ABSTRACT

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Student engagement is a process that combines the attention, interest, investment, and effort students expend in work towards learning. Studies have shown that engagement leads to academic achievement and that disengaged students have lower scores on achievement tests and a higher probability of dropping out of school (Connell et al. 1994; Finn et al., 1995; Marks, 2000). The goal of this study was to probe the validity of an explicit predictive model of the antecedents of engagement involving measures of prior achievement, ethnicity, sex, socioeconomic status, and parent involvement and the total effect of these variables decomposed into direct and indirect (via engagement) effects on academic achievement. Results indicate that a self-report measure of engagement was found to predict achievement for a sample of 676 third grade students but that engagement had no incremental validity in predicting achievement. The construct validity of engagement and parent involvement measures are discussed.

EARLY ELEMENTARY INFLUENCES ON STUDENT ENGAGEMENT IN
LEARNING

By

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Introduction

Student engagement is a process that combines the attention, interest, investment, and effort students expend in work towards learning (Marks, 2000). Engagement refers to active, goal-directed, persistent, focused interactions with the social and physical environments; its counterpart, disaffection, or disengagement, refers to alienated, apathetic, or rebellious behavior not directed toward opportunities for learning (Furrer & Skinner, 2003). Engagement has recently attracted scientific interest due to its value in understanding student motivation and achievement. The behavioral, emotional, and cognitive elements involved in engagement coincide with constructs involved in many theories of motivation (Fredricks et al., 2004). For example, the behavioral component of engagement is related to on-task behavior; the emotional component of engagement is related to student attitudes and values; and the cognitive component of engagement is related to goal theory and self-regulation (Fredricks et al., 2004). Thus, engagement may provide a single, robust framework for studying students' commitment and investment in the classroom.

Student learning and the motivation to succeed depend upon the interaction of a student's social and academic goals, the motives that drive these goals (e.g. internal, external), and the reward structure of the classroom (Covington, 2000). A number of investigations have shown that engagement leads to academic achievement and contributes to social development at all grade levels (Connell, Spencer, Aber, 1994; Connell & Wellborn, 1991; Finn, 1993; Marks, 2000). Moreover, low levels of school engagement can be detrimental to a student's achievement and social development. Disruptive and inattentive students have lower scores on achievement tests, and

disengaged students have a higher probability of dropping out of school (Finn et al., 1995). School participation and school identification, similar constructs preceding the conception of behavioral engagement, were predictors of dropping out of school (Rumberger, 1987; Finn, 1989). In short, research has shown that school disengagement has long-term academic consequences and evidence also implies that engagement influences academic achievement (see Fredricks et al., 2004).

Student engagement is important because it may be malleable. Engagement is the result of "the interaction of the individual with the context and is responsive to variation in environments," thus making it an ideal target for intervention (Fredricks et al., 2004, p. 61). Engagement has the potential for fostering student effort toward academic achievement and improving behavior and school persistence. The antecedents of engagement can be academic or social, and may stem from relations, activities, or opportunities both inside and outside of the classroom. Accordingly, further inquiry about the social antecedents of engagement is in order.

Despite a long history of systematic educational research on engagement (Finn, 1992), only recently has the construct been broadly reviewed and a standard definition and accepted measures been offered (Fredricks et al., 2004). The review by Fredericks et al. (2004) focused on the effect of the educational contexts on engagement, disregarding the influence of background characteristics. Marks (2000) observed that "much of the research has attributed the lack of engagement to factors in students' personal backgrounds" (p. 154), yet she herself found that personal background accounted for little variance in engagement. Background characteristics such as ethnicity, family socioeconomic status (SES), and ability have been found to be significant predictors of

achievement (Anderson & Keith, 2001), but there is no agreement on their effect upon *engagement*. The goal of this study is to probe the validity of a causal model involving measures of prior achievement, ethnicity, sex, socioeconomic status, and parent involvement, the effect of these measures on school engagement and in turn, academic achievement. One of the most prolific authors in this area, Finn, asserted that some students begin school predisposed to non-participation, or disengagement, and that basic research is needed to identify why that is (Finn & Cox, 1992; Finn et al., 1995). It may prove useful to identify ways to enhance student engagement, especially in the early elementary years.

A Causal Model of Engagement and Achievement

An explicit causal model of the antecedents of engagement and the influence of engagement on achievement is proposed here (Figure 1). "Models of school learning focus on hypothesizing and testing the simultaneous, direct and indirect, causal relations of environmental, personal, and background variables to academic achievement" (Anderson & Keith, 2001. p. 259). Multivariate models are valuable because they allow an examination of the relative effects of different influences on learning. The causal model proposed here focuses on the causal relations of background variables to engagement and academic achievement. One of the advantages of such a causal analysis is that it allows probes of hypothesized total, direct, and indirect causal relations specified by the model. Estimation of the multivariate model offers a way of empirically analyzing the influences of numerous variables simultaneously, providing a more comprehensive understanding of the influences of variables than do methods that focus only on one or few variables.

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The results of multivariate path models have implications for interventions for students showing depressed engagement and deficient academic achievement. If engagement is malleable and has an important effect on learning across ages and groups, "then interventions, techniques, or programs to [increase engagement] will, if successful, increase learning" (Keith, 2002, p. 400).

Learning models and theories have historically included general background characteristics to account for differences in academic achievement. These characteristics range from demographic, to ability, to contextual factors. Carroll (1963; 1989) developed the first model of school learning as a multivariate explanatory model to explain academic learning. More recently, other researchers (e.g. Anderson & Keith, 2002) have "endeavored to test these most common constructs in a 'generic' school learning model" (p. 397). Keith (2002) argued that researchers have focused on discrete aspects of learning but considerable overlap exists. In that line, DiPerna and Elliott (1999; 2002) have identified the domains of academic skills and academic enablers to be the contributors of academic achievement. In these current research articles, a generic model of school learning is presented, which specifically includes background, ability, and academic motivation when academic achievement is the outcome. Keith (2002) noted that, "to decide whether variables *must* be included in models of school learning, one must decide whether those variables are common causes of the variables of primary interest, or whether they are simple causes or intervening variables. Relevant theory and previous research are the primary sources for making such decisions" (p. 398, italics in original). In sum, based upon previous research, a student's demographic characteristics (i.e. ethnicity, SES, and sex), prior academic achievement, and parental education level

and parent involvement are all predictors of academic achievement and must be included in a model of student learning outcomes.

Previous investigations of the demography and achievement of children have tended to report significant group differences by age, gender, ethnicity, and social class (e.g., Achenbach & Edelbrock, 1981; Kaufman & Doppelt, 1976; Lindholm, et al., 1978; Touliatos & Lindholm, 1975) and research has linked demographic characteristics with student academic outcomes (e.g., McDermott, 1995; Rimm-Kaufman, et al., 2000). Background characteristics such as SES, race/ethnicity, and family type are three major aspects of social structure that have been found to affect early schooling (Entwisle & Alexander, 1993).

Research has further indicated that variables such as gender, SES, race or ethnicity, and prior achievement must all be controlled for when investigating causes of academic achievement (e.g., see Ethington, 1991; Low & Clement, 1982; McDermott, 1995; Patrikakou, 1996; Stevenson & Newman, 1986; Wentzel, 1988; White, 1982). In this study, background variables are controlled in order to see if engagement has a direct effect on achievement and to see if engagement mediates the influence of those variables on achievement. It is proposed that part of the influence of these background variables operates by means of engagement in producing achievement.

What We Know

Ethnicity. Engagement may be a valuable variable in understanding the achievement of minority students if minority group membership is correlated with engagement. Because engagement has been found to be correlated with academic achievement, low

engagement may help explain the lower average achievement of underachieving minority groups.

In a study examining the links among students' effort and achievement, Black students were found to exert less effort than White and Hispanic students while Asian students exerted more effort than all other races (Carbonaro, 2005). Yet after controlling for gender and SES, the differences in effort were reduced. Moreover, when prior effort and achievement were controlled, Black-White differences in effort were no longer statistically significant, and the SES effect decreased by two thirds.

A national sample of over 18,000 middle school students from a cross section from all regions of the United States found a strong correlation between participation and academic achievement and that correlation was found for Asian, Hispanic, African-American, and White students (Finn, 1993). Thus, participation and achievement were correlated for all ethnic groups. Moreover, the decrement in achievement due to disengagement is a problem for every student (Finn, 1992). That is, disengagement causes negative academic effects for all ethnic groups. It follows that engagement is an important construct in the academic successes of all students.

Socioeconomic status. In order to understand the role that ethnicity plays in predicting engagement, we need to account for socioeconomic status (SES). Student motivation has long been viewed as an important difference between lower and middle class students (Goldberg, 1967). Children from high income families tend to be more engaged in school than children from low income families (Morris & Gennetian, 2003). A vast amount of evidence documents a negative correlation between SES and academic achievement (e.g. Coleman et al., 1966; White, 1982; Entwisle & Alexander, 1990; Patterson et al., 1990;

Haveman & Wolfe, 1994; McDermott, 1995; McLoyd, 1998). Students of higher SES are more likely to exert more effort than are lower SES students, a finding that connects SES and student engagement (Cook & Ludwig, 1998; Marks, 2000; Carbonaro, 2005).

Marks (2000) concluded that SES and student engagement are positively related regardless of grade level, but the relation between ethnicity and academic engagement differs by SES. Minority students demonstrating academic proficiency were distinguished from their lower achieving peers by certain characteristics, income being one (Finn & Rock, 1997). In a study conducted with a sample of middle-class African-American adolescents, school engagement, along with educational expectations, were determined to have the strongest relation to academic performance (Sirin & Rogers-Sirin, 2004). Although ethnicity and SES are related, research "should include analyses or experimental controls in their designs that reveal sensitivity to possible interactions" (Graham, 1994, p. 107). Thus, including the variable of socioeconomic status is essential to understanding the role that background characteristics play in the construct of student engagement.

Parent involvement. Research generally agrees that students of lower SES are increasingly at risk for academic failure (e.g. Hall & Barnett, 1991; Reid & Patterson, 1991; Schaefer, 2004). Many home factors related to SES have been linked to the development of difficulties with academic achievement and motivation. As children from ethnic minorities are disproportionately affected by poverty, it is not surprising that they also experience more academic failure (Arnold & Doctoroff, 2003). One way to parcel family type is to consider the degree to which the parents are involved in the schooling of their child. Evidence from the research indicates that parental attitudes toward school are

important for academic success (e.g., Seginer, 1983; Keith & Cool, 1992; Singh et al., 1995; Patrikakou, 1996).

Hamre and Pianta (2005) suggested that one of the most robust of these demographic risk markers is low maternal education (e.g., Christian, et al., 1998; Shonkoff & Phillips, 2000; Ferguson, et al., 2001; Hamre and Pianta, 2001; Peisner-Feinberg et al., 2001). Thus, the following factors are included in the measurement model presented in Figure 2: the highest level of school completed by the caregiver; the highest level of school completed by the most educated household inhabitant (as rated by the caregiver); and parent involvement in the student's schooling, as rated by the caregivers and the classroom teacher. These are important variables because earlier research indicates that even after controlling for background characteristics, parent involvement in school was significantly associated with lower rates of high school dropout, suggesting that parent involvement in school is an important component in early childhood education to help promote long-term effects (Barnard, 2004).

Not only has parent involvement been found to contribute to ethnic differences in achievement, but it also tends to diminish in the later school years, suggesting that it is of particular importance for young children (Anderson & Keith, 2001). In the model presented here, "parent participation refers to parent involvement in the child's schooling at school and at home" (Ysseldyke & Christenson, 1993). Parent involvement includes the extent to which a child's home environment supports academic performance and correlates highly with positive academic outcomes (Ysseldyke & Christenson, 1993). A large body of research has found positive effects of parent-school participation on

achievement and on child behavior (for review see Fan & Chen, 2001; Gonzalez-DeHass et al., 2005).

Sex. The research involving sex and student engagement is clear. Females have been found to exert more effort and be more engaged than their male counterparts (Carbonaro 2005; Cook & Ludwig, 1998; Johnson et al., 2001; Marks, 2000). Elliot et al. (2004) reported that females received significantly higher ratings on academic enablers, including engagement, than did males, and sex has also been found to correspond with engagement (Sirin & Rogers-Sirin, 2005). It is also important to note that boys engage in more risk-behavior than do girls and that being male and a minority has been associated with academic disengagement (Connell et al., 1994; Graham & Taylor, 2002).

Prior achievement. Prior achievement is particularly important to the design of this study as it may be the strongest predictor of current academic achievement. The majority (92%) of studies examined in a review by Dochy et al. (1999) demonstrated the positive effects of prior knowledge on performance. Research indicates that the determinants of achievement are primarily variables such as intellectual ability and previous achievement (Castejon & Vera-Munoz, 1996). Farkas et al. (1990) found that the differential course-grade attainment of gender, ethnicity, and poverty groups are almost entirely accounted for by cognitive performance variables. It is probable that prior achievement can directly explain future academic achievement and is thus a necessary exogenous variable in this model.

Age. There has been much research that suggests that early engagement plays a pivotal role in determining academic achievement. Disengagement from school may have its

roots in early childhood and these patterns of withdrawal are likely to persevere (Finn, 1993). If a student is not engaged in the first two or three grades, it is highly unlikely that he or she will become involved in later grades when an ability requirement is perceived as an additional obstacle to learning (Finn, 1992). Moreover, significant relations have been found between inattentive-withdrawal behavior in the third grade and misconduct in adolescence (Spivack & Cianci, 1987). Third grade is the grade at which the transition is made from learning-to-read to reading-to-learn; the academic rigors of writing are introduced; and the referral rate to special education is seen to rise. Thus, the third year of schooling may well be the point in education at which effort alone is not enough to succeed and academic skills become necessary.

Gaskill and Hoy (2002) contended that because a child's self-beliefs for school success are undeveloped when they enter school, they are at their most malleable. Moreover, "what happens to students in the first few years of school will lead them to develop self-beliefs that will become increasingly stable as they confront more demanding work" (Gaskill & Hoy, 2002, p. 188). Some researchers have suggested that because the perception of competence decreases as children get older, students who withdraw from participation in the classroom should be identified at the earliest possible time in an attempt to avert the deleterious effects that may ensue (Eccles et al., 1993; Finn, 1992). The longer a student remains disengaged, the more difficult that disaffection will be to remedy. Graham (2002) stated well that, "if our goal is preventive intervention, then change efforts based on endorsing achievement values would need to be implemented before the critical transition to early adolescence, when motivation begins to decline among all youth" (p. 143).

Much of the literature on engagement is devoted to middle and high school students, where the students' school engagement is likely to be established and less likely to be affected by intervention. The current study proposes an assessment of the engagement of third grade students in an attempt to find differences in levels of engagement at a young age, if in fact they exist, and tries to distinguish if certain cultural, social, and familial factors play a role in its establishment.

What We Need To Know

Students who are more engaged are more academically successful (Smerdon, 1999; Marks, 2000; Yair, 2000; Johnson et al., 2001). The goals of this study are to examine the incremental relationship between engagement and academic achievement net of background characteristics and to explore whether engagement mediates the influence of these background variables and achievement. Engagement has been found to predict school performance, and while non-participation was related to depressed academic performance, disengagement was found to be a precursor to more severe forms of withdrawal in the later school years (Connell et al., 1994; Finn, 1989). Disengaged students in the classroom performed more poorly than their disruptive peers (Finn, 1995), which is alarming considering the fact that since disaffection does not disrupt the classroom environment, it can often go unnoticed and unresolved (Millman, et al., 1980).

Prior to entering school, the factors that primarily place students at risk for failure are family and demographic factors (Hamre & Pianta, 2005). It has been noted that children's early performance in school may affect their perceptions of their academic competence and engagement, which in turn may affect their future performance (Stipek, 2001). It thus stands to reason that performance affects engagement and that engagement

reciprocally affects performance (Stipek, 2001). Although it is difficult to ascertain which comes first, the study proposed here involves young students and may be able to help make that distinction. Connell et al. (1994) found that student engagement is the most proximal point of entry for reform efforts designed to enhance the educational chances of low achieving students. Because engagement declines after the first few years of elementary school in children who perform poorly (Marks, 2000), the first few years of elementary school are important as that is when academic precedence is set and school engagement is established.

While studies have evaluated the effects of student background characteristics on engagement, there remains no agreement of those effects. Furthermore, there has not been a comprehensive review of these effects in general, or with this age group in particular. In a review of engagement and student background information over the past two decades, Marks (2000) found that at the elementary school level, girls were more significantly engaged than boys; social class contributed significantly to the engagement of students; no racial or ethnic effect on engagement; parental involvement supports engagement; and prior achievement was a significant factor in engagement. According to her HLM analyses, Marks (2000) reported that most of the variance in engagement was within classrooms and thus "engagement is largely a function of individual student characteristics and experiences" (p. 166) – yet she concluded that "personal background [characteristics] accounted for little of the variance in engagement among students" (p. 173). Thus, further empirical work on the relation (if any) between background characteristics and engagement is required, particularly among elementary students.

The purpose of this study is to determine whether student background characteristics influence engagement at a young academic age, when the effect is most critical. The research questions are:

1. Does a self-report measure of engagement predict achievement for third grade students?

2. Does engagement have incremental validity in predicting achievement net of ethnicity, socioeconomic status, prior achievement, sex, parent involvement, and parent education level?

3. Does engagement mediate the influence of ethnicity, SES, prior achievement, sex, and parent characteristics on achievement?

Methods

Participants

Participants were 676 third grade students enrolled in 12 Maryland public elementary schools, and their respective caregivers and classroom teachers (see Table 1). The sample was 53% male and 47% female. Because of the lack of diversity in our sample (for example, there were only 46 Black and 13 Latino students identified by the schools), the ethnicity variable was collapsed into two categories: historically advantaged students, which made 91% of the sample and included White and Asian students; and historically disadvantaged students, which made 9% of the sample and included Black, Latino, and American Indian/Alaskan Native students. Further, this sample lived in households of particularly high income, as 81% of the households had an annual income of $70,000 or more. Had the ceiling on the annual income scale been higher than

$70,000, it is expected that a typical salary distribution with a long right tail would have been found.

Measures

Sex. The sex of each student was taken directly from the individual student survey.

Prior achievement. Prior achievement was measured using the students' academic grades from the previous academic year. No test scores were available to use as a measure of prior achievement which is a limitation of the measurement. Though grades are a good estimation of achievement, this variable may be susceptible to teacher bias (refer to Table 2 for the reliability of each scale).

Ethnicity. The ethnicity of each student was obtained from the questionnaire given to the caregiver about the student; the questionnaire given to the caregiver about the caregiver; and school records. The six categories coded were: Hispanic, American Indian/Alaska Native, Asian, Black, White, and other. As aforementioned, given the limited diversity of the sample, the variable was collapsed into a dichotomy involving traditionally advantaged groups (i.e. White and Asian) and traditionally disadvantaged groups (i.e. all other groups).

Socioeconomic status. Family SES was estimated using measures of the total household income, the highest level of education achieved by the caregiver, and the highest level of education achieved by the most educated household inhabitant, all as self-reported by the caregiver in their questionnaire.

Parent involvement. A nine-question measure was used to assess parent and teacher involvement as rated by the primary caregiver and the classroom teacher. The measure assessed the amount and type of contact that occurs between parents and teachers, the

parent's interest and comfort in talking with teachers, the parent's satisfaction with their children's school, and the parent's degree of involvement in the child's education (refer to Figure 2). The answers are coded on item-specific 5-point scales, where zero represents no involvement. The measure was taken from a scale that includes 26 questions for parents and 21 questions for teachers, developed by the Fast-Track Project, a comprehensive intervention program designed to prevent behavioral problems in high-risk school children (Conduct Problems Prevention Research Group, 1991). An item analysis was conducted in order to improve the correlation among the items within the scales and 4 items were omitted from the parent questionnaire, thus matching it to the items on the teacher questionnaire and providing a moderate correlation (0.41) between the two measures (see Tables 3 & 4). Some items from the original measure were omitted because of concerns about a primary caregiver's ability to report about behaviors in those items; concerns about generalization to diverse populations; and the items did not reflect the primary caregiver's degree of involvement.

The third measure of parent involvement consisted of two questions on the teacher scale which assessed a parent's general involvement and their involvement compared to other parents (see Table 5). The internal consistency of the three factors of parent involvement was low (alpha = .31).

Engagement. A ten-item self-report measure was used to assess student engagement in the classroom. Students reported on their own engagement using a measure of engagement versus disaffection developed by Furrer and Skinner (2003). The scale assessed students' perceptions of their effort, attention, and persistence while initiating and sustaining learning activities. The answers were coded on item-specific four-point

scale; where zero represents disagreement with the statements and three represents agreement with the statements. The result yielded a score of engagement at one pole and disengagement at the other.

An item analysis was conducted in order to improve the correlation among the items within the scale. As a result, two items were omitted which raised the alpha reliability from 0.62 to 0.75 (see Table 6). Because the omission of these items increased the internal consistency of the scale, the measurement of the theoretical construct of engagement is strengthened.

A one-item teacher-report measure was used to assess a student's overall motivation to succeed academically compared to the average third grade child (see Table 7). The answers were coded on item-specific five point scale where one marked extremely low motivation and five marked extremely high motivation.

Academic achievement. The dependent variable, academic achievement, was measured by using a composite of school-system administered standardized tests for reading and math, and the fourth quarter academic grades of the student at the conclusion of the 2005 school year. Prior grades and test scores were used in order to avoid under-representing the latent variable.

<center>Results</center>

Each exogenous variable and hypothesized mediating variable significantly correlated with reading achievement. That is, all of these variables had significant correlations with one or more measures of achievement. These correlations are summarized in Table 8.

Thus, in answer to the first research question, a self-report measure of engagement did predict achievement for third grade students (though not as well as the teacher report). It remains to be seen if engagement has incremental value.

Structural Equation Model

The hypothetical causal model proposed here (Figure 1) and its associated measurement model (Figure 2) show how the data were analyzed. In order to deal with attrition issues, an Expectation-Maximization (EM) algorithm was used to impute missing data. EM uses a maximum-likelihood method to replace missing values with predicted scores. The predicted scores based on EM are unbiased and efficient, even for Structural Equation Models with latent variables like the one used here (Graham et al., 2003). The EM analysis was compared to a complete cases analysis using listwise deletion and the two analyses appeared generally comparable.

All model analyses were performed using the EQS structural equations program (Bentler, 1995). To verify that the measured variables reflected the latent constructs, the covariances among latent variables were examined using confirmatory factor analyses (CFA). Confirmatory factor analyses were run to determine the adequacy of the hypothesized factor loadings, the degree of model fit, and the latent construct correlations. In each model, factor loadings shown in Figure 2 were freed, all factors were allowed to correlate freely, and factor variances were constrained to 1.0 to identify the constructs. A Lagrange Multiplier test was used to assess the probability that relaxing the restrictions on the model would produce a model with a better fit (Bentler, 1995). The Wald test was used to suggest parameters that could be fixed at zero without degrading the fit of the model.

The summary of all fit indices for the CFA and structural models is shown in Table 9. The CFA model for the exogenous variables (that is, sex, ethnicity, SES, and prior achievement) fit well with a Comparative Fit Index (CFI) of 0.97; the CFA model for engagement fit quite well, with a CFI of 1.0; and the CFA model for the outcome of academic achievement fit well, with a CFI of 0.90.

The factor structures confirmed in the CFA models were used as the foundation for the final structural model. Following the suggestions of the Lagrange test, two parameters were freed in the final model that were initially fixed at zero. That is, the error covariance was freed between the academic grades of the outcome variable and the teacher's report of student engagement. In addition, the error covariance was freed between the academic grades of the outcome variable and the teacher's report of general/comparative parent involvement. These adjustments were justified based on the possible teacher bias present in each measure. That is, the errors in each of the 2005 teacher measures (i.e. engagement, parent involvement, and grades) were correlated because the variables were defined by the same rater and thus susceptible to bias across the variables.

Based on the suggestions of the Wald test, two paths in the final model were fixed at zero: the path between prior achievement and engagement (correlation coefficient of -.003); and the path between parent involvement and the achievement outcome (correlation coefficient of .007).

The CFI for the initial structural model was 0.85. Following the suggestions produced by the Lagrange and Wald tests, the final structural model had a CFI of 0.87. It would have been preferred that the CFI be greater than 0.90 to demonstrate that the

model represented the data, however it was determined to be unacceptable to change any more parameters of the model. The fit of the final model simply is what it is and should be recognized as such. The final model accounted for 10% of the variance in Parent Involvement, 28% of the variance in Engagement, and 64% of the variance in Academic Achievement.

The standardized path coefficients added to the model can be seen in Figure 3. Of the four background variables (i.e. sex, ethnicity, SES, and prior academic achievement), sex and Family SES were found to have significant effects on engagement ($p < .05$); that is, girls were more likely to be engaged than boys and higher SES was associated with higher engagement. There were no significant predictors of Parent Involvement in the model. Family SES and Prior Achievement were found to have significant effects on the outcome variable, Academic Achievement ($p < .05$); that is, higher SES and previous academic achievement were each related with higher achievement (refer to Figure 4).

Thus, to answer the third research question, engagement did not mediate the influence of ethnicity, SES, prior achievement, sex, and parent involvement on achievement. The total effect of these five variables could not be decomposed into direct and substantial indirect (via engagement) effects on academic achievement. This result indirectly answers the second research question without needing to perform a hierarchical regression in order to determine whether the inclusion of the engagement measure increases the proportion of variance in the achievement measure when added to an equation containing the background characteristics and parent involvement. That is, engagement did not have incremental validity in predicting achievement net of ethnicity, sex, SES, prior achievement, parental involvement, and parental education level.

Ordinary Least Squares Model

To provide a check on the complex latent variable structural model, and as a sensitivity analysis, additional analyses using ordinary least squares regression were performed. The results are summarized in Table 10.

Reading achievement was used as the outcome variable in this simpler model as it was regarded as the best single variable representation of academic achievement for third graders. Other outcome variables would have yielded different results. For example, judging by the correlation matrix (see Table 8), using student grades as the outcome variable would likely have produced greater effects for student-rated engagement. Only one measure was used to represent the exogenous variables sex, ethnicity (school report), family education (highest education level of the most educated household inhabitant), and household income. The prior achievement measure was the mean of the quarter grades from the 2004 school year. The best single indicators were chosen represent the teacher report of parent involvement ("Compared to the parents of other children in your class, how would you rate the encouragement to succeed academically that this child receives from his/her parents or guardians?"), the parent report of parent involvement ("You volunteered at your child's school"), the teacher repot of student engagement (Compared to the average 3rd grade child, what is this child's overall motivation to succeed academically), and the student report of student engagement (the mean of the self-report items). As this was a *post hoc* analysis, a different indicator was used to represent the parent report of parent involvement than was used in the structural model. The indicator used was the question: "You volunteered at your child's school," and was rated on a five-point Lickert scale ranging from "Never" to "More than once a week." This indicator was

chosen because it was thought to be the best available representation of a parent's involvement in his/her child's schooling and also had the highest correlation with reading achievement. (This indicator had been dropped from the LVSM measurement model because it did not cohere with the other indicators of parent involvement.) To sum, in the OLS model, family education level, prior achievement, and the teachers' reports of student engagement all had significant direct effects on achievement. In contrast, the students' report of their own engagement had no direct effect on achievement.

Discussion

The research presented is an effort to understand the role that background variables play in engagement and the role that engagement plays in the academic achievement of young students. Generalizations from this study are restricted by the limited ethnic and socioeconomic diversity of the sample, although it should be noted that according to the model, ethnicity had no effect on either engagement or achievement when SES was statistically controlled. The model proposed here is a descriptive device within one data set which attempts to illuminate the relationship between a student's background characteristics and his or her academic engagement. Results from such models are inherently tentative and generalizations should be made accordingly.

The results of this study lend support to the idea that some students may begin school predisposed to disengagement as males and those of lower socioeconomic status were significantly more likely to be academically disengaged. Nevertheless, the variance of engagement was not adequately explained by background characteristics in the exploratory model. There are thus two possible explanations: it could be that important

predictors were left out of the hypothesized model; or it could be that latent variables were measured with much error.

First, the proposed predictive model is susceptible to specification errors. Namely, a relevant variable may have been omitted in the hypothetical model that may have directly affected the academic achievement outcome and/or may have been related to engagement. Such an omission would limit the interpretability of the structural relationships. If a researcher were particularly interested in the influence of family background on engagement and achievement, it would be useful to have explicit measures of parental ability to disentangle the influence of family SES, ability, and other variables on achievement. The intent of the proposed model was to determine if some students are predisposed to disengagement prior to entering the school setting. Thus, variables of the individual that represented background characteristics were the focus of the model, however the effects of the educational context on engagement were excluded. Consequently, there may be important school-level and classroom context variables (e.g. classroom structure, task characteristics, class size, teacher-student relationships, teacher experience) associated with engagement. These are just some examples and represent factors of interest to be explored in future engagement models and in future research on engagement.

Second, if any single construct is poorly represented by the available measures it would limit the effect of the estimation of other structural coefficients. One such example is the measurement of prior achievement. Prior achievement was represented only by prior grades, because standardized tests were not administered in the second grade in this school district. This may have under-represented the latent variable of prior achievement.

But of special interest here is the construct validity of engagement and parent involvement. The research here was dependent on the available measures of student engagement and parent involvement for this sample, yet it appeared at the outset that good measures of all of the hypothesized constructs were available. That presumption was later questioned.

The reliability of the three measures of engagement was relatively weak (alpha coefficient of .51). The teacher report measure, one of the indicators of this latent variable, was a single question about how motivated the student is to succeed academically. This does not seem like an adequate representation of teacher assessments and likely under-represents teacher views of student engagement, however it did strongly correlate with reading achievement (r = .51). The lack of convergence between students' and teachers' reports of student engagement ultimately weakened the reliability of this construct. This sample of third grade students did not provide evidence that self-reported engagement was strongly correlated with reading achievement (r = .13).

The re-analysis of these data using an OLS approach sheds additional light on the engagement construct as measured in this research. It turned out that a single student self-report of engagement that did not appear much correlated with the teacher and parent reports had a higher zero-order correlation with achievement than did the self-report measures included in the LVSM analyses. As a result, the OLS results imply that self-reported engagement is predictive of achievement (although it has no "effect" when statistical controls are applied according to the OLS model). These differences in the more complex LVSM and the simpler OLS models counsel circumspection in uncritically accepting the results of any statistical model.

The levels of engagement reported by students in this study were generally high. It may be that students at this age level generally view themselves as highly engaged, which would be an important finding, or it may be that the scale is not sensitive enough. Regardless, the elevated student-reports of engagement may be one reason the measure of engagement did not have a significant effect on academic achievement. In contrast, the teacher-reported indicator of student engagement did have significant effects on achievement (refer to Table 10).

Finally, although the items in the engagement measures were similar to items of other measures of engagement reported in the literature, those used here may not have provided an adequate assessment of student engagement (see Tables 6 and 7). A review by Fredricks et al. (2004) suggested that using items that tap behavioral, cognitive, and emotional engagement should increase the predictive strength of an engagement measure. The self-report of student engagement in this study did not include emotional reactions to academics and school, items such as "When we start something new in school, I feel interested." Moreover, this study relied on student and teacher questionnaire data; observational techniques may have strengthened the measure of engagement.

There were also problems with the construct of parent involvement. A parent's involvement in a student's school life was a variable that, according to research, should have positively correlated with academic achievement. The three measures of parent involvement did not show good convergent reliability –alpha coefficient was only .31. The questions used in the parent and teacher surveys in this study were adapted from a more extensive and detailed measure of parent and teacher involvement (Conduct Problems Prevention Research Group, 1991). The items included in the questionnaires

did not appear on the surface to assess a parent's involvement in his/her child's schooling (see Tables 3 -5). Items included appeared to be identifying something different than parent involvement, even something as contrary as academic/behavior problems (see Izzo et al., 1999). Moreover, items appearing to tap into positive parental involvement (e.g. helping your child at home with subjects he/she is having difficulty with, taking your child to the library, making sure that your child got his/her homework done, volunteering at your child's school) did not hang together in an exploratory factor analysis and did not correlate with other involvement measures. The inclusion of the parent involvement variable lowered the Comparative Fit Index of the final model, but was retained in the end because its inclusion accounted for more of the variance of the academic achievement outcome.

Parent involvement could be measured in numerous ways: participation in parent-teacher interactions, participation in school activities, engagement in school activities at home, parental control/autonomy in the home, and parental values. Frameworks have been developed to guide empirical research on school-related opportunities for parental involvement that include many of these typologies (Epstein, 1992). The operational definition of parent involvement thus varies in the literature. Furthermore, much of the research in this area is non-empirical and inconsistent (see Fan & Chen, 2001). For instance, a meta-analysis of parental involvement and achievement found that parental home supervision had a poor relation with students' achievement whereas parents' expectations for their children's educational achievement had the strongest relation with academic achievement (Fan & Chen, 2001). The results of a study by Izzo et al. (1999)

suggested that greater parent-teacher contact was associated with poorer school engagement, which seems to accord with the results found in the present investigation.

The meta-analysis conduced by Fan & Chen (2001) concluded an average correlation between parental involvement and academic achievement to have a medium effect size ($r = .33$), yet this modest finding is cited as support of the positive relation between the two constructs which appears tenuous. In a study by Grolnick & Slowiaczek (1994), support was found for a multidimensional model of parent involvement, yet as Gonzalez-Has et al. (2005) put it in summarizing this study, the associations between parent involvement and school performance through motivation was only supported "for some types of motivational resources and some types of parental involvement" (p. 114).

The implications of the poor construct validities of engagement and parent involvement are that more work needs to be done to operationalize, assess, and measure engagement and parent involvement. Specifically, in future research, a better job needs to be done assessing and measuring engagement in students third grade or younger than was done in this study.

The present research is an attempt to contribute to the understanding of the effects of student background characteristics on engagement, particularly for young students. Further research needs to be done to determine whether young students can accurately report their engagement in learning activities; to improve the assessment and measurement techniques of engagement; and to identify significant predictors of engagement. Because student engagement is potentially malleable, it would prove beneficial to understand all the variables that contribute to its formation. The results of this study concluded that background variables account for only a small portion of the

variance in engagement. These findings can help shape future structural models of engagement, as more attention can perhaps be given to contextual factors specific to schools and classrooms. In the end, the primary goal of research on student engagement is to develop and focus engagement-enhancement and disengagement-prevention programs in an effort to improve the academic performance of low-achieving populations.

Table 1. Sample Demographics.

	n	*%*
Sex		
Male	355	53
Female	321	47
Ethnicity		
Advantaged	616	91
Disadvantaged	60	9
Education		
8th grade or less	4	1
Some high school	15	2
High school equivalency (GED)	11	2
High school graduate	70	10
Vocational, trade, business school	36	5
Some college	137	20
Associates degree	106	16
Bachelors degree	172	25
Post-grad degree	122	18
Other	3	0.44
Income		
Under $5,000	4	1
$5,001-$9,999	1	0.15
$10,000-$19,999	2	0.30
$20,000-$29,000	14	2
$30,000-$39,999	27	4
$40,000-$49,999	28	4
$50,000-$59,999	49	7
$60,000-$69,999	115	17
$70,000 or more	436	64
Total	676	

Table 2. Alpha Coeffecients for Each Latent Variable.

	Alpha
Ethnicity	0.88
Family SES	0.80
Prior Achievement	0.93
Engagement	0.51
Parent Involvement	0.31
Achievement Outcome	0.83

Table 3. Parent Involvement - Parent Report.

In the past 30 days, how often have you done the following things?					
		Mark only one answer for each item			
	Never	Once or Twice	Almost every month	Almost every week	More than once a week
You asked your child's teacher questions or made suggestions about your child	0	1	2	3	4
You called your child's teacher	0	1	2	3	4
You wrote your child's teacher a note or email	0	1	2	3	4
You were invited to attend a parent-teacher conference	0	1	2	3	4
You attended a parent-teacher conference	0	1	2	3	4

Table 4. Parent Involvement - Teacher Report.

In the past 30 days how often have this child's parents or guardians done the following actions?					
	Never	Once or twice	Almost every week	More than once a week	Cannot judge
Asked questions or made suggestions about this child	0	1	2	3	d
Called you on the phone	0	1	2	3	d
Written you a note or email	0	1	2	3	d
Been invited to attend a parent-teacher conference	0	1	2	3	d
Attended a parent-teacher conference	0	1	2	3	d

Table 5. Parent Involvement - Teacher Report General/Comparative.

How involved is this child's parent or guardian in his/her education and school life?
1. Not at all
2. A little
3. Somewhat
4. Involved
5. Very Involved
d. Cannot judge

Compared to the parents of other children in your class, how would you rate the encouragement to succeed academically that this child receives from his/her parents or guardians?
1. Very low
2. Somewhat low
3. About average
4. Somewhat high
5. Very high
d. Cannot judge

Table 6. Engagement Scale - Student Report.

Here are some statements about your school. For each one, tell us how much you agree or disagree with the statement. You should only mark one answer for each statement.

	Disagree A LOT	Disagree a little	Agree a little	Agree A LOT
I try hard to do well in school.	a	b	c	d
In class, I work as hard as I can.	a	b	c	d
I pay attention in class.	a	b	c	d
When I am in class, I listen very carefully.	a	b	c	d
When I am in class, I just pretend like I am working.	a	b	c	d
I don't try very hard at school.	a	b	c	d
When I'm in class, I think about other things.	a	b	c	d
When I'm in class, my mind wanders.	a	b	c	d

Excluded Items.

When I'm in class, I join in on class discussion.

In class, I only work as much as I have to so I don't get in trouble.

Table 7. Engagement Scale - Teacher Report.

These items require your judgments of this child's academic performance in your classroom compared with grade level standards. Please indicate the child's actual performance or ability not their potential.

Compared to the average 3rd grade child, this child's overall motivation to succeed academically is:

1. Extremely Low
2. Low
3. Average
4. High
5. Extremely High

Table 8. Correlation Matrix of Measured Variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1	-	.13	.11	.06	-.04	.06	-.07	.07	.10	.07	.09	-.13
2	-.01	-	.92**	.75**	.07	.44**	.05	.11	.13	.19*	.13	.08
3	.02	.82**	-	.81**	.09	.48**	.09	.16	.18*	.21*	.18*	.07
4	-.05	.67**	.64**	-	.18*	.62**	.16	.25**	.25**	.25**	.25**	-.02
5	-.14**	.15**	.13**	.16**	-	.38**	.85**	.21*	.20*	.24**	.19*	-.01
6	-.02	.35**	.34**	.36**	.40**	-	.41**	.39**	.42**	.42**	.36**	-.09
7	-.13**	.19**	.16**	.19**	.84**	.42**	-	.26**	.28**	.31**	.25**	.08
8	-0.02	.05	.02	.06	.23**	.15**	.22**	-	.85**	.82**	.81**	-.10
9	.01	.06	.01	.06	.24**	.15**	.24**	.79**	-	.89**	.88**	-.10
10	.00	.09*	.03	.07	.25**	.18**	.25**	.74**	.83**	-	.90**	-.09
11	.02	.08*	.02	.07	.20**	.14**	.19**	.69**	.78**	.85**	-	-.09
12	-.06	-.15**	-.17**	-.15**	-.01	-.07	-.03	-.16**	-.20**	-.20**	-.18**	-
13	-.06	.03	.04	.04	.06	.04	.08*	-.12**	-.16**	-.12**	-.15**	.41**
14	-.01	.10**	.10**	.13**	.32**	.22**	.34**	.24**	.23**	.26**	.24**	-.00
15	.16**	.10**	.08*	.11**	.24**	.24**	.23**	.39**	.41**	.41**	.39**	-.30**
16	.07	.10*	.07	.11**	.04	.09*	.08*	.13**	.15**	.15**	.14**	-.21**
17	.09*	.16**	.12**	.18**	-.00	.12**	.04	.11**	.12**	.12**	.12**	-.22**
18	.09*	.07	.01	.10**	.30**	.20**	.29**	.56**	.59**	.61**	.58**	-.25**
19	.09*	.17**	.12**	.23**	.34**	.27**	.35**	.47**	.46**	.48**	.45**	-.20**
20	-.03	.15**	.11**	.21**	.32**	.24**	.32**	.47**	.45**	.50**	.46**	-.23**

Note. EM analysis correlations listed below the diagonal, listwise deletion analysis correlations listed above the diagonal. See table key below.

$*p < .05$. $** p < .01$.

Table 8. Correlation Matrix of Measured Variables – continued.

	13	14	15	16	17	18	19	20
1	-.22*	.23*	.28**	.09	.15	.24**	.12	.01
2	.08	.01	.11	-.02	.17	.10	.12	.07
3	.06	.03	.19*	.01	.17	.14	.15	.15
4	-.02	.03	.23**	.07	.26**	.26**	.28**	.23**
5	.01	.26**	.21*	.20*	.12	.22*	.38**	.32**
6	-.06	.17	.41**	.26**	.24**	.42**	.37**	.40**
7	.06	.31**	.21*	.17	.08	.27**	.42**	.38**
8	-.18*	.24**	.43**	.23**	.23**	.57**	.56**	.60**
9	-.18*	.22*	.49**	.25**	.23**	.63**	.59**	.58**
10	-.16	.22*	.47**	.26**	.21*	.63**	.60**	.58**
11	-.19*	.21*	.48**	.27**	.20*	.61**	.62**	.56**
12	.62**	.13	-.22*	-.27**	-.27**	-.20*	.01	-.20*
13	-	.31**	-.19*	-.22*	-.21*	-.20*	-.14	-.15
14	.22**	-	.44**	.23**	.10	.45**	.18*	.20*
15	-.12**	.50**	-	.41**	.29**	.65**	.42**	.48**
16	-.10**	.11**	.24**	-	.69**	.42**	.24**	.22*
17	-.13**	.07	.20**	.71**	-	.33**	.17	.14
18	-.15**	.43**	.60**	.23**	.17**	-	.61**	.58**
19	-.11**	.31**	.49**	.13**	.11**	.61**	-	.67**
20	-.11**	.32**	.51**	.15**	.13**	.60**	.69**	-

Note. EM analysis correlations listed below the diagonal, listwise deletion analysis correlations listed above the diagonal. See corresponding variable key.

*p < .05. **p < .01.

Table 8. Correlation Matrix of Measured Variables – continued.

Variable Key
1. Sex
2. Parent Ethnicity, Parent Report
3. Student Ethnicity , Parent Report
4. Student Ethnicity, School Report
5. Education Level of Caregiver
6. Household Income
7. Education Level Household Member
8. Quarter 1 Grades, 2004
9. Quarter 2 Grades, 2004
10. Quarter 3 Grades, 2004
11. Quarter 4 Grades, 2004
12. Parent Involvement - Parent Report
13. Parent Involvement - Teacher Report
14. Parent Involvement - Teacher Repot General/Comparative
15. Engagement - Teacher Report
16. Engagement - Student Report Cluster 1
17. Engagement - Student Report Cluster 2
18. Quarter 4 Grades, 2005
19. Reading Achievement Score
20. Math Achievement Score

Table 9. Model Fit Indices.

Model	χ^2	df	χ2:df	p	NNFI[a]	CFI[b]
EM Data						
CFA[c] Exogeneous Variables	174.90	38.00	4.60	<.001	0.96	0.97
(i.e. sex, ethnicity, SES, prior achievement)						
CFA Parent Involvement	7.93	1.00	7.93	<.005	0.86	0.95
CFA Engagement	0.80	1.00	0.80	0.37	1.00	1.00
CFA Academic Achievement	75.48	1.00	75.48	<.001	0.71	0.90
(i.e. outcome varable)						
Initial STR[d]	1252.17	165.00	7.59	<.001	0.83	0.85
Final STR	1150.94	165.00	6.98	<.001	0.85	0.87

Note. [a]NNFI = non-normed fit index. [b]CFI = comparative fit index. [c]CFA = confirmatory factor analysis. [d]STR = structural model.

Table 10. Decomposition of Effects in an Ordinary Least Squares Model for Reading Achievement Outcome

Predictors	r	Total Effect	Direct Effect
Sex	.09*	.10**	0.04
Ethnicity	.24**	0.07	0.08
Family Education	.35**	.18**	.18**
Household Income	.28**	0.03	0.01
Prior Achievement	.64**	.56**	.46**
Parent Involvement - Teacher Report	.31**	0.03	-0.05
Parent Involvement - Parent Report	.24**	0.07	0.06
Engagement - Student Report	.13**	-0.03	-0.03
Engagement - Teacher Report	.51**	.20**	.20**

Note. *p < .05. **p < .01.

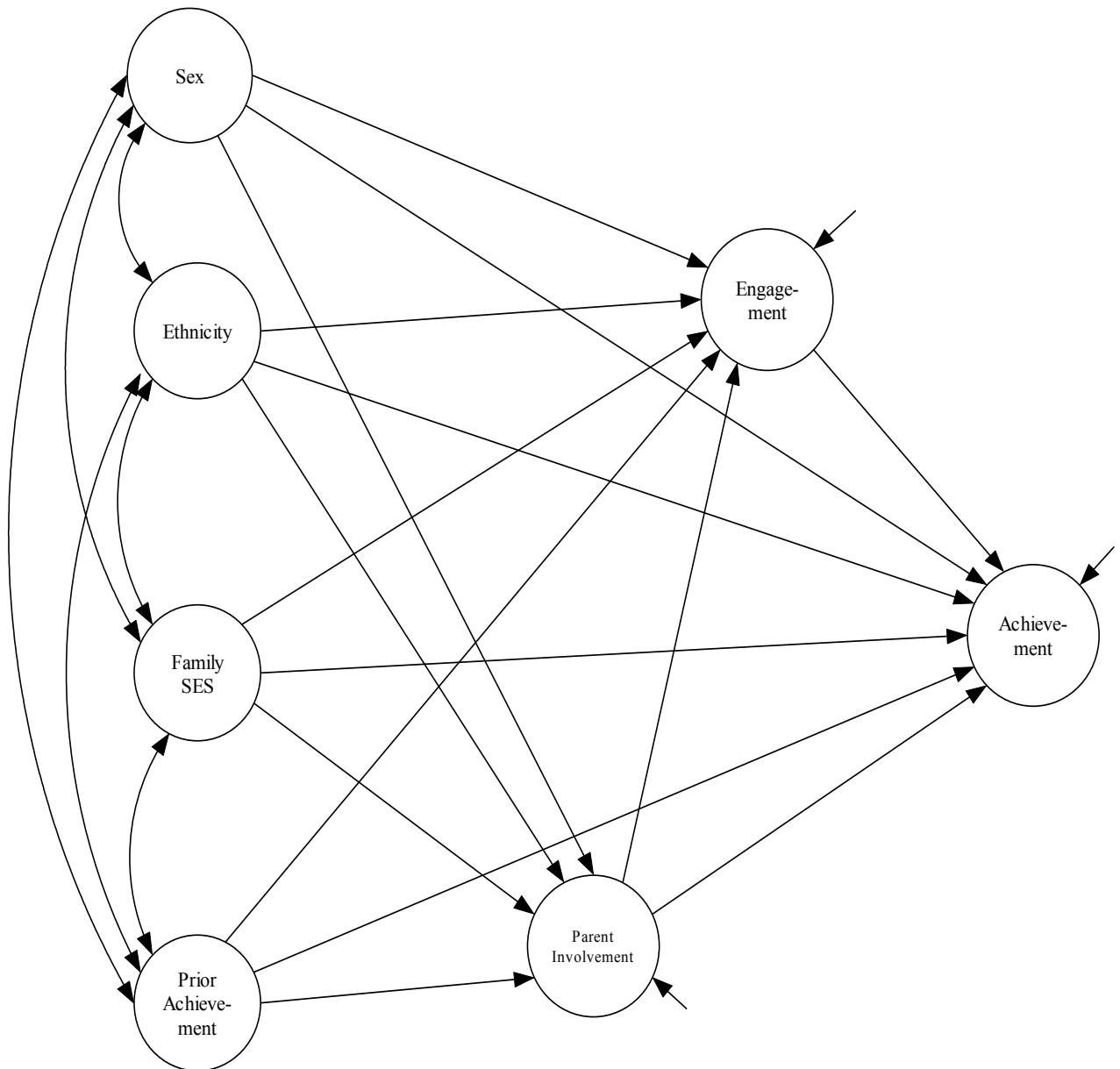*Figure 1. Exploratory Causal Model.*

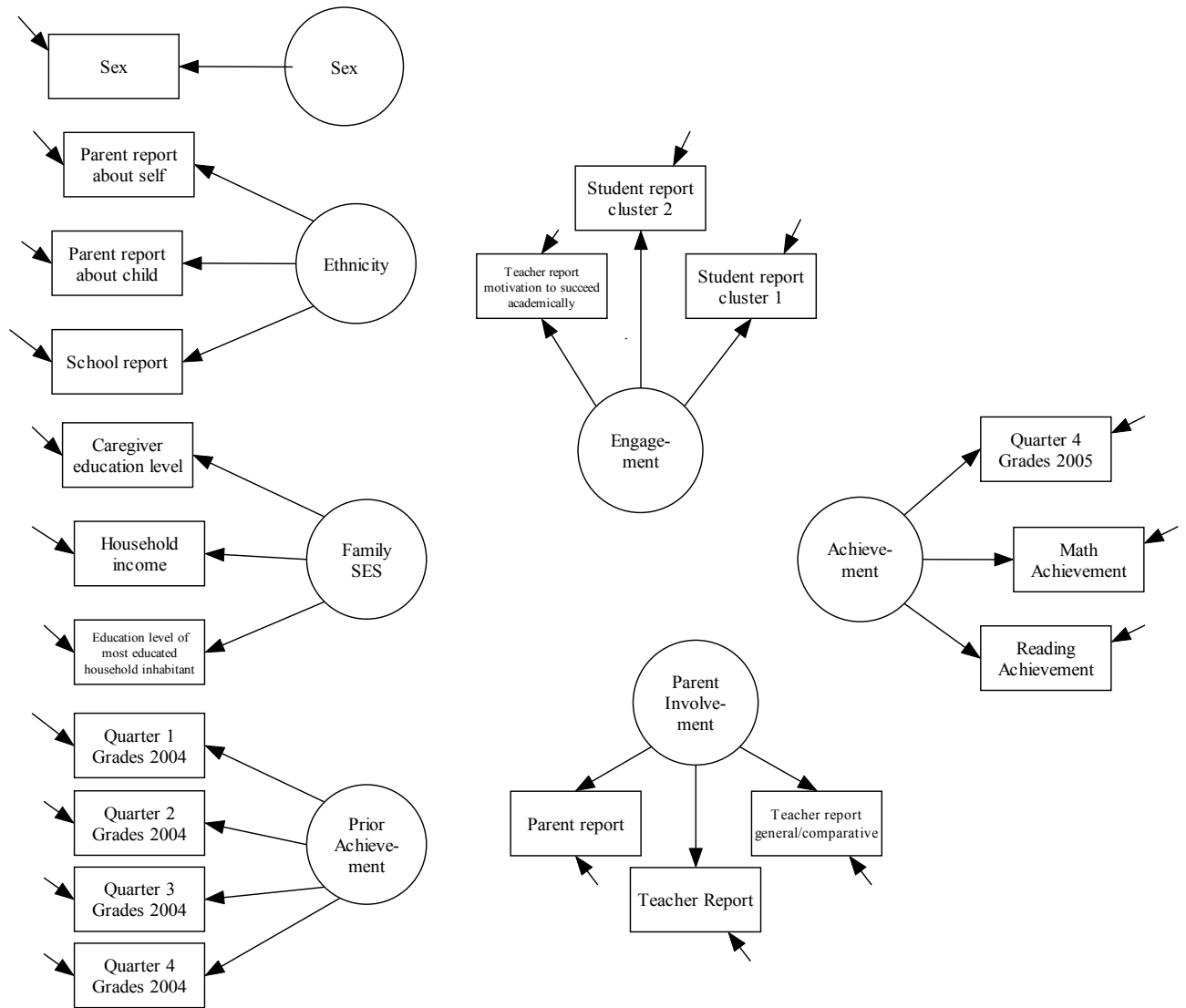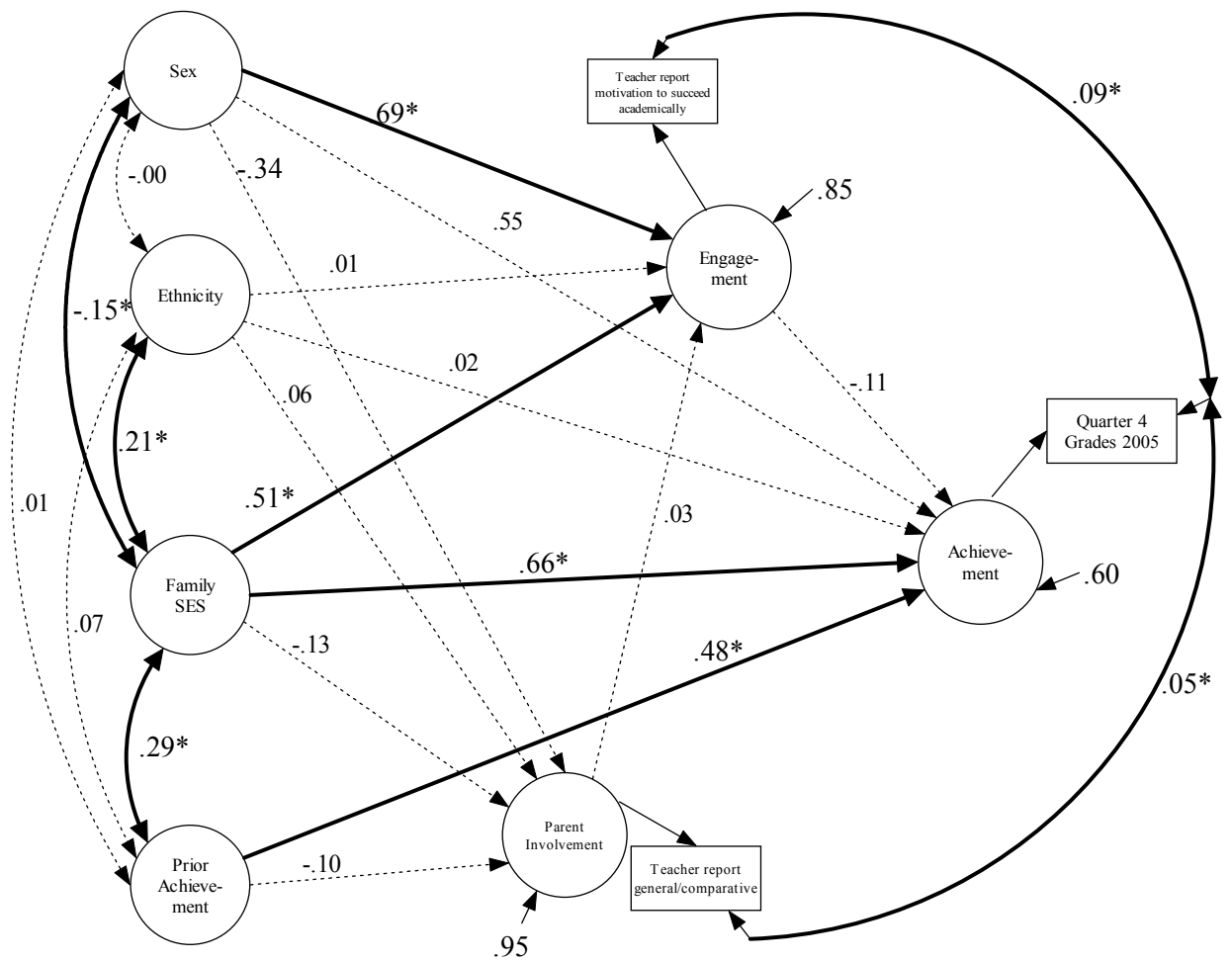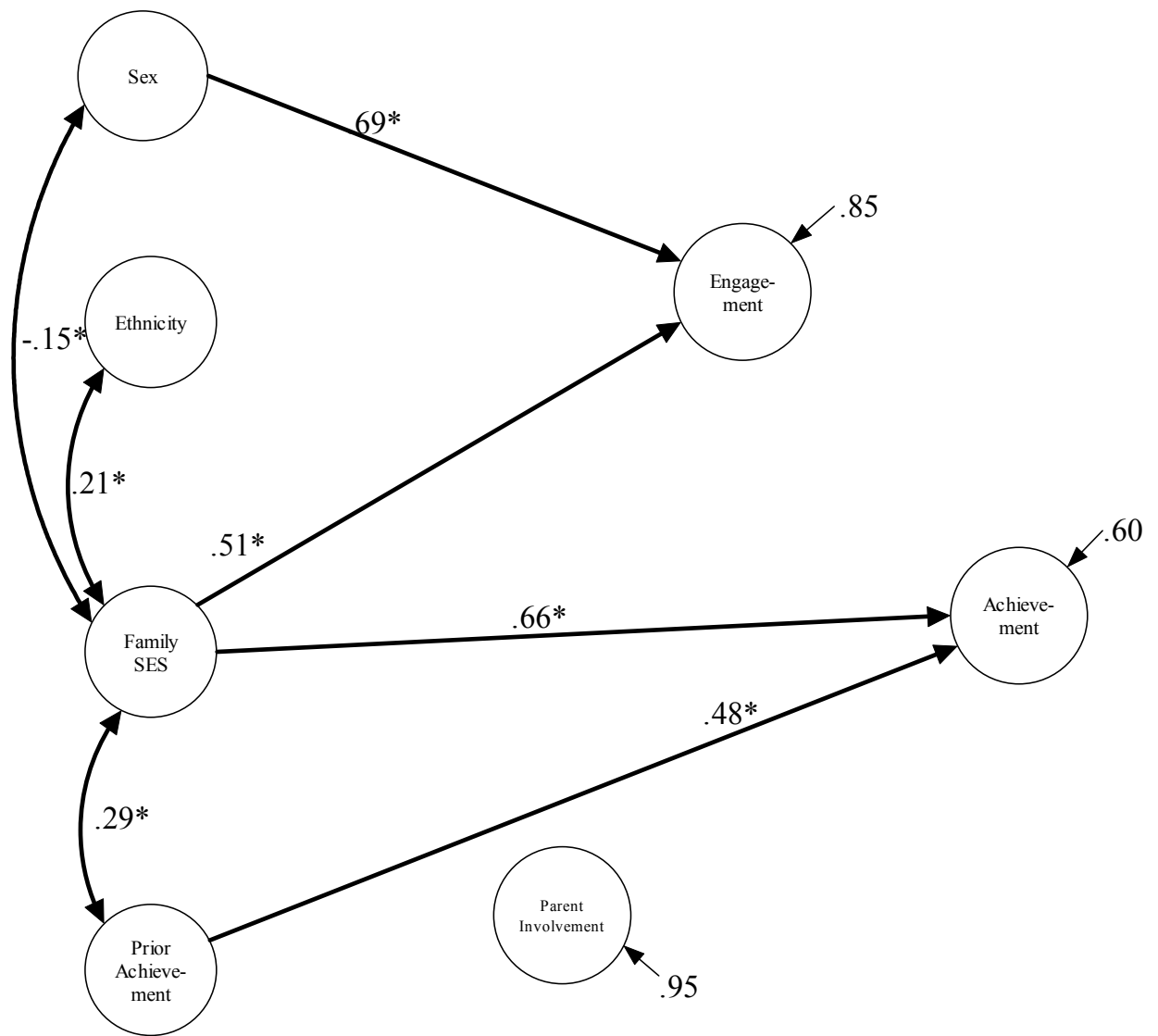*Figure 2. Explicit Measurement Model.*

Figure 3. Structural Model with All Path Coefficients.

Note. *p < .05

Figure 4. Structural Model with Significant Path Coefficients.

Note. *p < .05

Appendix

Descriptive Statistics

Measure	EM Imputation N = 676		Listwise Deletion N = 130	
	Mean	Standard Deviation	Mean	Standard Deviation
1. Sex	1.47	0.50	1.42	0.50
Males (1), Females (2)				
2. Parent Ethnicity, Parent Report	0.93	0.24	0.95	0.23
Disadvantaged (0), Advantaged (1)				
3. Student Ethnicity , Parent Report	0.92	0.25	0.95	0.21
Disadvantaged (0), Advantaged (1)				
4. Student Ethnicity, School Report	0.91	0.28	0.97	0.17
Disadvantaged (0), Advantaged (1)				
5. Education Level of Caregiver	6.86	1.77	7.33	1.59
8th grade or less (1) to Post-graduate education or degree (9)				
6. Household Income	8.27	1.37	8.46	1.35
Under $5,000 (1) to $70,000 or more (9)				
7. Education Level Household Member	7.40	1.60	7.74	1.35
8th grade or less (1) to Post-graduate education or degree (9)				
8. Quarter 1 Grades, 2004	1.44	0.27	1.50	0.40
Demonstrates Proficiency (2) to Needs Improvement (0)				
9. Quarter 2 Grades, 2004	1.46	0.26	1.53	0.38
Demonstrates Proficiency (2) to Needs Improvement (0)				

10. Quarter 3 Grades, 2004	1.50	0.26	1.58	0.37
Demonstrates Proficiency (2) to Needs Improvement (0)				
11. Quarter 4 Grades, 2004	1.53	0.25	1.60	0.37
Demonstrates Proficiency (2) to Needs Improvement (0)				
12. Parent Involvement - Parent Report	0.55	0.37	0.60	0.41
Never (0) to More than once a week (4)				
13. Parent Involvement - Teacher Report	0.41	0.37	0.46	0.42
Never (0) to More than once a week (4)				
14. Parent Involvement - Teacher Repot General Comparative	4.05	0.80	4.14	0.83
Not at all (1) to Very Involved (5)				
15. Engagement - Teacher Report	3.48	0.82	3.42	0.90
Extremely Low (1) to Extremely High (5)				
16. Engagement - Student Report Cluster 1	3.70	0.39	3.35	0.42
Disagree a lot (0) to Agree a lot (4)				
17. Engagement - Student Report Cluster 2	3.72	0.39	3.34	0.45
Disagree a lot (0) to Agree a lot (4)				
18. Quarter 4 Grades, 2005	3.08	0.50	3.04	0.58
F (0) to A (5)				
19. Reading Achievement Score	4.47	0.39	4.52	0.36
Range (2.40 to 5.95)				
20. Math Achievement Score	4.44	0.44	4.46	0.40
Range (3.10 to 5.63)				

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