sub domain has a much lower test-retest reliability coefficient (0.20 for males and 0.54 for females) (Schutz, et al., 1983). High ceiling effects and the sub domain's division into two factors, value and enjoyment, which gives each only two and three respective word-pairs, are the two main reasons for the low reliability coefficient of this sub domain. Schutz et al. (1985) suggested that more word pairs be added to this sub domain to combat this problem. For this study, based on Ajzen's (1985) work, five word pairs were added to the health and fitness sub domain of Schutz et al.'s (1985) revised CATPA, making a total of five word-pairs in both the value and enjoyment groups. Despite the high level of reliability and validity reports with the revised CATPA, Schutz et al. (1985) warn that the inventory should not be considered suitable for assessment of individual changes in attitudes. The authors do find, however, that the inventory is well suited for the assessment of groups.

Scoring. The CATPA (Schutz et al., 1985) inventory is comprised of seven domains; social growth, social continuation, health and fitness, vertigo, aesthetic, catharsis and ascetic. Inventory items were scored using a 5-point Likert-type scale, with five representing the positive adjective and one representing the negative adjective in the word pair. Each domain was totaled to yield a maximum score of 25, excluding the Health and Fitness domain, which yielded a score of maximum 40. A high score represented a positive attitude toward physical activity, while a low score indicated a negative attitude toward physical activity.

The President's Challenge Physical Fitness Test

The President's Challenge, formerly known as the Presidential Physical Fitness Test, was created in 1966 by the President's Council on Physical Fitness and Sports [PCPFS] (n.d.) in an effort to encourage American youth to be more physically active. (See Appendix B.) There are three areas to the President's Challenge (PCPFS, n.d.): the Active Lifestyles Program that recognizes those youth and adults who participate in regular physical activity, the Physical Fitness Program that recognizes youth for achieving specific standards of physical achievement, and the Health Fitness Program that recognizes those who meet the healthy level of fitness goal on all five events in the program.

For this study, the Physical Fitness Program (PCPFS, n.d.) was utilized because most school children are familiar with the various components that are measured in this test. The five health-related fitness components incorporated in the Physical Fitness Program (PCPFS, n.d.) are: 1) Curl-Ups to measure abdominal strength and endurance, 2) Shuttle Run to measure anaerobic endurance, 3) Endurance Run to measure cardiorespoiratory endurance, 4) Right Angle Push-Ups to measure upper body strength and endurance, and 5) V-Sit Reach to measure muscular flexibility.

Scoring. The President's Challenge (PCPFS, n.d.) was scored through observation and record keeping. The one-mile run was scored by the instructor observing and recording the amount of time, in minutes and seconds, required for the participants to run one mile. The instructor who counted the number of curl-ups the participant could perform in one minute scored the curl-up test. The instructor who observed and recorded the number of push-ups the participants could perform without stopping scored the push-up test. Participants were required to perform at least one push-up every three seconds until exhaustion. The shuttle run test was scored by the instructor who observed and recorded the amount of time, to the nearest tenth of a second, required for the participant to perform the run following correct procedure. The instructor who recorded and observed the fourth reach performed by the participant scored the v-sit reach. In order for the fourth reach to be counted it was held for a minimum of three seconds.

For comparison purposes, a fitness index was constructed consisting of each of the individual performance measures (mile run, shuttle run, v-sit reach, push ups, and curl ups) as well as a percentile scoring. For the percentile scoring analyses, participants were assigned a percentile score, based upon Norm-Referenced criterion supplied by the PCPFS (n.d.). This is the measure used in the North Alabama public school system in order to award participants for meeting specified expectations on the fitness test.

3.3 Procedures

The following section will discuss the population, confidentiality, consent and assent, and procedures that were followed in order to implement the intervention. Population and sample will be discussed first.

Population and Sample

The population for this research was 206 fifth to eighth grade physical education students, two classes per school, in four North Alabama schools. The schools were selected based on the voluntary participation of the physical education instructors. Classes were chosen based on the age of the students in the class and the class size. All classes had fewer than 50 students.

Confidentiality

Confidentiality of participants was assured in several ways. Each participant was assigned a number one through 206. The ID was matched with the participant's name in the researcher's records only. All persons reviewing the participant data had access only to the identification number. All data is stored in the researcher's home office in a secure location and will be disposed of no sooner than three years following the study.

Consent

The researcher contacted the superintendent of all schools that were chosen to participate in the study. The researcher met with and described the purpose, importance, and benefits associated with the study to the superintendent of the schools. After the superintendent gave his written consent for the chosen schools to participate in the study, the researcher then met with the principal of each participant school and described the purpose, importance, and benefits associated with the study. After the principal gave his or her written consent for the school to participate in the study, a consent form for the parents or guardians of the participants was designed.

This consent form was sent to the parents of all students who were invited to participate in the study. Students were given a consent form at school (See Appendix C.) to take home and have signed by their parent or guardian. The consent form described the purpose of the study, the importance of the study, and potential benefits and risks of participating in the study. Parents were informed that participation in the study was strictly voluntary and that their child could withdraw from the study at any point in time without a threat of harmful repercussions. Only those students who brought the signed consent form back to school were allowed to participate in the data collection part of the study. Those students who did not return signed consent forms still attended their regularly scheduled physical education class.

Assent

Because this is a study involving minors, all students who returned the signed consent form giving their parents' permission for them to participate in the study were then asked to sign an assent form (See Appendix C.). The assent form described the purpose, importance, and benefits of the study in age-appropriate language. The students were informed that signing the assent form and participating in the study was strictly voluntary and that, even after they signed the form, they could withdraw from the study at any point in time without any negative repercussions. Upon signing the assent form, the students were then be assigned a number between 1 and 206 to use on all data collection forms.

Intervention

The physical education instructors who participated in this study volunteered to learn and implement instructional strategies following TARGET dimensions (Ames, 1992b), as discussed in Chapters 1 and 2. Their voluntary participation in this study eliminated the likelihood of objections about the implementation of methods used in the motivational climates. However, if the instructors had stated objections they would have been discussed and resolved if possible. If resolution could not have been made the instructors would have been removed from the study group. Instructors established a control climate for one of their participating classes by incorporating a performance-oriented climate into their lessons and teaching style. They established an experimental climate for their second participating class by incorporating a mastery-oriented climate into their lessons and teaching style. Instructors were given verbal instruction and reading material (see Appendix D) pertaining to the incorporation of each of the TARGET dimensions into their classroom. After reading the material describing components of

a mastery- and performance-oriented climate, the instructors completed a survey marking the statements that best represented a mastery-oriented climate. Based on their survey responses, additional training was unnecessary. Additionally, the instructors were provided with a weekly checklist used to mark each of the mastery- and performance-oriented strategies implemented in the appropriate groups. Instructors were not informed about the expected outcome of the study.

Participating classes were randomly assigned to a control or experimental motivational climate. Pretest scores for the TEOSQ (Duda & Nicholls, 1992) and the President's Challenge Physical Fitness test (n.d.) were obtained from each participant. Participating classes attended their regularly scheduled physical education class Monday through Friday for eight consecutive weeks and were exposed to either a mastery- or performance-oriented climate. Lesson plans, incorporating a strength-training regimen (See Appendix D), were utilized by the instructors three times weekly on Mondays, Wednesdays, and Fridays. On Tuesdays and Thursdays throughout the eight-week study period, instructors incorporated activities to enhance speed and quickness. Suggested activities were made available (See Appendix D) for the instructors. Upon completion of the study the participants were administered The President's Challenge Physical Fitness test (PCPFS, n.d.) and the CATPA (Schutz et al., 1985) inventory.

The strength-training program was designed following safety protocol for youth participants. The instructors adhered to recommendations made by the American College of Sports Medicine (1993/1998) and the American Academy of Pediatrics (1990). The strength-training regimen consisted of the following exercises:

1. Body weight: Participants performed exercises in which their body served as the resistance used to build strength. Examples of this type of exercise are squats, lunges, push-ups, pull-ups, and crunches.
2. Tubing exercises: Participants performed exercises using a piece of elastic tubing attached to a stationary object in order to provide resistance.
3. Medicine ball exercises. Participants performed strengthening exercises using weighted balls as the form of resistance. Ball weights ranged between ½ lb to 5 lbs.
4. Dumbbell exercises: Participants performed strengthening exercises using light dumbbells as the form of resistance. Dumbbells were 5 lbs or less.
5. Training bar exercises: Participants performed exercises using a training bar, which is similar in size and weight to a broomstick. Examples of the type of exercises that were performed are front squats, back squats, and overhead press.
6. Speed, agility and quickness exercises: Participants performed exercises that specifically enhance speed, agility and quickness. Examples of the type of exercises that were performed are sprinting, pro-agility, reaction drills, and plyometrics. No ballistic type exercises were performed.

Manipulation Check

Four weeks into the study, the PMCSQ (Seifriz, Duda, & Chi, 1992) was administered to all study participants. This inventory was used to determine the extent to which the instructors developed the intended motivational climates. Patrick et al. (Patrick, Anderman, Ryan, Edelin, &

Midgley, 2001) generally advise that the beginning of the year is the most important time for instructors to incorporate a new motivational climate in their classroom. However, for this study, that was not possible. Allowing four weeks before implementing the manipulation check allowed the study participants ample time to adjust to the new motivational climate in their classroom. Regardless of the results of the PMCSQ, (Seifriz, Duda, & Chi, 1992) analysis was conducted with regard to intention to treat rather than students' perceptions of the type of motivational climate to which they were exposed.

3.4 Data Collection and Analysis

The following section discusses the data collection methods and data analysis. Data were collected from 206 physical education students in the state of Alabama. The data was analyzed using inferential statistical methods.

Data Collection

To ensure proper data collection protocol, information from each of the administered inventories was used to create a data entry screen using the statistical software package EpiData 3.1 (Lauritsen, Bruus, & Myatt, 2001).The inventories were converted to a .qes file in EpiData where variable names were determined for each inventory item. Variable labels and values were then assigned for each variable. Following this procedure the .qes file was converted into .chk file to create checks for the different variables. The .chk file was used to ensure that entered data were checked for the appropriate range of values, missing values, skip and fill as required, and logical consistency.

Data Analysis

A sample size of 200 achieves 80% power to detect change in R^2 of 0.019 attributed to one independent variable using an *F*-Test with a significance level (alpha) of 0.05 (NCSS/PASS, 2004). The variables tested are adjusted for an additional 12 independent variables with an R^2 of 0.50 (NCSS/PASS, 2004).

4. Results

Analysis of Covariance (ANCOVA) will be used for statistical analysis. Multiplicative interaction terms will be constructed using the variable representing the mastery and performance groups, age, gender, individual goal orientation, and the pretest score. The extent to which there are interaction effects will be tested using hierarchical regression. Regression (R^2) will be computed to assess contribution to the model of the interaction effects and the overall fit of the model. Unstandardized partial regression coefficients and their level of significance will be examined to assess the contribution of the main effects. R^2 and the effects of the independent variables will be considered statistically significant at $p < 0.05$.

4.1 Demographic Information

The initial study group consisted of 226 male and female students attending four different schools located in North Alabama. Due to unforeseen circumstances, only 206 of these participants were able to complete the study and complete data are available for 115 participants.

Participants ranged in age from 10 to 14 years and were in grades 5 through 8. Caucasian, Black/African American, and Hispanic populations were represented (45.77%, 38.34%, 11.91%, respectively [see Table 1]). Minority populations were over represented in comparison with findings from the 2000 Census (U.S. Census Bureau, 2000) for the state of Alabama which reported the state's population as 71.8% Caucasian, 26.3% Black/African American, and 1.7% Hispanic.

Table 1

Demographic Characteristics of Participants (N = 206)

Personal characteristics	*n*	Percent
Gender		
Male	97	47.55
Female	107	52.45
Ethnicity		
Caucasian	92	45.77
Black/African American	77	38.34
Hispanic	24	11.91
Other	8	3.98
Age at time of study (years)		
10	13	6.40
11	80	39.41
12	55	27.09
13	34	16.75
14	21	10.35
Grade at time of study		
5	103	50.00
6	66	32.04
7	12	5.83
8	25	12.13

4.2 Reliability of Instruments

Preliminary analyses of all measurement instruments were conducted in order to determine the reliability of the inventories. The statistic that was used for this measure was Cronbach's alpha.

The CATPA (Schutz et al, 1985) inventory was used to assess participant's attitude toward physical activity. A reliability analysis for the CATPA (Schutz et al,1985) inventory as a whole yielded a Cronbach's alpha of 0.90 for the pretest and 0.89 for the posttest, which are both considered acceptable (Wright, 1979). Additional analyses were performed in order to determine the reliability for each of the seven domains that comprise the CATPA (Schutz et al, 1985) inventory.

Reliability testing was performed on each of the CATPA (Schutz et al, 1985) domains. Pretest CATPA (Schutz et al, 1985) analysis revealed strong alphas for the aesthetic, catharsis, and ascetic domains. The remaining four domains, social growth, social continuation, health and fitness, and vertigo had weak alphas (0.35, 0.79, 0.61, and 0.75, respectively). By removing one survey item from each of these domains in the CATPA pretest inventory the alphas were increased (0.67, 0.83, 0.73, and 0.82, respectively [See Table 2]). Therefore these items were removed from subsequent analyses.

The posttest reliability coefficients for all domains, excluding the social growth and the health and fitness domains, ranged from 0.85 to 0.93. These are very strong alphas, suggesting good reliability. The alpha for the social growth domain (0.76) was not increased by removing any survey items. The alpha for health and fitness (0.64) was increased to 0.83 by removing one item from the posttest CATPA (Schutz et al, 1985). Therefore this item was removed from subsequent analyses.

The PMSCQ (Seifriz et al, 1992) was administered to the participants to serve as a manipulation check to determine the extent to which the instructors manipulated their physical education environments. Cronbach's alpha for the PMCSQ (Seifriz et al, 1992) was 0.67, which suggests poor reliability. If the item "In my physical education class everyone feels that they have an important role in the class" is removed, the alpha improves to 0.71, which is not considered strong, but acceptable (Wright, 1979). This item was removed from subsequent analysis (see Table 3).

Table 2

Internal reliability (coefficient alpha) for CATPA inventory

Domain	Pretest alpha	Posttest alpha
Social Growth	0.67	0.76
Social Continuation	0.83	0.85
Health and Fitness	0.73	0.82
Vertigo	0.82	0.93

Aesthetic	0.86	0.85
Catharsis	0.84	0.88
Ascetic	0.87	0.91

The TEOSQ (Duda & Nicholls, 1992) was used to determine the individual goal orientation of the participants. Reliability analysis for the TEOSQ (Duda & Nicholls, 1992) inventory yielded a Cronbach's alpha of 0.73, which is acceptable (Wright, 1979). There was not a significant improvement in the alpha by removing any of the inventory items, with the greatest possible improvement being an alpha of 0.76 by removing the item "I feel most successful in physical education class when I learn a new skill by trying hard" (see Table 4). All items were left in for all analyses.

Table 3

Internal reliability (coefficient alpha) for PMCSQ

Questionnaire Item	alpha if deleted
Students feel good when they do better than the other students	0.64
Trying hard is rewarded	0.67
Students are punished when they make mistakes	0.66
Teachers make sure students improve on skills they are not good at	0.68
The focus is to improve each class	0.66
Students are put in time out for mistakes	0.65
Playing better than other students is important	0.64
Teachers give most of the attention to the "best students"	0.64
Doing better than others is important	0.64
Students work hard because they want to learn more about the activities	0.67
Teachers favor some students more than others	0.64
Students are encouraged to outplay their classmates	0.62
Students are encouraged to work on their weaknesses	0.68
Everyone wants to score the most points	0.65
Everyone feels that they have an important role in the class	0.71
Teachers want us to try new skills	0.66
Students like playing when teams are evenly matched	0.64
Only the best students get noticed by the teachers	0.64
Students are afraid to make mistakes	0.67

Note. All items are preceded by the statement "In my physical education class"

4.3 Normality of Distribution

Preliminary analyses of all measurement instruments were conducted in order to determine the extent to which the frequency distribution of the data is normal with regard to the specific inventories. The statistic that was used for this measure was the Kolmogorov-Smirnov (K-S) Goodness-of-fit test. The K-S tests for the CAPTA (Schutz et al, 1985), PMCSQ (Seifriz et al, 1992), and TEOSQ (Duda & Nicholls, 1992) were significant at $p < 0.01$, $p < 0.001$, and $p < 0.01$, respectively. Findings from the K-S test for each of the aforementioned inventories result in a rejection of the null hypothesis. The sample distributions are not normal and, by inference, the distributions in the population from which the sample was selected were not normal.

Table 4

Internal reliability (coefficient alpha) for TEOSQ

Questionnaire Item	alpha if deleted
I'm the only one who can do the play or skill	0.72
I learn a new skill and it makes me want to practice more	0.70
I can do better than my friends	0.70
The others can't do as well as me	0.71
I learn something that is fun to do	0.71
Others mess up and I don't	0.69
I learn a new skill by trying hard	0.76
I work really hard	0.71
I score the most points, goals, or hits	0.74
Something I learn makes me want to go and practice more	0.70
I'm the best	0.71
A skill I learn feels really right	0.72
I do my very best	0.71

Note. All items are preceded by the statement "I feel most successful in physical education class when".

Analysis of Gender, Age, Group, and School

A posttest Presidential Fitness Test score X gender ANOVA suggested that gender of the participant did not have a significant effect on Posttest Presidential Test outcomes (F (1, 182) = 2.72, p = 0.10). To determine the extent to which the residuals were normally distributed the Levene's test for Equality of Variance was utilized. Analysis indicated variances for the residuals did not differ significantly for boys and girls (p = 0.73). This finding suggested that there was equal variance across gender (See Table 5).

A posttest Presidential Fitness Test score X age ANOVA suggested that the age of the participant did have a significant effect on Posttest Presidential Test outcomes (F (4, 179) = 3.63,

$p < 0.05$). To determine the extent to which the residuals were normally distributed the Levene's test for Equality of Variance was utilized. Analysis indicated that the residuals did differ significantly ($p < 0.05$) by age. This finding suggested that there was not equal variance across age groups (See Table 5).

A posttest Presidential Fitness Test score X group ANOVA suggested that group assignment did not have a significant effect on Posttest Presidential Test outcomes (F (1, 182) = 0.26, $p = 0.61$). To determine the extent to which the residuals were normally distributed the Levene's test for Equality of Variance was utilized. Analysis indicated variances for the residuals did not differ significantly between the groups ($p = 0.54$). This finding suggested that there was equal variance across group assignment (See Table 5).

A posttest Presidential Fitness Test score X school ANOVA suggested that the school the participants attended did have a significant effect on Posttest Presidential Test outcomes (F (3, 180) = 18.11, $p < .001$). To determine the extent to which the residuals were normally distributed the Levene's test for Equality of Variance was utilized. Analysis indicated variances for the residuals did differ significantly across schools ($p < .001$). This finding suggested that there was not equal variance across schools (See Table 5).

Table 5

One-Way Analysis of Variance Summary Posttest Presidential Fitness Outcomes

Source		*df*	*SS*	*MS*	*F*
Gender					
	Between groups	1	1836.07	1836.07	2.72
	Within groups	182	122663.93	673.98	
Age					
	Between groups	4	9341.50	2335.38	3.63**
	Within group	179	115158.50	643.34	
Group					
	Between groups	1	176.61	176.61	0.26
	Within groups	182	124323.39	683.10	
School					
	Between groups	3	28859.48	9619.83	18.11***
	Within groups	180	95640.52	531.34	

*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$

Children's Attitude toward Physical Activity Inventory

The CATPA (Schutz et al, 1985) inventory was administered to determine the attitudes of the participants toward physical activity. Analysis of Variance (ANOVA) showed statistically significant ($p < 0.001$, $p < 0.001$, respectively) pretest differences between the mastery and performance groups in the CATPA (Schutz et al, 1985) domains representing social continuation and aesthetic. Statistically significant ($p < 0.05$) posttest differences between the mastery and performance groups were demonstrated in the CATPA (Schutz et al, 1985) posttest domain representing social continuation (See Table 6).

Other domains on both the pretest and the posttest did not differ across groups. Mean scores for the CATPA (Schutz et al, 1985) inventory ranged from 3.01 to 4.50 in all domains, which suggest favorable attitudes toward physical activity by all participants in pretest and posttest conditions (see Table 6). As a result of randomization not resulting in equivalent scores across all pretest CATPA domains, attitude about physical activity will be controlled for in all subsequent analysis.

Table 6

Group Differences for CATPA Inventory by Domain

	Mastery group		Performance Group			
Domain	*M*	*SD*	*M*	*SD*	*df*	*F*
Social growth pretest	4.15	0.76	3.88	0.97	159	3.90
Social growth posttest	4.48	0.76	4.28	0.90	156	2.35
Social continuation pretest	4.50	0.53	4.07	0.91	160	14.51***
Social continuation posttest	4.43	0.67	4.21	0.79	155	3.96*
Health & fitness pretest	3.06	1.22	2.97	1.11	157	0.28
Health & fitness posttest	3.01	1.39	3.12	1.12	157	0.26
Vertigo pretest	3.89	1.14	3.78	1.02	153	0.42
Vertigo posttest	3.93	1.03	3.78	0.99	160	0.89
Aesthetic pretest	4.17	0.86	3.57	1.14	157	14.48***
Aesthetic posttest	4.17	1.00	3.95	0.97	157	1.94
Catharsis pretest	3.08	1.24	3.29	1.08	153	1.31
Catharsis posttest	3.10	1.29	3.33	1.13	151	1.32
Ascetic pretest	3.08	1.24	3.29	1.07	154	1.31
Ascetic posttest	3.91	0.54	3.85	0.60	133	0.42

*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$

Perceived Motivational Climate in Sport Questionnaire

The PMCSQ (Seifriz et al, 1992) was administered as a manipulation check following the 4th week of the study. The manipulation check was used to determine the extent to which the instructors were able to manipulate the motivational climate specified by the researcher. The PMCSQ (Seifriz et al, 1992) was utilized to determine the extent to which the study participants perceived that they were in a mastery-oriented or a performance-oriented motivational climate. Participants in both the mastery- and performance-oriented climates responded more favorably to mastery items than performance items, demonstrating that the participants perceived themselves to be in primarily a mastery-oriented climate (see Table 7).

Table 7

Mean measures for the PMCSQ for Mastery and Performance Indices

	Mastery Index		Performance Index	
Source	*M*	*SD*	*M*	*SD*
Group				
Mastery Group	3.89	0.63	2.48	0.67
Performance Group	3.88	0.76	3.03	0.68
School				
School 1	4.14	0.50	2.66	1.01
School 2	3.73	0.83	2.92	0.66
School 3	3.88	0.78	2.56	0.63
School 4	3.78	0.58	2.71	0.70

A group (2) X climate (2) ANOVA suggested that the performance group (M = 3.03) responded more positively to the performance index than did the mastery group (M = 2.48, [F (1, 159) = 26.28, $p < 0.001$]). Groups did not appear to respond differently to mastery items (F (1, 155) = 0.01, p = 0.90 [see Table 8]). A climate (2) x schools (4) ANOVA found that all none of participants in any of the schools perceived themselves to be a participant in either a mastery (F (1, 156) = 1.82, p = 0.15) or a performance climate (F (1, 157) = 2.31, p = 0.08 [see Table 9]).

Task and Ego Orientation in Sports Questionnaire

The TEOSQ (Duda & Nicholls, 1992) was utilized to determine individual goal orientation of the study participants. An orientation index (2) X group (2) ANOVA revealed that the goal orientations, task (F (1, 196) = 3.72, $p < 0.05$) differed significantly across the mastery and performance groups (see Table 10). Ego goal orientation (F (1, 197) = 3.60, p = 0.06), did not differ across groups (see Table 10). An orientation (2) X school (4) ANOVA did not reveal any statistically significant differences among the schools in task and ego orientation (see Table 11).

Table 8

One-Way Analysis of Variance Summary of PMCSQ by Group

Source	*df*	*SS*	*MS*	*F*
Mastery Climate Index				
Between groups	1	0.01	0.01	.01
Within group	155	73.89	0.48	
Performance Climate Index				
Between groups	1	12.00	12.00	26.28***
Within group	159	72.60	0.46	

*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$

Table 9

One-Way Analysis of Variance Summary of PMCSQ by School

Source	*df*	*SS*	*MS*	*F*
Mastery Climate Index				
Between groups	3	2.89	0.96	1.82
Within group	156	82.41	0.53	
Performance Climate Index				
Between groups	3	3.58	1.19	2.31
Within group	157	81.03	0.52	

*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$

Table 10

One-Way Analysis of Variance Summary of TEOSQ by Group

Source	*df*	*SS*	*MS*	*F*
Task Orientation Index				
Between groups	1	3.72	3.72	5.42*
Within group	196	134.78	0.69	
Ego Orientation Index				
Between groups	1	2.87	2.87	3.60
Within group	197	157.01	0.80	

Table 11

One-Way Analysis of Variance Summary of TEOSQ by School

Source	*df*	*SS*	*MS*	*F*
Task Orientation Index				
Between groups	3	1.36	0.45	0.64
Within group	194	137.14	0.71	
Ego Orientation Index				
Between groups	3	4.63	1.54	1.94
Within group	195	155.26	0.80	

President's Challenge Fitness Test

The President's Challenge Fitness Test (PCPFS, n.d.) was administered to determine the extent to which participants exhibited a change in health-related fitness outcomes following the intervention period. Paired sample *t*-tests of the mile run, shuttle run, v-sit reach, push up test, curl up test and overall percentile score demonstrated statistically significant differences in several areas for the study population as a whole, for females, and for males (see Table 12). These findings suggest that the strength-training intervention had a positive affect on the health-related fitness components measured via the Presidential Challenge Fitness Test.

Table 12

Pretest and Posttest Differences for Health-Related Fitness Measurements

	Pretest		Posttest			
Source	*M*	*SD*	*M*	*SD*	*df*	*t*
All Participants						
Mile run	11.68	3.09	11.00	3.46	162	-3.36**
Shuttle run	11.40	1.33	11.17	1.37	168	-2.93**
V-sit reach	2.88	4.04	3.26	4.12	174	1.78
Push up	14.92	13.15	18.32	12.60	179	4.19***
Curl up	37.76	11.36	41.24	11.06	172	5.19***
Percentile	18.84	19.39	30.03	26.19	180	7.08***
Males						
Mile run	11.18	3.50	11.00	4.31	80	-0.54
Shuttle run	11.11	1.35	11.00	1.51	81	-0.79
V-sit reach	1.20	4.11	1.68	4.28	82	1.46
Push up	19.14	14.15	22.84	14.09	86	2.65*
Curl up	38.98	11.57	43.16	11.36	83	3.67***
Percentile	16.34	17.45	26.63	26.39	85	4.43***
Females						
Mile run	12.19	2.53	11.00	2.36	81	-5.14***
Shuttle run	11.67	1.25	11.32	1.21	86	-3.95***
V-sit reach	4.39	3.34	4.68	3.42	91	1.05
Push up	10.98	10.81	14.09	9.28	92	3.54**
Curl up	36.61	10.51	39.43	10.51	88	3.84***
Percentile	21.11	20.84	33.11	25.76	94	5.55***

*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$

Hypothesis Testing

To test hypothesis one and two an interaction model (See Table 13) was constructed consisting of eight main effects (gender grade age, group, school, pretest presidential percentile scores, a score representing attitude toward physical activity [CATPA], and two scores representing goal orientation [ego and task]) and 22 two-way interaction terms consisting of these main effects. To test hypothesis two the interaction model was reduced to a model consisting of the interaction term gender x pretest Presidential Fitness test (see Table 14). To test hypothesis one the interaction model was reduced to a parsimonious model (see Table 15) by first retracting the insignificant interactions followed by the insignificant main effects. Results of the interaction model are in displayed in Table 13.

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Table 13

Summary of General Linear Model for Posttest Presidential Fitness Test Outcomes

Model 3	*df*	*F*
Source: Interaction Model		
Main Effects		
Intercept	1	0.06
Gender	1	0.55
Age	4	0.17
Group	1	0.47
School	3	0.29
Pretest Presidential Test	1	0.72
Ego index	1	0.27
Task index	1	0.67
CATPA survey	1	0.41
Interactions		
Gender x Age	4	0.31
Gender x School	3	1.23
Gender x Group	1	0.83
Gender x Pretest Presidential Test	1	1.44
Gender x Ego index	1	0.74
Gender x Task index	1	0.03
Gender x CATPA survey	1	0.06
Age x School	6	1.01
Age x Group	4	0.16
Age x Pretest Presidential Test	4	0.51
Age x Ego index	4	1.24
Age x Task index	4	0.42
Age x CATPA survey	4	0.26
School x Group	3	0.64
School x Pretest Presidential Test	3	1.59
Group x Pretest Presidential Test	1	0.47
Group x Ego index	1	2.85
Group x Task index	1	1.40
Group x CATPA survey	1	0.24
Pretest Presidential Test x Ego index	1	1.50
Pretest Presidential Test x Task index	1	0.87
Pretest Presidential Test x CATPA survey	1	0.05

Note: $R^2 = 0.78$
$^*p < 0.05$ $^{**}p < 0.01$ $^{***}p < 0.001$

Hypothesis Two

General Linear Model (GLM) was utilized to test hypothesis two by constructing an interaction model (See Table 13) consisting of eight main effects (gender, age, group, school, pretest presidential percentile scores, a score representing attitude toward physical activity [CATPA], and two scores representing goal orientation [ego and task]) and 22 two-way interaction terms consisting of these main effects. The interaction model was reduced by first retracting the insignificant interactions followed by the insignificant main effects. Results of this model are in displayed in Table 14.

For these analyses the number of participants with all data sets were 115. Results of this analysis revealed that when controlling for goal orientation (TEOSQ), attitude about physical activity (CATPA), initial performance score and age, male participants do not demonstrate larger gains in health-related fitness measures than do females (F (1, 18) = 0.62, p = 0.43 [see Table 14]). Hypothesis two was not supported. Further statistical analyses regarding main effects and interactions from this reduced model were not discussed because this is not the parsimonious model.

To determine the extent to which the residuals were normally distributed the Levene's test for Equality of Variance was utilized. Analysis indicated variances for the residuals did not differ significantly across gender (p = 0.38).

Table 14

Hypothesis Two Summary of General Linear Model for Posttest Presidential Fitness Test

Model 2	*df*	F
Source: Reduced Model		
Main Effects		
Intercept	1	15.57***
Gender	1	3.52
Age	4	2.36
Group	1	0.51
School	3	9.83***
Pretest Performance	1	44.56***
Interactions		
Gender x Age	4	1.88
Group x School	3	3.03*
Gender x Pretest Performance	1	0.62

Note: R^2 = 0.59
*p < 0.05 **p < 0.01 ***p < 0.001

Hypothesis One

General Linear Model (GLM) was utilized to test hypothesis one. For these analyses the number of participants with all data sets were 115. Results of this analysis revealed that when controlling for goal orientation (TEOSQ), attitude toward physical activity (CATPA), gender, initial performance score and age, there was not a statistically significant effect of group assignment on change in performance from pretest to posttest (F (1, 17) = 0.06, p = 0.81 [see Table 15]). Hypothesis one was not supported.

Table 15

Hypothesis One Summary of General Linear Model for Posttest Presidential Fitness Test

Model 1	*df*	F
Source: Final Parsimonious Model		
Main Effects		
Intercept	1	35.65***
Group	1	0.06
School	3	10.38***
Pretest Presidential Test	1	51.23***

Note: R^2 = 0.51
*p < 0.05 **p < 0.01 ***p < 0.001

To determine the extent to which the residuals were normally distributed the Levene's test for Equality of Variance was utilized. Analyses indicated variances for the residuals did not differ significantly across groups formed by the independent variables (p = 0.27).

In order to test the assumption that the residuals are normally distributed a Kolmogorov-Smirnov (K-S) Goodness-of-fit test was performed on the studentized deleted residuals. There was not a statistically significant (p = 0.93) finding from this analysis. Findings from the K-S test results in an acceptance of the null hypothesis. The residual from the parsimonious model were normally distributed. The implication from the analysis was that the results from the GLM could be interpreted in a meaningful way.

Significant main effects were school (F (3, 17) = 10.38, p < 0.001[See Table 15]). There was also a significant main effect of the pretest Presidential Fitness test (F (1, 17) = 51.23, p < 0.001).

5. Conclusions and Recommendations

The study's research question was: When controlling for gender, age, physical activity attitude, and initial fitness scores, to what extent does the motivational climate influence the health-related fitness outcomes of youth participating in a strength-training regimen? Two directional hypotheses were addressed. Hypothesis one stated that youth in a mastery climate will have better health-related fitness scores than youth in a performance climate when controlling for goal orientation (TEOSQ), attitude toward physical activity (CATPA), age, gender, and initial performance score. Hypothesis two stated that, when controlling for goal orientation (TEOSQ), attitude toward physical activity (CATPA), initial performance score and age, male participants will demonstrate larger gains in health-related fitness measures than will females. Data analysis indicated both first hypothesis and hypothesis two were rejected. (See data analysis in Chapter 4.)

5.1. Hypothesis One

The first hypothesis was stated as: Youth in a mastery climate will have better health-related fitness scores than will youth in a performance climate when controlling for gender, age, initial fitness scores, attitude toward physical activity (CATPA) and goal orientation (TEOSQ). As discussed in Chapter 2, the literature has identified that, when students' perceive that their learning environment emphasizes a mastery-orientation, this perception significantly relates to a personal mastery goal orientation (Midgley et al. 1995) and also to adaptive patterns of engagement and learning (Ames & Archer, 1988). In comparison, students who viewed their learning environment as performance-oriented have been associated with a personal performance goal orientation (Midgley et al., 1995) and with maladaptive learning and engagement patterns (Kaplan & Midgley, 1999). However, the results of this study do not appear to support the literature. Analysis indicated that when predicting the health-related fitness outcomes group assignment did not have a significant effect.

The PMSCQ (Seifriz et al., 1992) was administered in this study to serve as a manipulation check. The purpose of this manipulation check was to determine the extent to which the participants' perceived themselves to be in a mastery-oriented or performance-oriented climate. Data analysis revealed (Table 3) that the PMSCQ (Seifriz et al., 1992) yielded a low Cronbach's alpha (0.67) meaning that this inventory was not a good measure of perception of motivational climate for this study group. These results are in conflict with various other studies (Seifriz et al., 1992; Walling et al., 1993) who reported alphas greater than 0.80 in both instances.

Possible explanations for the differences between this study and those of Seifriz et al. (1992) and Walling et al. (1993) are that participants took the inventory at the beginning of their physical education class when they were eager to begin participating and possibly did not take an adequate amount of time to read each item thoroughly. A second possibility is that the inventory was changed from that of a sport-context to a physical education-context. Another possible cause of the rejection of Hypothesis One may be related to the fact that the instructors did not successfully manipulate the motivational climate as intended by the researcher.

As demonstrated in Table 7, both the mastery- and the performance-oriented group perceived their motivational climates as a mixture of mastery and performance motivational factors. The mastery group responded fairly strongly to the mastery index and responded almost neutrally to the performance index while the performance group responded almost identically to the mastery index and the performance index. A possible explanation for the instructors not correctly manipulating their motivational climate is that the instructors were asked to alter significantly their teaching styles three-fourths of the way through a school year. When altering ones motivational teaching style, teachers are strongly encouraged (Patrick et al., 2001) to do so at the beginning of the school year because classroom routines and practices tend to become established relatively quickly in the school year and then remain comparatively stable.

A second possible reason for the lack of proper climate manipulation may stem from the strength-training program that was adhered to during the study period. The very nature of Ames' (1992a; 1992b) TARGET criteria for establishing a mastery-oriented climate stresses the importance of varying tasks on a regular basis. During the eight-week strength-training program, the same protocols were adhered to weekly, thus limiting the amount of task variance allowed. The only day during each of the eight weeks that was allowed to be varied by the students was Thursday (choice day), on which day they were allowed to choose any activity. However, because this study was initiated during the last two months of the school year, it was common for the students to miss physical education class at least once a week during several of the study weeks. The instructors were asked to ensure follow through of the three-day per week strength training program and eliminate the choice day if necessary to do so. Thus, even the small amount of variation that was allowed may have been totally eliminated in order to comply with the strength-training protocols.

5.2 Hypothesis Two

The second hypothesis was stated as: when controlling for goal orientation (TEOSQ), attitude about physical activity (CATPA), initial performance score and age, male participants would demonstrate larger gains in health-related fitness measures than will females. As discussed in Chapter 1, several studies (Newton & Duda, 1993; Paulson, 1999; White & Zellner, 1996) suggested that males are more inclined to achieve success in a performance-oriented climate than are females. Furthermore, Xiang et al. (2004) proposed that gender-stereotyped tasks might also play an integral part in the success of the participants. The results of this research do not appear to support this contention. The results suggested that gender is not a significant predictor of improvement on health-related fitness components.

Newton and Duda (1993), Paulson (1999), and White and Zellner (1996) suggest the likelihood of males outperforming females when exposed to a performance-oriented climate. Data analysis of this study revealed that both climates appeared to display performance-oriented and task-oriented motivational factors in this study (Table 7); therefore males did not have an advantage regardless of grouping.

Xiang et al (2004) discussed the possibility that performance in an activity may be affected by the gender-role stereotype of the activity. Activities may be stereotyped for a particular gender or

they may be stereotyped as neutral (2004). The outcome of this study, in regards to hypothesis two, support the assumption that strength training may be gender stereotyped as neutral. Although in the past strength-training was viewed as a male sport, today it is encouraged for males and females alike (ACSM, 1993), In the world of amateur sports, for example, the 2000 Olympics in Sydney included male and female participants in the Olympic sport of weight lifting (Time, 2000). Participants in this study may possibly have perceived the strength-training program as a neutral gender stereotyped sport and causing both gender to have worked harder, yielding better health-related fitness outcomes for all participants. Precautions were taken to ensure that the strength-training workout was not viewed as a male stereotyped activity. These precautions involved not employing a traditional strength-training regimen incorporating free weight equipment; instead, medicine balls, resistance bands, towels, and body weight were utilized.

Although it was hypothesized that males would out perform females, it is important to note that all participants displayed significant improvement in the mile run, the shuttle run, push ups, sit ups, and overall percentile ranking. Overall males demonstrated significant improvement in push ups, curl ups, and overall percentile ranking. Data analysis revealed that females had significant improvements in the mile run, the shuttle run, push ups, curl ups, and overall percentile ranking. Although there were not any significant increases in the v-sit reach, scores did not decline for the participants, male or female (Table 12)

The literature cited above clearly indicates that there are barriers to manipulating a motivational climate and that, when attempting to do so, there are certain guidelines that should be followed in order to facilitate successful implementation. The data analysis of this study supports that literature as well as the gender literature by Xiang et al (2004).

5.3 Limitations

Limitations of the study involved some that were unique to this study and some related to survey research in general. General limitations will be presented first.

General Limitations

Motivational research (Patrick et al., 2001) offers many guidelines for successfully implementing a new motivational climate. One of these guidelines concerns the importance of implementing new motivational strategies at the beginning of the school year before routines and practices are established. This study was administered during March, April, and May of the 2004–2005 school year. Participants in the study already had established preconceived perceptions of their instructors and perceptions of the type of motivational climate displayed during physical education class. Although the instructors involved in the study reported attempts at successful manipulation, they may have been unable to do so in the view of the study participants, because of the lateness of implementing the interventions.

Because the study took place during the last three months of the school year, students were often absent from physical education class due to field trips, school plays, special programs, and spring break. These disruptions may have contributed to the unsuccessful implementation of the

motivational climate by limiting the amount of variety the instructors were able to incorporate into their physical education class. In addition, only 115 complete data sets were available for the final analyses.

Another limitation may be that the study took place in four different schools and nine instructors administered the motivational climate intervention. The inference is that there may have been a large amount of variability in the independent variable, thus contributing to the lack of success in climate manipulation. Although the instructors reported adhering to climate protocol, the complexity of nine different instructors, with different personality types and teaching and motivational styles, suggests a possible lack of continuity.

Study-based Limitations

Random assignment to the control group and experimental group was not possible in this study. The study took place in preexisting classrooms and classes were randomly assigned to control and experimental groups instead of individual participants. This may have contributed to a lack of internal validity. The generalizability of the study is also questionable. This study took place in four schools located in North Alabama; therefore, conclusions from this study should only be generalized to students who attend school in North Alabama.

5.4 Implications

When considering the implications of this study, several key issues need to be addressed. These implications include the importance of physical education instructors implementing strength training into their curriculum. Findings from this study suggest there are benefits to students who participate in a strength-training program. Not only was muscular strength and endurance enhanced, but cardiorespiratory endurance was as well (Table 13).

Students attending schools located in North Alabama participate in the President's Challenge (PCPFS, n.d.) in the fall and spring of every school year. Physical education instructors are continually investigating programs that will significantly influence the scores reached by their students. Superintendents of the schools in which the study was administered agreed to allow this study to be performed specifically because of the need to increase Presidential Challenge fitness scores. With Alabama reported as the second fattest state in the nation (Trust for America's Health, 2002), it is imperative that researchers discover programs that will help increase health-related fitness measures. Findings from this study appear to lend support to programs that incorporate strength training into the physical education curriculum.

5.5 Future Research

A need for further research is indicated by the results of this research. Several areas, based on the literature (Solmon, 1996; Theeboom et al., 1995; Treasure & Roberts, 1995) and the data in this research, indicate a need for motivational research in the physical education class. Previous research (Solmon, 1996; Theeboom et al., 1995; Treasure & Roberts, 1995) supports the presumption that a mastery-oriented climate facilitates adaptive motivational patterns. Regardless of the fact that motivational climates were not correctly manipulated in this study, significant improvements in health-related fitness measures for all participants were noted (Table

13). Research findings such as those demonstrated by Solmon (1996), Theeboom et al (1995), and Treasure and Roberts (1995) suggest that, not only might it be possible to manipulate the motivational climate in a physical activity setting, doing so might enhance performance outcomes.

Although the influence of gender and its effect on motivational climate has been discussed previously, there remain questions about the conclusions that can be drawn based on the ethnicity of the participants. Although minority populations were overrepresented in this study, due to the low number of participants in the study group very little insight can be gained from this study in regards to race. With the growing Hispanic population in the United States (U.S. Census Bureau, 2000), it is imperative that motivational studies involving ethnicity be researched.

A last important area of future research would be to include preschool and early elementary aged children in physical activity motivational studies. In 1999, 13% of children aged six to 11 years in the United States were overweight (HHS, 2004). Obese children have an increased risk of heart disease, type II diabetes, and low self-esteem and depression (2004). Physical education motivational studies and their subsequent impact on health-related fitness measures should be addressed in an effort to decrease overweight and obesity in America's youth population.

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