Does Socioeconomic Status Influence Achievement Goal Adoption?
An Investigation of Group Difference Using Structured Means Modeling

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Abstract

The purpose of this study was to investigate if family income influenced college students' goal orientation adoption. Specifically, responses to items representing five goal orientations were compared across two groups of college students with different family incomes (lower and higher). However, before the groups could be compared, the goal orientation measure (AGQ) had to be assessed for measurement invariance across the two income groups. Tests of measurement invariance via confirmatory factor analysis supported configural, metric, and scalar invariance across the two income groups, which allowed for the estimation of the latent mean difference for each orientation. Statistical and practical significance was found for two of the goal orientations: mastery-approach was endorsed more by lower income students, whereas performance-approach was endorsed more by higher income students.

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Consider two seventeen year old students, Tim and Emily, who are both seniors in high school, preparing to move out of their parents' home to go to college. Tim comes from a family with a low socioeconomic status (SES), whereas Emily comes from a family with high a SES. Clearly, SES is a background variable that Tim and Emily will "bring with them" to college, much like the background variables of gender and ethnicity. It is possible that the different levels of SES may impact how Tim and Emily approach achievement in college. More specifically, SES may influence students' achievement goal orientation.

The current study seeks to investigate if students having a lower SES versus a higher SES differ with respect to goal orientation endorsement. However, before group differences can be unambiguously interpreted, measurement invariance across the groups must be established. In addition, if measurement invariance is satisfied, group differences can be assessed at the latent versus observed level, providing a more accurate estimate of the mean differences (Hancock, 1997). Before we describe the details of the current study, we briefly review some relevant research concerning the importance of examining SES and its relationship with achievement-related variables along with research describing the construct of goal orientation.

The Relationship Between SES and Achievement and Achievement-Related Variables

SES is a specific background variable that represents a facet of the social structure in society (Oakes & Rossi, 2003). A variety of definitions of SES exist, such as "differential access (realized and potential) to desired resources" (Oakes & Rossi, 2003), and "a shorthand expression for variables that characterize the placement of persons, families, households, census tracts, or other aggregates with respect to the capacity to create or consume valued goods in our society" (Hauser & Warren, 1997). In general, when SES is considered, there is a propensity to think of money and education.

Importantly, results from multiple studies, using students spanning from pre-school to college-age and of various ethnicities, suggest that family SES affects students' academic achievement (e.g., Brooks-Gunn, Linver, & Fauth, 2005; Walpole, 2003). For instance, for both African-American and white students, performance on a 12th grade educational achievement test was higher for high SES students than low SES students (Battle and Lewis, 2002). SES was also positively related to 8th and 12th grade educational achievement test scores and a measure of the highest level of education received two years after high school for Hispanic students (Battle, 2002). Further, a study examining academic achievement in Brazilian children found that SES explained the most variance in general and math achievement when controlling for other factors, such as family size (Oakland, Weschler, Benusan, & Stafford, 1994). Additionally, a longitudinal study examining the prediction of school outcomes from early language production and socioeconomic factors emphasized that low SES children are at a disadvantage when they begin school, which may have a negative impact on academic performance and achievement if preventive actions are not taken (Walker, Greenwood, Hart, & Carta, 1994). Given findings from these studies, Battle (2002) asserted that "if our society is interested in increasing academic achievement, policies that increase students' socioeconomic status are inexpendable" (p. 442).

However, it is imperative to note that the effects of SES on achievement may be indirect, in that SES is related to a host of educational-related variables (e.g., study strategies, motivation, ability), which are themselves related to achievement. The above studies were not concerned with investigating the extent to which the effects were direct or indirect; rather, they were concerned with simply uncovering if SES and achievement had any relationship at all. Importantly, other research has investigated the type of relationship (direct versus indirect) and found data that suggested only an indirect effect of SES on academic achievement. Using structural equation modeling, Anderson and

Keith (1997) tested a model of school learning for at-risk high school students and found that although family SES was directly related to parental involvement and ability, it was only indirectly related to academic achievement. Similarly, research on early school success suggested that SES does not directly affect long term academic achievement; rather, mediator variables (e.g., motivation and early academic achievement) result in an indirect effect of SES on long term academic achievement (Stipek, 2001). Likewise, a study investigating the effects of family processes on high school students' science and math achievement suggested an indirect effect of SES on both boys' and girls' science and math achievement through the following variables: pressure, psychological support, attitudes towards school, and math and science self-concept (Koutsoulis & Campbell, 2001). These research findings support White, Reynolds, Thomas, and Gitzlaff's (1993) assertion that schools should be cautious in making policy decisions based solely on SES, because the relationship between SES and academic achievement is more complex than it appears on the surface.

The research suggesting indirect effects of SES on achievement leads to the question of exactly which outcomes are related to SES. A variety of studies have uncovered that SES affects achievement-related variables such as cognitive readiness, academic skills, academic adjustment, ability, decisions of where to attend college, and decisions concerning college major (e.g., Anderson & Keith, 1997; Davies & Guppy, 1997; Felner et. al., 1995; Leppel, Williams, & Waldauer, 2001; Stipek & Ryan, 1997). For example, longitudinal research has suggested that SES (particularly family income) is positively related to cognitive readiness in preschool and kindergarten children and cognitive and academic skills in first graders (Stipek & Ryan, 1997; Stipek, 2001). Other research has suggested relationships between SES and academic adjustment, such as psychological adaptation, in middle school students (Felner et. al., 1995). Furthermore, significant relationships between SES and self-esteem, perceived competence, depression, classroom behavior problems, parental rejection, and family social support have been found.

Clearly, the relationships between SES and achievement and achievement-related variables underscores the value of studying SES in an academic setting. These investigations assist educators in clarifying the variables that impact academic achievement and achievement-related variables. Although the relationship between SES and various achievement-related variables have been investigated, one achievement-related construct has not been adequately investigated: achievement goal orientation. It is possible that a relationship between SES and achievement goal adoption exists, which would provide further insight into the role that SES plays in academic achievement.

The Benefits of Studying Goal Orientation

A number of motivational theories attempt to explain why students think, behave, and feel the way they do about school and academic tasks. One such theory, achievement goal orientation theory, was developed to help explain the reasons behind students' motivation to learn or perform in school. Said another way, an achievement goal orientation refers to a student's *purpose* for engaging in an achievement behavior (Pintrich & Schunk, 2002). It is very possible that two students are equally motivated yet have vastly different reasons *why* they are motivated (Ryan & Deci, 2000). Achievement goal theory focuses on understanding these different motivators or goals.

Educators can benefit from examining goal orientations and being cognizant of the students' differential reasons for achieving in an academic setting (Anderman, Austin, & Johnson, 2001; Nolen, 1988). The ability to assess a student's goal orientations allows for prediction of educational-related outcomes (e.g., Anderman et. al., 2002; Harackiewicz, Barron, Tauer, & Elliot, 2002) and in turn can prompt important changes in instruction by providing environments that are suitable for optimal learning (Ames & Archer, 1988; Anderman & Maehr, 1994; Dweck & Leggett, 1988; Dweck, 1990; Stipek, 2002). For example, students' adopted goal orientations have been found to be related to the cognitive strategies they employ when learning material (Ames & Archer, 1988; Elliot & McGregor, 2001; Pintrich, 2000b). Students who are motivated to simply score high on tests may memorize

information to make an "A" on the test, only to retain little information after the test. Thus, a teacher aware of this motivation can choose to emphasize methods that stimulate motivation to learn for reasons beyond grades, which may result in using cognitive strategies that foster long-term retention (Ames, 1992; Ames & Archer, 1988; Pintrich & Schunk, 2002; Stipek 2002). Put simply, educators may be better able to understand student performance and behavior if they attend to student goal orientation.

Achievement Goal Theory Overview

A clear understanding of goal orientation begins with the realization that achievement goal theory has evolved over the last 20 years. As a result, several types of achievement goals have been defined and studied in prior research.

Two Dimensions of Goal Orientation. For several years, the accepted conceptualization of achievement goal orientation was simply a dichotomy of mastery goals and performance goals[1] (e.g., Ames, 1992; Ames & Archer, 1988; Anderman & Maehr, 1994; Dweck & Leggett, 1988). Dweck (1986) defined a mastery goal orientation as students seeking to "increase their competence, to understand or master something new" (p.1040). Mastery goals are intrinsic in nature; students focus on learning for the sake of learning and the valuation of effort. When a mastery goal is adopted, one is motivated to learn for internal reasons, such as developing one's skills and knowledge (e.g., Ames, 1992; Anderman & Maehr, 1994; Maehr & Midgley, 1991). On the contrary, Dweck (1986) defined performance goal orientation as students seeking to "gain favorable judgments of their competence or avoid negative judgments of their competence" (p. 1040). Therefore, performance goals are extrinsic in nature, and the focus is on ability. When a performance goal is adopted, one is motivated to learn for external reasons, such as demonstrating one's ability to others (e.g., Ames, 1992; Anderman & Maehr, 1994; Maehr & Midgley, 1991).

Distinguishing between mastery and performance goals is important as each are related to different behaviors and personal characteristics. Historically, research has suggested that mastery goals yield more adaptive outcomes than performance goals (e.g., Ames, 1984; Dweck & Leggett, 1988; Pintrich & Schunk, 2002). This is because mastery-oriented students tend to utilize deep-processing strategies, such as use of elaboration strategies (i.e., summarizing), and checking one's self for comprehension (e.g., Ames & Archer, 1988; Dweck & Leggett, 1988; Middleton & Midgley, 1997). It is also common for a student with a mastery goal orientation to attempt challenging tasks, viewing errors as part of the learning process. Mastery-oriented students react positively to failure, and view it as an opportunity to improve (e.g., Ames & Archer, 1988; Dweck & Leggett, 1988).

On the other hand, performance-oriented students tend to utilize surface learning strategies, such as memorization of notes, self-handicapping, and immediately asking a teacher for help when encountered with a difficult task (e.g., Meece, Blumenfled, & Hoyle, 1988; Pintrich, 2000b; Pintrich & DeGroot, 1990). It is also common for a student with a performance goal orientation to avoid challenging tasks, viewing errors as an indication of lack of ability (Pintrich, 2000b). In turn, performance-oriented students tend to react negatively to failure (Ames & Archer, 1988) and are more likely to demonstrate helplessness when faced with a difficult situation (Dweck & Leggett, 1988). It must be noted, however, that performance goals have been linked to positive outcomes such as achievement-related performance (e.g., grades), with those having greater performance orientation yielding better performance (e.g., Barron & Harakciewicz, 2001; Barron & Harackiewicz, 2003; Harackiewicz, et al., 1997; Harackiewicz, et al., 2002).

Three dimensions of Goal Orientation. Using the two-factor model of goal orientation, students adopting a performance goal orientation were defined as being motivated by two things: wanting to perform well and wanting to avoid performing poorly (e.g., Dweck, 1986). In the three-factor model of goal orientation, performance orientation was divided into *approach* and *avoidance* dimensions. Approach motivation is driven by the possibility of a positive event or outcome whereas avoidance

motivation is driven by the possibility of a negative event (Elliot, 1999). Specifically, the performance-approach goal was defined as being motivated to demonstrate competence, whereas the performance-avoidance goal was defined as being motivated to avoid demonstrating incompetence (i.e., looking dumb). A student who adopts a performance-approach goal would strive to obtain the highest grade in the class, whereas a student who adopts a performance-avoidance goal will strive to avoid the worst grade in the class (Elliot & Church, 1997; Pintrich & Schunk, 2002).

The factor structure of the trichotomous framework has been empirically substantiated (e.g. Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Middleton & Midgley, 1997) providing support for the distinction between performance-approach and performance-avoidance. In addition, the importance of this distinction is reflected in the different antecedents and consequences of each type of goal orientation. Specifically, performance-approach goals were associated with both positive (i.e., high grades, high competence expectancy, persistent studying; Barron & Harackiewicz, 2003; Church et.al., 2001; Elliot & Church, 1997), and negative behaviors and personal characteristics (i.e., surface-level processing of information, fear of failure; Elliot & Church, 1997; Elliot & McGregor, 1999). Performance-avoidance goals, on the other hand, were associated with only negative variables, such as fear of failure (Elliot & Church, 1997), surface level processing (Elliot & McGregor, 2001), lower intrinsic motivation, and lower graded performance (Church et. al., 2001). Similar to the two-goal model, adoption of a mastery goal orientation was related to numerous beneficial outcomes such as persistence while studying, intrinsic motivation, deep processing of information, exam preparedness, and long-term retention of material (e.g., Church et. al., 2001; Elliot & Church, 1997; Elliot & McGregor, 1999; McGregor & Elliot, 2002).

2 x 2 Framework. More recently, the approach-avoidance distinction was extended to mastery goals as well (Elliot, 1999; Elliot & McGregor, 2001; Pintrich, 2000a, Pintrich, 2000b). Thus, the mastery-performance goal distinction was fully crossed with the approach-avoidance distinction, resulting in the 2 x 2 framework: mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance goals. Elliot (1999) defined mastery–avoidance goal orientation as trying to "avoid losing one's skills and abilities, forgetting what one has learned, misunderstanding material, or leaving a task in-complete or unmastered" (p. 181). Pintrich (2000c) further clarified the distinction between mastery-avoidance and mastery-approach by comparing how success is defined for each. Students who adopt a mastery-approach goal orientation define their success by self-improvement, increasing one's competence, and having a deep understanding of a task. On the other hand, success in the mind of someone who has adopted a mastery-avoidance goal orientation is defined by avoidance of being incorrect, misunderstanding information, or completing a task incorrectly.

Empirical support for this 2x2 framework was found in a well-fitting four-factor structure that fit significantly better than either the trichotmous or dichotomous models (e.g., Elliot & McGregor, 2001; Finney, Pieper, & Barron, 2004). In addition, the four goals have demonstrated unique relationships with various predictors and outcomes (Elliot & McGregor, 2001; Pieper, 2003). Mastery-approach goals were positively predicted by the need for achievement, workmastery, self-determination, and perceived classroom engagement; they positively predicted deep-processing study strategies and negatively predicted health center visits (Elliot & McGregor, 2001). Mastery-avoidance goals were positively predicted by fear of failure and perceived classroom engagement, and were negatively predicted by self-determination; they positively predicted disorganization, worry, and emotionality (Elliot & McGregor, 2001). Performance-approach goals were positively predicted by the need for achievement, competitiveness, fear of failure and SAT scores; they positively predicted exam performance (Elliot & McGregor, 2001). Performance-avoidance goals were positively predicted by fear of failure and negatively predicted by self-determination and SAT scores; they positively predicted surface processing study strategies, disorganization, state test-anxiety, emotionality, and health center visits (Elliot & McGregor, 2001). In sum, it seems that mastery-approach goals are associated with positive attitudes and behaviors, whereas performance-avoidance goals are associated

with negative attitudes and behaviors. Both mastery-avoidance and performance-approach are associated with a mix of positive and negative attitudes and behaviors.

Work-Avoidance: A Fifth Possible Goal Orientation. In addition to the 2 x 2 framework, researchers have emphasized the importance of studying work-avoidance as a fifth possible goal orientation (e.g., Archer, 1994; Elliot, 1999; Harackiewicz et al., 1997; Pieper, 2003). Work avoidance is endorsed by students who are attempting to complete the minimal amount of work necessary to satisfy their academic requirements (Elliot, 1999; Harackiewicz et al., 1997). Although further study is necessary, prior research has suggested that this type of goal orientation is associated with negative outcomes (e.g., Archer, 1994; Dowson & McInerny, 2001; Harackiewicz et. al., 1997; Nolen, 1988). For example, students adopting a work-avoidance orientation attempt to receive easier tasks, strive to get by doing as little work as possible, make little use of effective learning strategies, and are likely to have lower course grades and semester GPAs than students not adopting work-avoidance goals (Archer, 1994; Dowson & McInerny, 2001; Harackiewicz et. al., 1997). These students will often question teachers repeatedly in order to obtain help, so that they will have less work to do independently (Dowson & McInerny, 2001). Additionally, Nolen (1988) found a negative relationship between work-avoidance goals and deeper processing learning strategies.

The Importance of Studying Socioeconomic Status and Goal Orientation

As noted above, SES affects an assortment of achievement-related variables (i.e., ability, perceived competence, academic adjustment). Additionally, there have been implications of a relationship between SES and motivation. A study of Brazilian children found a relationship between achievement motivation and SES, and more specifically, family income (Oakland et.al., 1994). Additionally, Koutsoulis and Campbell (2001) found a direct effect of SES on students' educational aspirations. These are the only two recent studies that have explicitly examined the relationship between SES and achievement motivation. In both of these studies, the samples consisted of secondary students from non-US samples (Brazilian children in the former, Cypriot high school students in the latter); SES and achievement motivation has not been examined for U.S. college students. Although a relationship between SES and achievement motivation seems to exist for young children and high school students, it is uncertain at this point if this relationship exists in a university setting.

Purpose of the Current Study

The main purpose of the current study was to investigate if differences in goal adoption exist across two groups of college students: lower income and higher income. However, a crucial measurement issue needs to be investigated and established prior to examining group differences. Specifically, the properties of the scale should be invariant across the groups being compared. If there is a large discrepancy in the scale's properties across the groups, it will alert us to possible validity issues, and in turn, group comparisons should not be made. If, however, measurement invariance is established, we will estimate group differences for each goal orientation at the latent, rather than observed level.

Method

Participants and Procedure

Data were collected from 3,234 first-year students during fall 2001 (n = 1,610) and fall 2002 (n = 1,624) university-wide assessment days held at a mid-sized public university. During both the 2001 and 2002 assessment days, the achievement goal orientation instrument was the first instrument presented in a battery of assessment instruments. Trained proctors, reading standardized instructions, administered each of the instruments.

Defining Groups: Lower-income and Higher-Income Students

The operational definition of SES has been the topic of a long-standing debate, and in turn there is little consistency in its measurement (Oakes & Rossi, 2002). For instance, previous studies have considered various variables as indictors of SES: family income, parents' education, property values, household belongings, the percentage of low-income students in a school (K-12), the percentage of free or reduced lunches at a school (K-12), reading at home, home ownership, zip code, and more (e.g., Anderson & Keith, 1997; Battle & Lewis, 2002; Davies & Guppy, 1997; Felner et al. 1995; Koutsoulis & Campbell, 2001; Mincy, Sawhill, & Wolf, 1990; Stipek, 2001; White, Reynolds, Thamos, & Gitzlaff, 1993). Some studies have utilized combinations of these measures to form a composite measure of SES (e.g., Duncan's SEI; Duncan, 1961), whereas other researchers have supported the use of family income as a univariate measure of SES (e.g., Oakes & Rossi, 2003). Because of its common use and availability, we selected family income as our grouping variable.

Upon admission to the university, information concerning income was gathered. Specifically, income level was broken down into categories. Students, with help from their parents, selected the appropriate income category. For the purpose of the current study we chose to compare those with the lowest family income (less than $50,000, n = 351) to those with the highest family income ($200,000 or more, n = 275). Examination of the racial composition of both groups revealed that the higher-income group consisted of less than 8% non-white students, while the lower-income group consisted of 28.8% non-white students. Previous studies have noted influences of racial and ethnic background on achievement that were above and beyond socioeconomic measures, such as income (Battle & Lewis, 2002; Desimone, 1999). Because of potential confounds due to racial and ethnic background, we decided to analyze data from only white students, realizing that this would limit the generalizabilty of the findings. This resulted in 250 students in the lower income group and 255 students in the higher income group. In addition, twelve cases in the higher income groups were identified as multivariate outliers as defined by very large Mahalanobis distances. Subsequent examination of the item responses for these twelve cases revealed odd patterns suggesting either a response set or a random response pattern. These twelve outliers were deleted resulting in an effective sample size of 243 for the higher income group. Demographic information for the two groups may be found in Table 1.

As noted in Table 1, there were some differences between the two groups of students. For instance, the higher-income group scored significantly higher on total SAT than the lower-income group. However, it should be noted that SAT scores were weakly correlated with the goal orientation scores. Additionally, the lower-income group was comprised of a slightly higher percentage of females than the higher-income group.

Importantly, there were notable differences in mothers' and fathers' educational level between the two groups of students. Specifically, of the higher-income mothers, 74.9% had attained a college degree or higher, compared to 43.1% of the lower-income mothers. Similarly, of the higher-income fathers, 88.6% had earned a college degree or higher, compared to 40.5% of the lower-income fathers. Further, 49.5% of the higher-income fathers had graduate or doctoral degrees, compared to 15.2% of the lower-income fathers. Likewise, 27.3% of the higher-income mothers had graduate or doctoral degrees, compared to 10.5% of the lower-income mothers (see Table 1). Therefore, it is important to note that although the groups were formed solely on the basis of family income, the differences in parental education found across the two groups are consistent with defining low and high SES. Although we will refer to "lower-income" and "higher-income" groups in the current study, the marked differences in mothers' and fathers' education provides further evidence that what we are referring to as "lower-income" and "higher-income" may actually be lower and higher SES.

Measure

Achievement Goal Questionnaire (AGQ) for General Context (Finney, Pieper, & Barron, 2004; Pieper, 2003). The AGQ (Elliott & McGregor, 2001) was written to measure students' goal orientation in a specific course. This measure was subsequently adapted to measure students' achievement goal

orientation for all of the courses in which they are enrolled for a given semester (Finney, Pieper, & Barron, 2004). The scale consists of four achievement goal orientation subscales: mastery-approach (MAP), mastery-avoidance (MAV), performance-approach (PAP), and performance-avoidance (PAV). A fifth subscale, work-avoidance (WAV), was subsequently added to the general version of the AGQ, as it has been suggested that this could possibly be a fifth goal orientation (Pieper, 2003). The response scale for items on each of the five subscales ranges from 1 (not at all true of me) to 7 (very true of me). All subscales consist of three items, with possible subscale scores ranging from 3 to 21 (See Figure 1).

Data Analysis

In order to examine mean differences between the lower and higher income students for each of the five orientations, it is crucial to assess the equivalence of each of the subscale's psychometric properties across the two groups. This is necessary in order to infer that differences found in the observed responses are indeed a function of true group differences and not due to different conceptualizations of the constructs or due to bias. In addition, given that a certain level of invariance is established, we are then able to assess mean differences at the latent rather than observed level. Assessing differences at the latent level is preferred in that estimates of group differences are not contaminated with measurement error therefore providing a more accurate estimate of differences between the groups.

Structured means modeling, a method used to estimate the latent mean differences, incorporates a sequential procedure of testing measurement invariance or evaluating differential item functioning (DIF). This procedure entails adding constraints one at a time and assessing model fit. A minimum of three tests must be conducted in order to establish the invariance necessary to examine latent mean differences: configural invariance, metric invariance, and scalar invariance.

The first invariance test, *configural invariance*, involves constraining the general form of the model to be equivalent across the two groups. Specifically, the five-factor model must fit both the lower and higher income groups adequately, thereby, establishing that the number and type of factors are the same across the two income levels. This implies that the constructs are fundamentally similar across the two groups.

Given that configural invariance is established, the second invariance test, *metric invariance*, is used to evaluate non-uniform DIF (e.g., González-Romá, Tomás, Ferreres, & Hernández, 2005). Specifically, the general form of the model is still constrained to be equivalent (configural) but the additional constraint that the strength of the relationship between the items and the factor are the same across the two income groups is added. This is done by forcing the unstandardized factor pattern coefficients to be equivalent across the groups. Differential relationships may exist if an item is not as relevant for one group as the other group or if an item is more ambiguous to one group than the other group (Chan, 2000; Cheung, & Rensvold, 2000).

The third invariance test, *scalar* invariance, continues to constrain the general form of the model and the relationships between the items and the factors across the two groups but adds the additional constraint of equal item intercepts. If scalar invariance is established, observed group mean differences are reflections of true group mean differences on the underlying latent construct. If scalar invariance is not established, it cannot be assumed that group differences on the observed variables accurately reflect true differences (or lack of difference) on the latent construct. Specifically, if two people have the same value on the latent construct, their observed variable scores should reflect this by also being equal (i.e., scalar invariance established). However, if people with equivalent scores on the latent construct have different scores on the observed variables, this is an indication of uniform DIF or lack of scalar invariance. Therefore, it is crucial to establish scalar invariance, in addition to configural and metric invariance, if group differences are to be unambiguously interpreted.

Importantly, establishing configural, metric, and scalar invariance allows for the unambiguous interpretation of *latent* mean differences. Estimating mean differences at the latent level provides a

more accurate estimate of the group differences than estimating these differences at the observed level. This is because the differences between theoretically error-free constructs are estimated, rather than differences between error-prone observed composite variables (Hancock, 1997).

Results

Descriptive Statistics and Data Screening

Before examining the factor structure of the responses for each group, the data was examined for multicollinearity and normality. Bivariate correlations were .78 and lower, with the highest correlations between the performance-approach items for both groups (See Appendix A). The variance inflation factor (VIF) was less than 10 in each instance, suggesting that the scores were not multicollinear.

Normality was assessed both univariately and multivariately. Studies examining the impact of univariate normality suggest that problems may occur when univariate skewness and univariate kurtosis approach values of 2 and 7, respectively (see Finney & DiStefano, 2006 for a review of this literature). Appendix A contains means, standard deviations, skewness and kurtosis for both the lower- and higher-income individual item scores. Skew for the 15 items ranged from -1.86 to 1.27 for lower income students and from –0.95 to 1.06 for higher income students. Kurtosis ranged from –1.00 to 4.72 for lower income students and -0.90 to 1.23 for higher income students indicating that the responses have fairly normal univariate distributions. However, multivariate kurtosis equaled 15.71 for lower income students and 5.95 for higher income students. There is no standard cutoff for this index; however, it has been suggested that values greater than three could produce inaccurate results when ML estimation is used (Bentler & Wu, 2002). Therefore, we used methods that adjust results for nonnormality. Specifically, the Satorra-Bentler (S-B) Scaled χ^2 and robust standard errors (Satorra & Bentler, 1994) were calculated and reported. Research has shown that the S-B Scaled χ^2 outperforms the ML χ^2 when data are nonnormal (e.g., Curran, West, & Finch, 1996). In addition, the RMSEA and CFI were also adjusted for nonnormality by incorporating the S-B Scaled χ^2 into their calculations. Yu and Muthén (2002) have suggested that cutoffs at or below approximately .05 for the robust RMSEA (rRMSEA) and at or above approximately .95 for the robust CFI (rCFI) indicate adequate fit. To determine the relative fit of each model as compared to the previous, less constrained model, Cheung and Rensvold (2002) suggested examining the change in a the CFI along with change in χ^2 ($\Delta\chi^2$). This is because the $\Delta\chi^2$ can become sensitive when sample sizes are large. Thus, as suggested, ΔCFI was examined along with $\Delta\chi^2$ to determine invariance. A ΔCFI value less than or equal to -.01 indicates that invariance should not be rejected (Cheung & Rensvold, 2002).

Structured Means Modeling Results

PRELIS 2.71 (1996) was used to create the covariance and asymptotic matrices for both income groups. LISREL 8.71 (Jöreskog & Sörbom, 1993) was subsequently used to analyze these matrices. Before testing for metric and scalar invariance across groups, the fit of the five-factor structure had to be established independently for each group (See Figure 1). The five-factor model fit the data for both income groups adequately (See Table 2). Table 3 includes the unstandardized factor pattern coefficients for both groups; all were statistically significant. Interestingly, one can also see that the unstandardized factor pattern coefficients were of similar magnitude across income group. The test of metric invariance provides a formal test of the invariance of these parameters.

When conducting a multiple-group analysis to assess invariance, one must set the metric of the factors using an indicator, referred to as a referent variable (e.g., Steenkamp & Baumgartner, 1998). Setting the variance of the factors to a value of 1, as is convention for a simple CFA, assumes that the factor variance is equivalent across the groups and is therefore inappropriate when conducting tests of invariance. Therefore, instead of using this conventional method, items 1, 4, 7, 10, and 13 served as referent variables for their respective factors in both samples when testing configural, metric, and

scalar invariance. However, using the above listed items as referent variables implicitly assumes that these items are invariant across income groups. Therefore, tests were conducted to establish that the referent items were invariant across income groups before they were used to set the metric of the factors. This was done by constraining these items to be invariant when each of the other items served as the referent variable (see Cheung & Rensvold, 1999). The results indicated that the above listed items were invariant and could be used as referent variables when assessing metric and scalar invariance.

Configural Invariance. The first step in estimating latent mean differences between the two income groups is to test for configural invariance. As noted above, configural invariance simply indicates that both groups associate the same subsets of items with the same constructs (i.e., have the same factor structure). No equality constraints are imposed (Steenkamp & Baumgartner, 1998). In a sense, we have already tested this assumption when evaluating the fit of the five-factor model to each group separately. In fact, the ML χ^2 value for the configural model is simply the sum of the ML χ^2 values for the five-factor model tested individually for lower income and higher income students. If this model is found to fit well, it serves as a baseline model for comparison with the more restricted metric invariance model. As is reported in Table 2, this model fit well indicating that similar factor structures were found to underlie the responses from both groups.

Metric Invariance. Whereas configural invariance established that the groups associated the same items with the same factors, the test of metric invariance assesses the similarity of the strength of the relationships between items and factors. As can been seen in Table 2, the change in model fit from the configural invariance model to the metric invariance model indicated that metric invariance was established (i.e., the strength of the relationship between each item and factor is not significantly different between groups). There is no nonuniform DIF.

Scalar Invariance. After metric invariance has been established, scalar (or intercept) invariance must be tested before latent mean differences can be confidently interpreted. As noted above, establishing scalar invariance indicates that individuals who have the same value on the construct (e.g., mastery-approach) would obtain the same value on the observed variable (e.g., item 1) regardless of their group membership.

Scalar invariance is tested by constraining the factor pattern coefficients and intercepts to be equivalent between the groups and examining the change in model fit at this step compared to the fit when only the factor pattern coefficients are held invariant (i.e., compare the fit of the scalar model to the fit of the metric model). The results in Table 2 indicate that the intercepts are invariant. From this we can conclude that the differences in the observed means are a result of true between-group differences on the latent construct and not a function of measurement bias. There is no uniform DIF.

Latent Mean Differences. Given measurement invariance, the latent mean difference between the two income groups was estimated for each orientation. This was done by fixing the latent means of each orientation to zero for the lower income group; by doing this, the value produced for the higher income group reflected the difference between the higher income group's latent mean and the lower income group's latent mean (Hancock, 1997; Steenkamp & Baumgartner, 1998). The estimated differences between the latent means are presented in Table 4 along with their corresponding z-tests and effect sizes[2].

We found that lower-income students had higher mastery-approach scores with the difference reflecting a small effect size. Higher-income students had higher performance-approach scores with difference reflecting a small to medium effect size. No meaningful differences were found across the remaining three orientations.

Discussion

There is paucity of research investigating the relationship between SES and motivation. In particular, there is no study of the relationship between SES and goal orientation. As SES is linked to

various achievement-related variables and achievement itself, it is important to uncover the relationship or lack of relationship between SES and goal orientation. The current study sought to do just that. College-aged students from families with lower (less than $50,000) or higher income (more than $200,000) were compared on five achievement goal orientations.

However, subsequent to estimating group differences, it was necessary to first investigate and establish measurement invariance in order to unambiguously interpret group differences. Configural, metric, and scalar invariance were established for the general measure of the AGQ across the two income groups, suggesting that the measure functions equivalently for both groups. In other words, the scale is conceptualized the same, and demonstrates the same properties across lower and higher income students. Establishing this level of measurement invariance across the two income group provides *significant* validity evidence for the scale scores.

Given measurement invariance, we were able to estimate group differences for each goal orientation. Lower income students endorsed mastery-approach more than higher income students, whereas higher income students endorsed performance-approach more than lower income students. The fact that groups differ on only approach goals further emphasizes the importance of the approach-avoidance distinction incorporated into the 2x2 framework of goal orientation (e.g., Elliot, 1999; Elliot & McGregor, 2001). Failure to discriminate between approach and avoidance aspects of goal orientation could have masked these group differences.

It is important to note that in general mastery-approach goal orientation was the most highly endorsed goal orientation. In other words, students from both groups were *strongly* endorsing mastery-approach goals (using high end of the scale). This is similar to previous finding (Elliot & McGregor, 2001; Finney, Pieper, Barron, 2004). Interestingly, work-avoidance goal orientation was the least endorsed goal orientation. Specifically, students from both groups were endorsing work-avoidance goals on the low end of the scale and, in turn, the groups did not differ significantly on work-avoidance. The low endorsement of work-avoidance for first-year students is encouraging as work-avoidance has been linked to negative achievement-related outcomes. However, it must be noted that social desirability bias could be a possible explanation for the low endorsement of the work-avoidance items. For example, “I want to do as little work as possible” is an item with a laziness connotation that students may not strongly endorse simply because it does not sound like an item that *should* be strongly endorsed. Future research should investigate the relationship between social desirability and work avoidance in particular, although the relationship with all goal orientations would be interesting to investigate.

Speculations about Significant Differences

Lower income students endorsed mastery-approach goal orientation significantly more than higher income students. It is possible that lower income students have taken out loans to pay for college, are paying for college themselves, or are on scholarship; therefore, lower income students want to learn as much as they possibly can while they are here. If they are paying for their education, they may be determined to “make the most of it”. How they perform compared to others may not be of concern to them; they may simply be motivated to master material and retain as much information as they possible can as a result of being in college. It is possible that going to college to pursue a higher education may be something that lower income students simply will not take for granted.

Additionally, higher income students endorsed performance-approach goals significantly more than lower income students. This may be a result of higher income families valuing academic achievement more than lower income families (Fontaine, 1991). It is also possible that people who have been raised in higher income families are used to outperforming others, and demonstrating that they have advantages, simply because of the way they were raised. Another possibility is that students are receiving monetary rewards from their parents for being successful, such as $100 per “A”, a new car, or a trip over Spring Break. Students from higher income families potentially may be in college

because it is what they are supposed to do after high school. In other words, they may not be pursuing a higher education because they are motivated to master and learn everything they potentially can; they may be in college because it is what was expected of them upon graduating high school. Finally, the higher income students may have parents that are also performance-approach oriented, therefore influencing the achievement goal orientations they adopt.

Future Research

A primary limitation to the current study was the inability to obtain raw income data (the university collected income data using crude categories). In the future, it would be ideal to replicate this study using raw income data, as opposed to the income categories used in the current study. This would allow the selection of a lower range of income for the lower income group (e.g., $20,000 or less); again, this was not an option with the current dataset. Even though the demographic differences between the higher income and lower income groups suggest that they are indeed representative of low income and high income families, replication of the current study with a range of lower incomes would strengthen the current findings.

In addition, replication of the study using students who are further along in their college career would shed some light on the generalizability of these results across time. Would these differences found with entering freshman students who haven't been in the college classroom yet remain stable after a year or two of college experience? Would the differences across the two groups become even greater given increased time in college?

If the results from the current study replicate across various income groups (i.e., even lower income), various lengths of time in college, using multiple samples, then the relationship between achievement goal orientations and family income could be brought to the attention of educators, allowing them to be cognizant of their students' achievement goal orientation when guiding and instructing them through their college classes.

References

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80,* 260-267.

Ames, C. (1984). Achievement attributions and self-instructions under competitive and individualistic goal structures. *Journal of Educational Psychology, 76,* 478-487.

Ames, C. (1992). Classroom Goals, Structures, and Student Motivation. *Journal of Educational Psychology, 84,* 261-271.

Anderman, E.M., Austin, C.C., & Johnson, D.M. (2002). The development of goal orientation. In A. Wigfield & J.S. Eccles (Eds.), *The development of achievement motivation* (pp.197-220). New York: Academic Press.

Anderman, E.M., & Maehr, M.L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research, 64,* 287-309.

Anderson, E.S., & Zeith, T.Z. (1997). A longitudinal test of a model for at-risk high school students. *The Journal of Educational Research, 90,* 259-267.

Archer, J. (1994). Achievement goals as a measure of motivation in university students. *Contemporary Educational Psychology, 19,* 430-446.

Barron, K.E., & Harackiewicz, J.M. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80,* 706-722.

Battle, J. (2002). Longitudinal Analysis of academic achievement among a nationwide sample of Hispanic students in one versus dual-parent households. *Hispanic Journal of Behavioral Sciences, 24,* 430-447.

Battle, J., & Lewis, M. (2002). The increasing significance of class: The relative effects of race and socioeconomic status on academic achievement. *Journal of Poverty, 6*, 21-35.

Bentler, P. M., & Wu, E. J. C. (2002). *EQS for Windows User's Guide*. Encino, CA: Multivariate Software, Inc.

Brooks-Gunn, J., Linver, M. R., & Fauth, R. C. (2005). Children's competence and socioeconomic status in the family and neighborhood. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of Competence and Motivation* (pp. 414 – 435). New York: Guilford Press.

Chan, D. (2000). Detection of differential item functioning on the Kirton Adaption-Inventory using multiple-group mean and covariance structure analyses. *Multivariate Behavioral Research, 35*, 169 – 199.

Cheung, G. W., & Rensvold, R. B. (1999). Testing factorial invariance across groups: A reconceptualization and proposed new method. *Journal of Management, 25*, 1 – 27.

Cheung, G., & Rensvold, R. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*, 233–255.

Church, M., Elliot, A.J., & Gable, S.L. (2001). Perceptions of classroom environment, achievement goals, and achievement outcomes. *Journal of Educational Psychology, 93,* 43-54.

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods, 1*, 16 – 29.

Davies, S. & Guppy, N. (1997). Fields of study, college selectivity, and student inequalities in higher education. *Social Forces, 75,* 1417-1438.

Desimone, L. (1999). Linking parent involvement with student achievement: Do race and income matter? *The Journal of Educational Research, 93,* 11-30.

Dowson, M. & McInerny, D.M. (2001). Psychological parameters of students' social and work avoidance goals: A qualitative investigation. *Journal of Educational Psychology, 93,* 35-42.

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

Dweck, C. (1990). Self-theories and goals: Their role in motivation, personality, and development. In R.A. Dienstbier (Ed.) Nebraska Symposium on Motivation. (pp. 199-235). Lincoln, NE: University of Nebraska Press.

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

Elliot, A.J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34,* 169-189.

Elliot, A., & Church, M. (1997). A hierarchical model of approach and avoidance motivation. *Journal of Personality and Social Psychology, 72,* 218-232.

Elliot, A.J., & Harackiewicz, J.M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 70,* 461-475.

Elliot, A.J., & McGregor, H.A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 76,* 628-644.

Elliot, A.J., & McGregor, H.A. (2001). A 2 x 2 achievement goal framework. *Journal of Personality and Social Psychology, 80,* 501-519.

Felner, R.D., Brand, S., DuBois, D.L., Adan, A.M., Mulhall, P.H., & Evans E.G. (1995). Socioeconomic disadvantage, proximal environmental experiences, and socioemotional and academic adjustment in early adolescence: Investigation of a mediated effects model. *Child Development, 66,* 774-792.

Finney, S. J. & DiStefano (2006). Non-normal and categorical data in SEM. In G.R. Hancock & R.O. Mueller (Eds.). *A second course in structural equation modeling.* Information Age: Greenwich, CT.

Finney, S.J., Pieper, S.L, & Barron, K.E. (2004). Examining the psychometric properties of the Achievement Goal Questionnaire in a general academic context. *Educational and Psychological Measurement, 64,* 365-382.

Fontaine, A.M. (1991). Impact of social context on the relationship between achievement motivation and anxiety, expectations or social conformity. *Personality and Individual Differences, 12,* 457-466.

González-Romá, V., Tomás, I., Ferreres, D., & Hernández, A., (2005). Do items that measure self-perceived physical appearance function differentially across gender groups? An application of the MACS model. *Structural Equation Modeling, 12*, 148 – 162.

Hancock, G. R. (1997). Structural equation modeling methods of hypothesis testing of latent variable means. *Measurement and Evaluation in Counseling and Development, 30*, 91 - 105.

Hancock, G. R. (2001). Effect size, power, and sample size determinants for structured means modeling and MIMIC approaches to between-groups hypothesis testing of means on a single latent construct. *Psychometrika, 66*, 373 –388.

Harackiewicz, J.M., Barron, K.E., Carter, S.M., Lehto, A.T., & Elliot, A. (1997). Predictors and consequences of achievement goals in the college classroom: Maintaining interest and making the grade. *Journal of Personality and Social Psychology, 73,* 1284-1295.

Harackiewicz, J.M., Barron, K.E., Tauer, J.M., & Elliot, A.J. (2002). Predicting Success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology, 94,* 562-575.

Hauser, R.M. & Warren, J.R. (1997). Socioeconomic indexes for occupations: A review, update, and critique. *Sociological Methodology, 27,* 177-298.

Jöreskog, K., & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language*. Chicago: Scientific Software International.

Jöreskog, K., & Sörbom, D. (1996). *PRELIS 2: User's reference guide*. Chicago: Scientific Software International.

Leppel, K., Williams, M.L., & Waldauer, C. (2001). The impact of parental occupation and socioeconomic status on choice of college major. *Journal of Family and Economic Issues, 22,* 373-394.

Koutsoulis, M.K., & Campbell, J.R. (2001). Family processes affect students'motivation, and science and math achievement in Cypriot high schools. *Structural Equation Modeling, 8,* 108-127.

Maehr, M.L., & Midgley, C. (1991). Enhancing student motivation: A schoolwide approach. *Educational Psychologist, 26,* 399-427.

Meece, Blumenthal, & Hoyle (1988). Student goal orientations and cognitive engagement in classroom activities. *Journal of Educational Psychology, 80,* 514-523.

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

Nolen, S.B. (1988). Reasons for studying: Motivational orientations and study strategies. *Cognition and Instruction, 5,* 269-287.

Oakes, J.M., & Rossi, P.H. (2002). The measurement of SES in health research: Current practice and steps toward a new approach. *Social Science and Medicine, 56,* 769-784.

Oakland, T., Wechsler, S., Benusan, E., & Stafford, M. (1994). The construct and measurement of achievement among Brazilian children. *School Psychology International, 15,* 133-143.

Pieper, S. L. (2003). Refining and Extending the 2x2 Achievement Goal Framework: Another Look at Work-Avoidance. Unpublished Doctoral Dissertation, James Madison University, Harrisonburg, Virginia.

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

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

Pintrich, P.R. (2000c). The role of goal orientation in self-regulated learning. In M. Boekaerts, P.R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation: Theory, research, and applications* (pp. 451-502). San Diego, CA: Academic Press.

Pintrich, P.R., & DeGroot, E.V. (1990). Motivational and self-regua;lted learning components of classroom academic performance. *Journal of Educational Psychology, 82,* 33-40.

Pintrich, P.R., & Schunk, D.H. (2002). *Motivation in education: Theory, research, and applications* (2nd ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Ryan, R.M., & Deci, E.L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25,* 54-67.

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. vonEye & C. C. Clogg, (Eds.), *Latent variables analysis: Applications for developmental research*. Thousand Oaks, CA: Sage.

Stipek, D.J. & Ryan, R. H. (1997). Economically disadvantaged preschoolers: Ready to learn but further to go. *Developmental Psychology 33*, 711-723.

Stipek, D.J. (2001) Pathways to constructive lives: The importance of early school success. In A. Bohart and D. Stipek (Eds.) *Constructive and destructive behavior: Implications for family, school, and society.* (pp.291-315). Washington DC: American Psychological Association.

Stipek, D. (2002). Good instruction is motivating. In A. Wigfield & J. S. Eccles (Eds.), *The development of achievement motivation* (pp. 309 – 332). Academic Press: San Diego, CA.

Steenkamp, J, & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research, 25*, 78-90.

Walker, D., Greenwood, C., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development, 65,* 606-621.

Walpole, M. (2003). Socioeconomic status and college: How SES affects college experiences and outcomes. *The Review of Higher Education, 27*, 45 – 73.

White, S.B., Reynolds, P.D., Thomas, M. M., & Gitzlaff, N.J. (1993). Socioeconomic status and achievement revisited. *Urban Education, 28,* 328-343.

Yu, C., & Muthén, B (2002, April). *Evaluation of model fit indices for latent variable models with categorical and continuous outcomes*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

Footnotes

[1]Mastery goals have synonymously been referred to as task goals and learning goals (e.g., Midgley & Edelin, 1998). In addition, performance goals have synonymously been referred to as ability goals and ego goals. For the sake of consistency, the terms mastery goals and performance goals will be employed.

[2]We followed Hancock's (2001) guidelines for calculating an effect size that corresponds to the latent mean difference.

Table 1

Demographic information for both the lower- and higher-income groups (N = 493)

	Lower-Income Group (N = 250)	Higher-Income Group (N = 243)
Females	182 (73%)	155 (60.5%)
Age		
Mean (S.D.)	18.39 (.509)	18.41 (.494)
Range	17-19	18-19
SAT scores[a]		
Math – Mean (S.D.)	571.81 (64.727)	609.46 (66.59)
Verbal – Mean (S.D.)	571.43 (60.473)	585.42 (61.58)
Total – Mean (S.D.)	1133.87 (105.083)	1186.42 (107.426)
Fathers' education		
Some high school or less	12 (4.8%)	3 (1.2%)
High school graduate	69 (27.7%)	11 (4.5%)
Post-2nd other than college	9 (3.6%)	2 (.8%)
Some college	58 (23.3%)	12 (4.9%)
College degree	55 (22.1%)	83 (34.2%)
Some graduate school	8 (3.2%)	12 (4.9%)
Graduate degree	29 (11.6%)	76 (31.3%)
Doctoral degree	9 (3.6%)	44 (18.2%)
Mothers' education		
Some high school or less	9 (3.6%)	0 (.0%)
High school graduate	53 (21.4%)	17 (7.1%)
Post-2nd other than college	16 (6.5%)	7 (2.9%)
Some college	63 (25.4%)	36 (15.1%)
College degree	72 (29%)	95 (39.7%)
Some graduate school	9 (3.6%)	19 (7.9%)
Graduate degree	24 (9.7%)	56 (23.4%)
Doctoral degree	2 (.8%)	9 (3.9%)

Note. [a]The higher-income group scored significantly higher on the total SAT than the lower- income group, t (488) = -5.33, $p < .001$, d=.48. However, total SAT scores were weakly related to AGQ-R subscale scores, with correlations for the two groups ranging from r = -.248 to r = .176.

Table 2

Fit statistics for the goal orientation models

Model	ML χ^2	df	S-B χ^2	rCFI	rRMSEA
Five Factor Model					
Higher Income	166.80	80	159.60	.94	.06
Lower Income	134.06	80	116.89	.97	.04
Invariance Tests					
Configural Invariance: Same structure	300.86	160	274.87	.965	.054
Metric: Loadings set equal	308.37	170	287.09	.964	.053
Scalar: Intercepts set equal	329.06	180	309.29	.961	.054

Table 3

Factor pattern coefficients and factor correlations from the CFA of the five-factor goal orientation model estimated separately for lower and higher income students.

		Factor Pattern Coefficients	
		Lower Income	Higher Income
1	MAP	0.81 (.59)	0.71 (.66)
2	MAP	0.82 (.83)	0.73 (.78)
3	MAP	0.80 (.68)	0.77 (.66)
4	MAV	0.73 (.47)	0.63 (.39)
5	MAV	1.19 (.79)	1.31 (.86)
6	MAV	1.34 (.83)	1.15 (.74)
7	PAP	1.41 (.85)	1.20 (.84)
8	PAP	1.54 (.92)	1.27 (.85)
9	PAP	1.49 (.87)	1.23 (.83)
10	PAV	1.25 (.63)	1.17 (.58)
11	PAV	0.80 (.46)	0.98 (.58)
12	PAV	1.59 (.89)	1.15 (.68)
13	WAV	0.91 (.71)	1.05 (.72)
14	WAV	1.14 (.76)	1.24 (.83)
15	WAV	1.44 (.81)	1.14 (.84)

Correlations among the five orientations[a]

	MAP	MAV	PAP	PAV	WAV
MAP	1.0	.36	.30	.06	-.31
MAV	.22	1.0	.13	.38	.21
PAP	.34	.21	1.0	.24	.00
PAV	.09	.42	.48	1.0	.28
WAV	-.48	.16	-.02	.15	1.0

Note: All unstandardized coefficients were statistically significant $p < .01$.

MAP = Mastery-approach, MAV = Mastery-avoidance, PAP = Performance-approach, PAV = Performance-avoidance, WAV = Work-avoidance.

[a] Factor correlations for the lower-income group below the diagonal; factor correlations for the higher-income group above the diagonal.

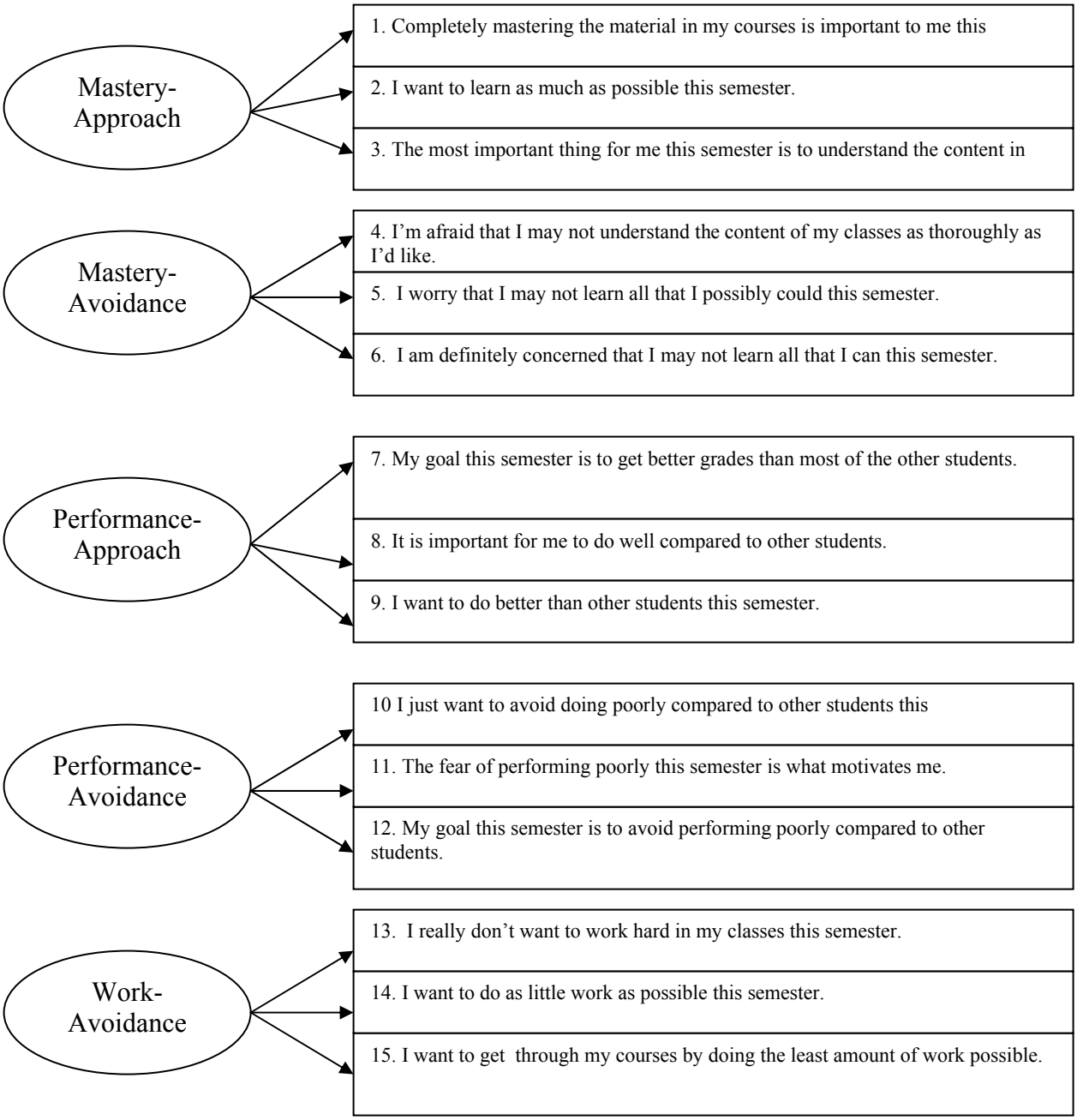
$N_{lower\ income} = 250$ $N_{higher\ income} = 243$.

Table 4
Latent Mean Differences between Lower and Higher Income Students for Five Orientations

	MAP	MAV	PAP	PAV	WAV
Latent Mean Differences					
Estimated Difference[a]	-0.15	-0.08	0.40	0.06	0.15
Significance (z-value)	1.96*	1.16	3.21*	0.46	1.52
Effect size[b]	0.21	0.12	0.31	0.05	0.15
Observed Mean Differences					
Subscale Means (3-21)[c]	17.42, 17.84	12.08, 12.48	15.63, 14.36	13.20, 13.15	7.43, 6.88
Subscale Means (1-7)[c]	5.81, 5.95	4.03, 4.16	5.21, 4.79	4.40, 4.38	2.48, 2.29
Observed Effect Size[b]	.15	.11	.29	.01	.15

[a] The latent means for the lower income group were fixed to zero so that the estimated differences reflect the difference in the latent mean of the higher income group from that of the lower income group. [b] The effect size statistic can be interpreted as follows: small=.2, medium=.5, large=.8 (Cohen, 1988). [c] Lower income observed subscale means follow higher income observed subscale means. MAP = Mastery-approach, MAV = Mastery-avoidance, PAP = Performance-approach, PAV = Performance-avoidance, WAV = Work-avoidance.
$N_{lower\ income} = 250$ $N_{higher\ income} = 243$.
* $p \leq .05$

Figure 1. *Factor structure of the ATL measure.*



Note. The correlations among the factors were freely estimated.

Appendix A

Correlations among individual item scores with correlations for the lower-income group below the diagonal and correlations for the higher-income group above the diagonal

	MAP1	MAP2	MAP3	MAV1	MAV2	MAV3	PAP1	PAP2	PAP3	PAV1	PAV2	PAV3	WAV1	WAV2	WAV3
MAP1	1.0	.507	.395	.092	.225	.204	.325	.323	.301	-.087	.050	.022	-.145	-.131	-.197
MAP2	.483	1.0	.549	.081	.219	.193	.134	.235	.110	-.066	.035	.074	-.224	-.195	-.183
MAP3	.427	.568	1.0	.100	.218	.235	.044	.112	.087	-.014	.148	.053	-.107	-.154	-.213
MAV1	-.021	-.043	.099	1.0	.338	.238	.017	.084	.020	.182	.328	.199	.074	.181	.178
MAV2	.148	.202	.208	.337	1.0	.650	.070	.119	.130	.061	.276	.226	.129	.182	.139
MAV3	.125	.092	.118	.417	.654	1.0	-.008	.043	.113	-.005	.199	.228	.120	.169	.132
PAP1	.317	.235	.125	-.084	.107	.104	1.0	.709	.707	.042	.044	.147	-.017	-.003	-.010
PAP2	.325	.283	.171	.030	.188	.207	.771	1.0	.695	.057	.040	.283	-.071	-.085	.053
PAP3	.235	.178	.106	-.035	.169	.154	.757	.797	1.0	-.043	.039	.222	.018	.029	.054
PAV1	.136	.032	.022	.100	.180	.153	.211	.287	.175	1.0	.375	.419	.065	.120	.120
PAV2	.021	-.007	.044	.320	.308	.295	.096	.184	.089	.338	1.0	.337	.174	.207	.194
PAV3	.134	.034	.070	.163	.303	.288	.325	.446	.376	.567	.385	1.0	.153	.066	.164
WAV1	-.150	-.365	-.277	.167	.106	.116	-.041	-.037	.013	.065	.003	.048	1.0	.602	.602
WAV2	-.147	-.300	-.196	.179	.026	.076	-.060	-.014	-.035	.048	-.017	.145	.530	1.0	.697
WAV3	-.161	-.332	-.262	.166	.042	.131	-.007	.014	.027	.098	.043	.107	.557	.626	1.0
Lower-income group															
Mean	5.58	6.30	5.96	5.06	3.93	3.49	4.88	4.86	4.62	4.76	4.55	3.84	2.10	2.39	2.39
S.D.	1.358	0.988	1.175	1.533	1.515	1.614	1.665	1.671	1.714	1.982	1.756	1.788	1.295	1.502	1.413
Skew	-1.03	-1.851	-1.136	-0.546	0.039	0.225	-0.608	-0.532	-0.301	-0.466	-0.381	0.124	1.274	1.088	1.069
Kurtosis	0.929	4.715	1.094	-0.23	-0.526	-0.693	-0.268	-0.542	-0.696	-1.009	-0.720	-0.890	1.125	0.471	0.815
Higher income group															
Mean	5.64	6.14	5.64	4.89	3.70	3.48	5.33	5.25	5.05	4.78	4.47	3.95	2.34	2.64	2.44
S.D.	1.080	0.940	1.175	1.607	1.514	1.549	1.422	1.504	1.486	2.022	1.689	1.698	1.450	1.499	1.355
Skew	-0.629	-0.953	-0.466	-0.607	0.167	0.277	-0.710	-0.729	-0.573	-0.567	-0.136	-0.004	1.061	0.792	1.064
Kurtosis	-0.031	0.289	-0.789	-0.424	-0.510	-0.503	0.377	0.025	-0.151	-0.900	-0.836	-0.863	0.442	-0.007	1.226

Note. MAP = Mastery-approach achievement goal orientation, MAV = Mastery-avoidance achievement goal orientation, PAP = Performance-approach achievement goal orientation, PAV = Performance-avoidance achievement goal orientation, WAV = Work-avoidance goal orientation. (N = 250 for the lower-income group, and N = 243 for the higher-income group.