

**A CONCEPTUAL MODEL OF THE MECHANISMS BY WHICH  
EGO RESILIENCY IMPACTS ACADEMIC ENGAGEMENT  
AND ACHIEVEMENT: SOCIAL RELATEDNESS AS A MEDIATOR**

A Dissertation

by

LINDA LOYD DREKE

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2009

Major Subject: School Psychology

**A CONCEPTUAL MODEL OF THE MECHANISMS BY WHICH  
EGO RESILIENCY IMPACTS ACADEMIC ENGAGEMENT  
AND ACHIEVEMENT: SOCIAL RELATEDNESS AS A MEDIATOR**

A Dissertation

by

LINDA LOYD DREKE

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Approved by:

Chair of Committee,	Jan Hughes
Committee Members,	Robert Heffer
	Amanda Jensen-Doss
	Oi-Man Kwok
Head of Department,	Victor Willson

December 2009

Major Subject: School Psychology

**ABSTRACT**

A Conceptual Model of the Mechanisms by which Ego Resiliency Impacts Academic Engagement and Achievement: Social Relatedness as a Mediator.

(December 2009)

Linda Loyd Dreke, B.A., Princeton University

Chair of Advisory Committee: Dr. Jan N. Hughes

The current study tested the effect of ego resilience on engagement and achievement as mediated by social relatedness, using three waves of data and controlling for the stability of each construct as well as within wave correlations among study variables. Using structural equation modeling, we were able to control for the stability of each construct as well as the within wave correlations of residual error variances between constructs. The model also took into account the transactional properties of academic engagement and academic achievement. Furthermore, the study tested the moderation effects of gender on each theoretically-significant path.

Despite the models having adequate fit indices, in the larger context of the model the hypothesis that ego resiliency predicts subsequent social relatedness was not supported in either reading or math revised models. Because of this, the overall study hypothesis that social relatedness would mediate the relationship between ego resiliency and subsequent academic engagement and achievement was not supported. However, there were several findings of interest. The results of this study were consistent with the

reasoning that social relatedness helps children feel more accepted and supported by peers and teachers, therefore promoting more classroom engagement. Findings suggested that, while social interactions seem to impact students' academic engagement across in the subsequent year, their level of ego resilience at school entry appears to be an important long-term contributor to math achievement two years later. The moderation analyses indicated that ego resilience had more effect on boys' reading achievement and academic engagement two years later. Study limitations and implications were also discussed.

## TABLE OF CONTENTS

	Page
ABSTRACT .....	iii
TABLE OF CONTENTS .....	v
LIST OF FIGURES .....	vii
LIST OF TABLES .....	viii
INTRODUCTION AND LITERATURE REVIEW .....	1
Resilience .....	3
The Construct: ‘Ego Resiliency’ .....	4
Developmental Considerations .....	5
Definitional Distinctions between Ego Control and Ego Resilience .....	6
Ego Resiliency and Academic Achievement/Academic Engagement .....	7
Mechanisms Responsible for the Effect of Ego Resilience on Achievement .....	8
Ego Resiliency and Social Relatedness .....	8
Social Relatedness and Academic Achievement/Engagement .....	9
Conceptual Model and Study Hypotheses .....	12
Limitations in the Extant Literature .....	17
METHODS .....	18
Participants .....	18
Design Overview .....	19
Measures .....	20
Ego Resiliency .....	20
Social Relatedness .....	21
Peer Liking and Social Preference .....	21
Teacher Warmth .....	22
Academic Achievement .....	23
Academic Engagement .....	24
RESULTS .....	25
Sample Descriptive Statistics and Intercorrelations .....	25
Measurement Model for Social Relatedness .....	28

	Page
Confirmatory Factor Analysis.....	28
Measurement Model Invariance.....	28
Structural Model.....	30
Math Achievement.....	34
Reading Achievement.....	34
Model Revisions.....	38
Revised Math Model.....	38
Revised Reading Model.....	41
Gender Analyses.....	43
CONCLUSIONS.....	45
Noteworthy Findings.....	46
Study Limitations.....	48
Implications.....	50
REFERENCES.....	52
VITA.....	61

**LIST OF FIGURES**

FIGURE		Page
1	Hypothesized Conceptual Model .....	13
2	Measurement Model.....	29
3	Mediational Model of Math Achievement.....	32
4	Mediational Model of Reading Achievement.....	36
5	Revised Model of Math Achievement .....	39
6	Revised Model of Reading Achievement .....	42

## LIST OF TABLES

TABLE	Page
1	Intercorrelations and Descriptive Statistics for Continuous Analysis Variables ..... 26
2	Sample Normality Statistics ..... 27
3	Full Scale IQ Path Coefficients: Math Mediational Model ..... 31
4	Parameter Estimates of Covariances of Correlated Residuals on the Model Presented in Figure 3: Math Mediational Model ..... 33
5	Parameter Estimates of Covariances of Correlated Residuals on the Model Presented in Figure 4: Reading Mediational Model ..... 35
6	Full Scale IQ Path Coefficients: Reading Mediational Model ..... 37
7	Parameter Estimates of Covariances of Correlated Residuals on the Model Presented in Figure 5: Math Revised Model ..... 40
8	Full Scale IQ Path Coefficients: Math Revised Model ..... 40
9	Parameter Estimates of Covariances of Correlated Residuals on the Model Presented in Figure 6: Reading Revised Model ..... 41
10	Full Scale IQ Path Coefficients: Reading Revised Model ..... 43



## INTRODUCTION AND LITERATURE REVIEW

Children enter school with a wide variety of temperamental, emotional, behavioral, personality, and academic readiness characteristics. These initial differences can help or hinder students' likelihood of successfully adapting to the novel school environment. Two of the most obvious indicators of school success are students' academic engagement and achievement. Further understanding about factors that promote students' engagement and achievement in the early elementary grades are warranted so that we are better able to promote long-lasting positive patterns of motivation, engagement, and social relatedness (Hamre & Pianta, 2001; Ladd, Birch, & Buhs, 1999).

Most students maintain fairly constant standing compared to their classmates from third grade onward; thus low achievement in the early grades greatly compromises the potential for later academic success (Alexander, Entweisel, & Horsey, 1997). The lack of mobility in relative academic performance suggests an intense need for capitalizing on and enhancing students' positive attributes (e.g. resilience, creativity, desire for exploration) early on in their school careers, thus promoting their chances for success.

Researchers concerned with promoting students' early school success often adopt a transactional perspective on children's development. Increasing research suggests that developmental processes are transactional; children's school entry characteristics (e.g.

---

This dissertation follows the style of *School Psychology Review*.

temperament and self-regulation) affect outcomes in unfolding processes such that initial differences in skills are maximized over time (Bronfenbrenner, 1979; Dodge & Pettit, 2003; Hughes, Gleason, & Zhang, 2005; Sameroff, 1975). For example, students who are lacking in self-regulation skills at school entrance may have difficulty adjusting to the structure of the classroom, and therefore may have more negative interactions with the teacher than does the student with advanced self-regulatory skills. In turn, these negative interactions provide feedback for the student that she is not as competent at school, and may impact the level of motivation she exudes towards schoolwork.

Relatively small disadvantages initially in the academic realm (such as entering with less self-regulation, as in the previous example) can become exponentially greater as those students who are struggling early in school continuously fail to improve while those who are engaged and excelling in school are on an upward trajectory. In this way, children shape their own environments, which, in turn, shape the child. Transactional, dynamic interactions and influences can discretely influence a student's likelihood of excelling in school (Bronfenbrenner, 1979; Sameroff, 1975).

Among the within-child characteristics that children bring to the school setting, the focus for decades has been on distal or demographic variables (e.g. ethnicity, socioeconomic levels, parental educational levels), and on behavioral and academic factors such as externalizing behaviors, self-regulatory skills, and lack of academic readiness. However, in recent years researchers have begun to focus more on children's positive characteristics and how those attributes help individuals adapt to and flourish in spite of challenging circumstances and risk factors (Seligman & Csikszentmihalyi,

2000). These positive characteristics provide insight into individual differences in children's academic achievement and behavioral, emotional, and social development and adjustment. Despite the increased attention on these attributes, there are few longitudinal studies examining how these positive characteristics in children might enhance their ability to succeed academically.

### ***Resilience***

Researchers for several decades have used varied definitions of *resiliency* or *resilience* (for review, see Luther, Cicchetti, & Becker, 2000), but arguably one of the most common definitions of the construct of resilience is a “class of phenomena characterized by good outcomes in spite of serious threats to adaptation or development” (Masten, 2001, p. 228). Studies in resilience have tended to focus on how people thrive despite substantial risk factors and adversity. The term resilience, for example, has been used in reference to stress-resistant children as “a descriptive label that they apply to individuals who appear to function surprisingly well under environmental conditions judged to be adverse and stressful” (Klohn, 1996, p. 1068). In related research Garnezy, Masten, and Tellegen (1984) view resilience as a child being able to avoid psychopathology despite risk factors or stressors that might predispose him/her to be more susceptible. Though the construct of resiliency has been defined and measured in a variety of ways, resiliency research has enabled greater understanding of the processes by which at-risk individuals positively adapt to life stressors (Luthar, Cicchetti, & Becker, 2000).

### ***The Construct: 'Ego Resiliency'***

The current study considers the construct of *ego*-resiliency (ER), a within-child characteristic stemming from temperamental and personality attributes which contribute to individuals' responses to environmental and personal stressors (Block & Block, 1980). Ego resilience has been defined as “resourceful adaptation to changing circumstances and environmental contingencies, analysis of the ‘goodness of fit’ between situational demands and behavioral possibility, and flexible invocation of the available repertoire of problem-solving strategies” (Block & Block, 1980, p. 48).

Ego resiliency can be conceptualized as a continuum in which individuals who demonstrate high ego resilience are likely to bounce back easily and persevere in spite of new and challenging situations (Block & Block, 1980; Cumberland-Li, Eisenberg, & Reiser, 2004); this resiliency is both socially and psychologically beneficial (Block & Kremen, 1996; Klohnen, 1996). Ego resilient individuals have “a sense of active and meaningful engagement with the world” (Klohnen, 1996, p. 1075). At the other end of the ego resilience continuum are those who demonstrate a rigid or inflexible approach to dealing with day-to-day stressors and are sometimes referred to as being more ‘ego-brittle’ (Block & Block, 1980). Individuals who exhibit more ego-brittleness may also require more time to ‘bounce back’ or longer recuperation time after dealing with stressors. Ego brittleness lends itself to a “less differentiated behavioral repertoire” from which to glean solutions to problems or find resources for support (Block & Kremen, 1996). At this end of the continuum, there may be a tendency to perseverate on problems such that finding, planning, and executing a plausible solution or coping

strategy is stifled. In this study, ego resilience was measured by teachers' ratings and are therefore likely based on perceptions of students' reactions to day-to-day setbacks in the school setting (i.e., receiving a poor grade, being reprimanded by the teacher, or having to adapt to a last-minute scheduling change) as opposed to a major life stressor or singular event as is often the case in research on resiliency without the *ego* prefix.

### *Developmental Considerations*

When considering within-child factors such as ER that contribute to academic outcomes, it is important to discuss how these factors develop and change over time. From infancy, children's temperaments begin to emerge, and those temperamental characteristics are largely believed to have a biological basis (for review, see Thompson & Goodvin, 2005). Differences in whether a child is easy to soothe, difficult, happy, or fussy, may foreshadow broader personality characteristics.

Temperament is believed to be rooted in biological systems, but some theorize that those biological attributes change based on interactions individuals have with their environment (Rothbart & Ahadi, 1994). These temperamental variables "provide the within-the-person substrate from which personality develops" (Rothbart & Ahadi, 1994, p. 56). Throughout development, these attributes remain somewhat stable but do continue to evolve slightly as children develop more sophisticated cognitive skills and experience their environments.

It is expected that within-child characteristics have a substantial impact on a students' interactions with their environment. Consistent with the "broaden and build" theory, it is likely that early adaptive skills and coping strategies contribute to a prosocial

and inquisitive approach to their surroundings (Fredrickson & Losada, 2005). As was previously discussed, the transactional nature of the environment impacts both how a child responds to her environment and how the environment responds to her. As children become exposed to the school setting, their responses to setbacks impact how they interact with peers and teachers, and enhance children's inherent ability to adapt to the school environment (Bronfenbrenner, 1979; Sameroff, 1975).

The longitudinal nature of this study seeks to address how a within-child factor (ER) relates to children's environment, subsequent level of engagement, and success in that environment. It is expected that ego resilience will remain fairly constant throughout the three time periods in this study. It will be important to consider both the direct and indirect effects of ER on future achievement and engagement.

#### *Definitional Distinctions between Ego Control and Ego Resilience*

To further understand ego resilience, it is important to consider a related yet independent construct: ego control. Block and Block (1980) proposed the ego control/ego resiliency model in which ego control is an individual's level of inhibition and behavioral control. Having less ego control, or being ego *under*controlled, for example, has been associated with negative outcomes such as externalizing behaviors (Huey & Weisz, 1997). The terms ego resilience and ego control are inseparable conceptually; as Block and Kremen (1996) explain, "the dynamic and resourceful regulation and equilibration of impulses and inhibitions...it is this modulation of ego-control that we more formally mean by the construct of ego-resiliency" (p. 351). In

other words, ego resilience is the tendency to be adaptable and exhibit self-regulation (either up-regulation or down-regulation) as environmental situations dictate.

### ***Ego Resiliency and Academic Achievement/Academic Engagement***

In the academic setting, it is reasonable to hypothesize that ego resiliency would have important implications including (but not limited to) the following: coping with academic challenges, transitioning into the school setting and to new classrooms/teachers each school year, controlling impulses to act inappropriately, and exhibiting emotional stability in light of peer rejection or conflict. A child with high ego resilience would likely be able to bounce back after an academic challenge or failure, which, in theory, would maintain or improve her self-concept and self-efficacy, while reducing the occurrence of learned helplessness.

Some correlational studies have linked positive personality characteristics with academic achievement (Digman, 1989; Wentzel, 1991). These studies are limited in that they did not analyze long-term relationships between the study variables. Another small number of studies have addressed the cross-sectional and across-year relationship between ego resilience and academic achievement, but are limited in that they did not control for variables such as cognitive ability or externalizing problems, two variables which are closely linked with academic achievement (Digman, 1989; John, Caspi, Robins, & Moffitt, 1994). By not controlling for these variables, these findings may have been due to an unmeasured third variable that cause changes independently in the variables of interest.

In a sample that overlaps with the current study, Kwok, Hughes, and Luo (2007) were the first to demonstrate the unique contribution of a positive characteristic (resilient personality) to subsequent academic achievement, controlling for prior achievement levels, cognitive ability, externalizing problems, and socioeconomic status. In their study, resilient personality assessed in first grade uniquely predicted reading & math one year later. Further work is needed to clarify the long-term relationship between ego resilience and academic achievement and to test for possible mechanisms by which ER may affect engagement and achievement.

### ***Mechanisms Responsible for the Effect of Ego Resilience on Achievement***

The level of student's engagement is likely one mechanism that mediates the relationship between ego resilience and academic achievement. School engagement is conceptualized as students' levels of motivation, participation, and interest in learning, which is directly linked to academic achievement (Furrer & Skinner, 2003; Skinner & Belmont, 1993). Some researchers have posited that ego resilience is associated with academic achievement because of resiliency's impact on social relatedness in school (Kwok et al., 2007). To date, however, no published longitudinal studies have tested whether social relatedness or academic engagement mediate the effect of ego resilience on achievement. Next we review conceptual and empirical support for an effect of ego resilience on both academic engagement and achievement via its effect on classroom social relationships.

***Ego resiliency and social relatedness.*** With regards to social development, some researchers have found that ego resilience is related to competence with peers,



development of moral judgment, and development of friendship-making qualities (Hart, Keller, Edelstein, & Hofmann, 1998). Children and adults with high ego resilience tend to exhibit superior social skills and increased popularity with peers compared to individuals characterized by low ego resilience (Block & Block, 1980). An ego resilient individual may be less likely to respond impulsively to social provocations or disappointments. Conceptually, individuals with high ego resilience have good self-regulation, control over their impulses, are flexible and compromising in challenging social situations, and are able to problem-solve both in cognitive and social realms.

Furthermore, some evidence suggests that certain children may be better equipped to accrue social resources when needed to help them manage difficult situations—this social accrual of resources is known as support-seeking and support-attracting (Milgram, 1989). As part of their adaptive, flexible repertoire of coping responses, children with higher levels of ego resilience may be better at recognizing when they need to seek out peers, teachers, parents, or other adults to assist them in a difficult situation.

***Social relatedness and academic achievement/engagement.*** The term ‘social relatedness’ is used here to define a variety of social resources, such as students’ relationships with teachers and peers. Extensive research has found teacher and peer relationships to be positively and significantly correlated. For example, teacher-student relationship and peer acceptance were correlated 0.44 in a sample of kindergarten students (Ladd, Birch, & Buhs, 1999). Furrer and Skinner (2003) found the correlation between child-perceived teacher and peer relatedness to be 0.42 in a study of students in grades 3-6. In high school students, teacher and peer relationships were shown to have

additive effects on student engagement, and were correlated 0.31 (Zimmer-Gembeck et al., 2006). Those relationships contribute to emotional and behavioral engagement (Furrer & Skinner, 2003; Goodenough, 1993; Zimmer-Gembeck, et al., 2006) and class participation (Ladd et al, 1999).

Empirical evidence suggests that teacher-student relationships impact a number of positive outcomes, including academic motivation (Connell & Wellborn, 1991), level of classroom engagement (Hughes, Luo, Kwok, & Loyd, 2008), attitude toward school, and social competence (Meehan, Hughes, & Cavell, 2003; Pallas, Entwisle, Alexander, & Cadigan, 1987). Students who have a supportive relationship with their teachers and peers tend to experience a sense of school belonging, enjoy school, and exhibit more academic engagement in the classroom (Connell & Wellborn, 1991; Furrer & Skinner, 2003; Hughes & Kwok, 2007). Recent research also found that social competence and teacher-student relationship quality contribute to grades (Valiente, Lemery-Chalfant, Swanson, & Reiser, 2008). Particularly in early elementary grades, an accepting, supportive relationship with a teacher is likely to provide a sense of security and self-efficacy as students react to new and unfamiliar academic and peer situations (Little & Kobak, 2003). Longitudinal studies suggest that social relatedness in early grades is particularly important in that it establishes a precedent for students' levels of academic engagement that can affect long-term academic achievement (Hamre & Pianta, 2001).

Previous research also supports the notion that peer-relationships impact academic outcomes. For example, Flook, Repetti, and Ullman (2005), conducted a two-year longitudinal study in which peer acceptance predicted academic self-concept and

subsequent academic performance. Diehl et al. (1998) demonstrated that peer acceptance, friendship, and social status affected students' attitudes toward school and their academic achievement. Other researchers have found that students' peer relationships (e.g., peer acceptance, friendships, and peer victimization) predicted academic readiness and levels of school satisfaction (Ladd, Kochenderfer, & Coleman, 1997). In middle school, peer acceptance has been shown to predict increased participation in class discussions, above teacher-student relationship (Ostermann, 2000). Furthermore, peer rejection and negative peer relationships have been shown to adversely impact class participation, school adjustment (Buhs, 2005), academic engagement, achievement (Buhs, Ladd, & Herald, 2006), and perceived academic competence (Guay, Boivin, & Hodges, 1999).

Social resources on which children rely to cope with challenges may provide a sense of security, support, and acceptance that benefits them in the classroom. Ladd et al. (1999) found that behaviors children used to deal with school setbacks were a strong predictor of subsequent relationships with peers and teachers. Students with a prosocial style of interacting tended to have more friends and support from teachers.

Their study also found that students who were well-liked were more active class participants. Clearly, the ability to relate socially to others and accrue social resources can be a vitally important component of school success.

### ***Conceptual Model and Study Hypotheses***

The purpose of this longitudinal study is to test a theoretical model that posits that ego resilience directly and indirectly influences subsequent academic engagement and achievement. The conceptual model (see Figure 1) posits that indirect influences of ego resilience on engagement and achievement are mediated by social relatedness, a latent construct comprised of peer liking and teacher-rated warmth towards the students. The current study will test the effect of ego resilience on engagement and achievement as mediated by social relatedness, using three waves of data and controlling for the stability of each construct as well as within wave correlations among study variables; this methodology is based on recommendations by Cole and Maxwell (2003) to study mediation. In this model, we are able to control for the stability of each construct as well as the within wave correlations of residual error variances between constructs. Four constructs are measured across three time periods. The model also takes into account the transactional properties of academic engagement and academic achievement.

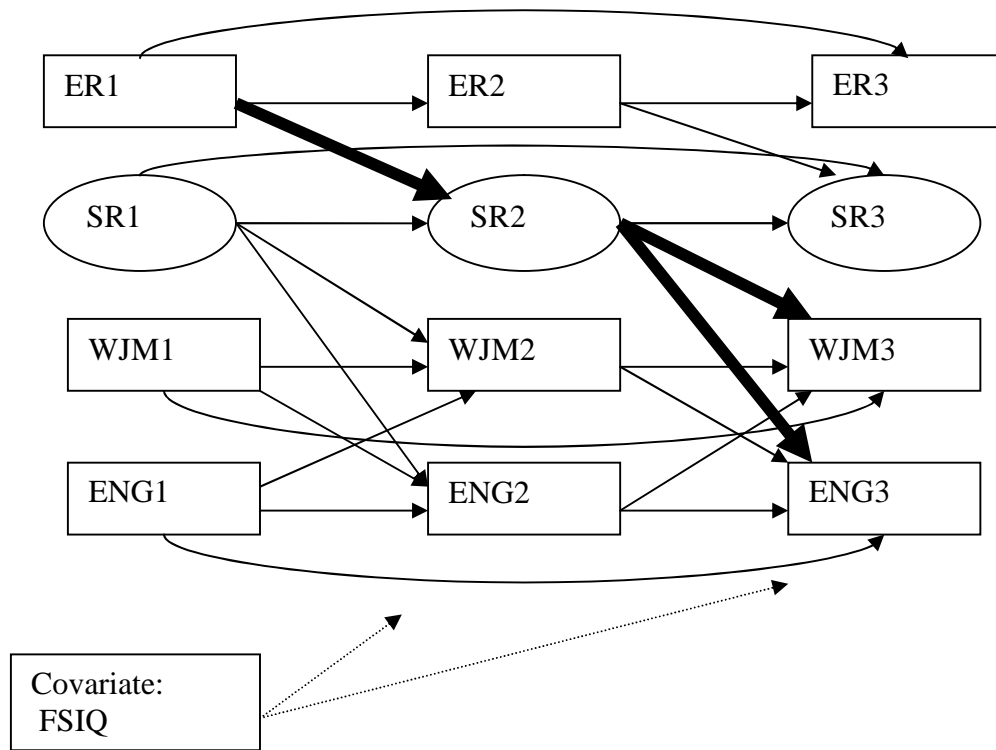


Figure 1. Hypothesized conceptual model. The targeted hypothesized paths are bolded. ER=Ego Resiliency, SR=Social Relatedness, WJM=Woodcock-Johnson-III Math Achievement W-scores (reading scores were tested separately), ENG=Teacher-rated engagement, FSIQ=Full Scale IQ. The numeral after each variable name denotes the time period at which the variable was measured (e.g., time 1, 2, or 3). Indicators for latent variable Social Relatedness (SR) at each time period are not pictured in the model, but include: Peer-rated preference scores; Mean Peer rating scores; and Teacher-rated warmth scores.

This study is conducted using a sample that overlaps with several previous studies (Hughes & Kwok, 2007; Hughes et al., 2008; Kwok et al., 2007). Kwok et al. (2007) established a longitudinal association between resilient personality assessed in first grade and academic achievement the following year. Hughes and Kwok (2007) established a relationship between a construct related to this study's social relatedness construct and subsequent academic engagement. Hughes et al. (2008), also a three-wave study with an overlapping sample, established the effect of teacher-student relationship

on subsequent achievement via its effect on academic engagement. These findings are related to the current study in that the construct of social relatedness contains an indicator of teacher-rated warmth. Though many of the individual paths in the proposed model have been supported by previous studies, unanswered by previous research is whether ego resilience is a child characteristic that *launches* that process. The purpose of the current longitudinal study is to expand upon and provide a more comprehensive analysis of the mechanisms by which ego resilience impacts subsequent academic engagement and achievement through a mediator of social relatedness.

This study expands upon the previously mentioned studies and is unique in several ways. First, the construct ego resilience used in this study is comprised solely of items based on Block and Block's (1980) theoretical Ego-Control/Ego Resiliency Model of Self-Regulation. Kwok et al. (2007) proposed a second-order latent construct, resilient personality, which included items related to personality agreeableness and conscientiousness in addition to ego resilience. The agreeable and conscientiousness items were not used, however, in this study. Items on the agreeableness scale (e.g., cooperation and helpfulness with others), in particular were thought to overlap theoretically with the proposed mediator variable of social relatedness in this study. In other words, the aim of this study is to determine the degree to which ego resilience affects social relatedness, and it was deemed important to keep the construct ego resilience free from clearly social items that might confound the two constructs.

Next, this study proposes a latent variable for social relatedness that is comprised of ratings from two sources: peers and teachers. As described in detail above, teacher-

student relationship and peer relationship variables, which are similar to this study's social relatedness construct, have been shown to correlate well with one another in previous research (Furrer & Skinner, 2003; Ladd et al., 1999; Zimmer-Gembeck, et al., 2006). Both variables have also been predictive of engagement and achievement-related outcomes in many studies (Buhs, 2005; Buhs et al., 2006; Connell & Wellborn, 1991; Diehl et al., 1998; Flook et al., 2005; Furrer & Skinner, 2003; Goodenough, 1993; Guay, et al., 1999; Hughes & Kwok, 2007; Hughes et al., 2008; Ladd et al, 1999; Ladd et al., 1997; Meehan et al., 2003; Ostermann, 2000; Pallas et al., 1987; Valiente et al., 2008; Zimmer-Gembeck et al., 2006); therefore, it is logical to include them in this study's model as a latent construct. The goal of this study is to provide a more broad view of the ways in which high ego resilient children accrue social resources, using this latent construct of social relatedness.

The current study would promote further understanding of the complexities between one of children's important school entry characteristics, social interactions, and academic performance. This study is unique in that it posits that ego resilience is a critical school entry characteristic that *triggers* the longitudinal processes related to accruing social resources and academic outcomes that were demonstrated by Hughes et al. 2008. This study is not focused on proving reciprocal relationships between school entry characteristics and academic outcomes, as those relationships have been addressed previously; instead, this study contributes to extant literature by considering the specific role of children's ego resilience in launching the reciprocal causal processes between social relatedness on one hand and academic engagement and achievement on the other.

The goal of the study is to parse out the complex relationships between these variables in order to facilitate the development of future targeted interventions to cultivate the attributes that are most critical to academic achievement. By determining whether or not social relatedness fully or partially mediates the relationship between ego resiliency and academic achievement/engagement, those interventions can be made more specific and effective. The practical implications of this finding might be to identify children who are at-risk for poor social relatedness and target them with interventions to improve social relatedness, thus improving their academic trajectories. Social relatedness may be particularly important for children with poor self-control, for example (Chen, Liew, & Hughes, 2007; Rimm-Kaufman & Pianta, 2000).

Covariates in the model will include child's cognitive ability (full scale IQ), as well as time 1 scores on social relatedness and time 1 and 2 scores on ego resilience, academic engagement, and academic achievement. In terms of general cognitive ability, some evidence has suggested that IQ is associated with levels of ego resilience (Block & Kremen, 1996). Reading and math achievement will be analyzed in separate models to enable us to parse out whether outcomes on these two achievement areas differ in the models.



This conceptual model will be tested using a sample of early elementary (first through third grade) students who scored below the median on a test of literacy skills. Children who enter school with low self-regulatory skills (Normandeau & Guay, 1998) and academic readiness skills are at particular risk for low achievement outcomes, but it is likely that attributes such as ego resilience will promote increased social relatedness with peers and teachers, and ultimately increased engagement and achievement in school. Thus, approaching challenges in one's environment with ego resilience is likely to provide a series of beneficial outcomes for students.

#### ***Limitations in the Extant Literature***

This study helps to further knowledge in areas that are currently lacking in the literature. An overall understanding of the mechanisms by which ego resilience contributes to positive academic outcomes is lacking. This lack of knowledge is particularly worrisome considering that teachers rate emotional and social characteristics as being more important than academics for school readiness (Lewit & Baker, 1995). There is also a dearth of research that utilizes multiple informants and measures to answer this question, as well as limited longitudinal research as to the impact of within-child characteristics and their impact on school outcomes.

## **METHODS**

### ***Participants***

Participants in the current study are elementary-school students who attended school districts in central/south-east Texas; one of the districts was urban, while the other two districts were smaller cities. The current study participants are comprised of a subsample of students from the original 784 students who were participating in a longitudinal study on the effects of grade retention on academic achievement. These 784 students were selected from a sample of 1,374 first grade students who scored below the median on a district-wide literacy test, had not been previously retained in the first grade, and were in general education classrooms. Of those 1,374 students, 784 students had parental permission to participate in the original study (57% of eligible participants).

Attrition analyses on the original sample of 784 participants did not indicate a statistically significant difference on a range of demographic or study variables between those students who did and did not consent to participate in the larger study. In the study subsample, 294 students (28.4%) had complete data on all analysis variables assessed at all three years in the study, while 389 students were missing at least one variable. In the current study, a subsample of 683 students (87.1%) was chosen from the 784 students who had participated in the original longitudinal study.

Attrition analyses indicated that the study subsample of 683 students did not differ from the remaining 101 students who initially participated in the larger study on major demographic variables including age, gender, ethnicity, eligibility for free or reduced lunch, bilingual class placement, literacy test scores or study variables. The

overall rate of missingness for the 683 participants was 8.11%; thus the assumption that data were missing at random is deemed tenable. Based on these results, multiple imputation in SAS PROC MI (SAS Institute, 2004) with Markov Chain Monte Carlo (MCMC) method (Schafer, 1997) was utilized to create 10 imputed datasets with complete responses in each of them. Imputation was chosen over the mean substitution technique since using the group mean to fill missing data can lead to bias due to a reduced variance in estimates of variables. By using multiple imputation rather than the 294 subjects with complete data, the sample size and statistical power were preserved since all available data were used in creating estimates.

Of the 683 students, 360 (52.7%) were male, and the racial/ethnic composition was 23% African American, 37% White-Hispanic, 35% White Non-Hispanic, and 5% other ethnicities. The subsample students' mean age at the beginning of first grade was 6.59 (S.D.= 0.55) years, and the mean intelligence measured with the Universal Nonverbal Intelligence Test (Bracken & McCallum, 1998) was 92.93 (S.D.=14.42). Based on family income, 62% of the participants in the study subsample were eligible for free or reduced lunch and 69% had at least one parent employed half-time or more at the first time period of this study. The students were clustered in 199 classrooms.

### ***Design Overview***

At baseline, during the late fall and winter when students were in first grade, each student was given an individually-administered measure of cognitive ability. During the late fall and winter of participants' first (baseline), second, and third years in school, research staff individually administered achievement tests. During the spring semesters

each year, teachers were mailed a questionnaire that included items asking teachers to rate students' personality characteristics and their relationships with the participating students. Teachers received compensation for responding to the questionnaire and returning it to researchers. Sociometric interviews with participants' classmates were also completed during the spring semester of each wave of data collection.

### *Measures*

#### *Ego Resiliency*

The measure of ego-resiliency was a subset of items taken from a 15-item scale of ego-control and ego-resiliency that was adapted from the California Child Q-Set (CCQ; Block & Block, 1980). Due to the time of administration required for the CCQ (i.e. the participant sorts large numbers of cards into various categorizations), the assessment tool was modified and shortened for ease of administration in a school setting. Kwok et al. (2007) utilized an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) and cross-validation technique of the 15-items to determine the items that best loaded on ego resiliency. The results indicated a good fit for a four-factor model, including: pro-social, antisocial, ego-resiliency, and ego-brittle.

Furthermore, the Kwok et al. (2007) EFA and CFA results indicated that seven items from two factors (ego resiliency and ego brittleness) were the best fit for the ego resiliency composite. Items that load on the ego resiliency factor were: "Resourceful in initiating activities," "Curious, eager to learn, open to new experiences," "Persistent, doesn't give up easily," and "Self-reliant, confident." Items loading on the ego brittle composite (which were reverse coded to load on the overall ego resilience composite)

were: “Becomes rigidly repetitive or immobilized under stress,” “Tends to go to pieces under stress, becomes rattled and disorganized,” and “Has rapid shifts in moods, is emotionally labile.”

Each of the items was rated on a 1–5 Likert scale, indicating teachers’ levels of agreement with a series of statements about student participants. With the current study sample, the ego resiliency and ego brittleness factors were correlated 0.47, therefore a composite of 7 items (with ego brittleness items reverse coded) from the two factors was calculated as the measure of ego resiliency for this study. The scale demonstrates good internal consistency (0.85) with the current study sample.

### ***Social Relatedness***

***Peer liking and social preference.*** A student’s peer liking score was computed as the mean of two standard scores: mean roster rating of liking and social preference scores, described below. These two scores were strongly associated ( $r = .82$ ). All students with permission to participate in the sociometric interviews were asked to rate how much they liked each child in the classroom on a 5-point scale (1 = don’t like at all and 5 = like very much). A child’s mean liking score was calculated using the average rating received by classmates. Social preference scores were computed as the standardized “liked most” nomination score minus the standardized “liked least” scores (Coie, Dodge, & Coppotelli, 1982). In an attempt to avoid asking children to nominate disliked children, a rating of “1” on the roster rating of liking was automatically considered to be a “liked least” nomination score (Asher & Dodge, 1986). Sociometric scores were standardized within classrooms. Both peer liking mean ratings and peer social preference scores have

been found to have good test–retest reliabilities and stability across the elementary school years (Hughes, 1990).

*Teacher warmth.* Teacher support was measured using a modified version of the 22-item Teacher Relationship Inventory (TRI; Hughes & Kwok, 2007). The TRI is based on the Network of Relationships Inventory (NRI; Buhrmester & Furman, 1987), a child-report measure of relationship quality. On the TRI, teachers report on the level of support (16 items) or conflict (6 items) in relationships with students on a 5-point Likert-type scale.

The TNRI support scale has demonstrated good psychometric properties, including strong concurrent and predictive validity, with support being positively associated with peer acceptance and cooperative engagement and negatively associated with aggression (Hughes & Kwok, 2006; Hughes, et al., 2007; Meehan, et al., 2003). The correlations between the teacher support scale and peer assessments of teacher-student support are moderate and have ranged from .29 to .53 (Hughes & Kwok, 2007; Hughes, Yoon, & Cavell, 1999). In this sample, the correlation between the teacher-support scale and peer ratings of teacher support is 0.36. The internal consistency was .94 for the Warmth score (13 items) in this study sample. Examples of items include: “I enjoy being with this child,” “look forward to spending time with him/her,” “this child accepts my help with things he/she can’t do by himself/herself,” “it is easy to mend relationships with this child after a disagreement or conflict.”

### ***Academic Achievement***

Academic Achievement was assessed using the individually-administered *Woodcock Johnson III Tests of Achievement* (WJ-III; Woodcock, McGrew, & Mather, 2001). The WJ-III is an individually administered measure of academic achievement for individuals ages 2 to adult. The psychometric properties of the WJ-III have been studied at length and demonstrate sound reliability and validity (Woodcock & Johnson, 1989; Woodcock et al., 2001). The age-standard scores have a mean of 100 and standard deviation of 15. The mean Broad Reading age-standard score for this sample at time 1 is 96.5 (SD=18.1) and for Broad Math is 100.7 (SD=14.0). In this study, age-based W scores for Broad Reading (Letter–Word Identification, Reading Fluency, and Passage Comprehension subtests) and Broad Math (Calculations, Math Fluency, and Math Calculation Skills subtests) were used. W scores are based on the Rasch measurement model and yield an equal interval scale (Woodcock et al., 2001).

If children or their parents indicated they spoke any Spanish, children were given the *Woodcock-Muñoz Language Test* (WMLS; Woodcock & Munoz-Sandoval, 1993) to determine the child's language proficiency in English and Spanish. Based on their scores on the WMLS, some children were administered the *Batería-R*, the Spanish-equivalent of the WJ-III, due to their relative strengths in Spanish. As with the WJ-III, the W score for the Broad Reading and Broad Math Scales on the *Batería-R* were used in this study. The scores on the WJ-III and *Batería-R* are comparable, and throughout this study, the Broad Reading and Broad Math scores will be referred to as reading and math achievement scores.

### ***Academic Engagement***

This teacher-report is a 10-item scale taken from the Big Five Inventory (BFI: John & Srivastava, 1999). To measure engagement, 8 items from the Conscientious scale and 2 items taken from the Social Competence Scale (Conduct Problems Prevention Research Group, 2004) were used. The Social Competence Scale items were used to measure engagement because they address behaviors that are in line with academic engagement, such as setting and working towards goals and turning in homework. The Conscientiousness items are comparable to other researchers' measures of student engagement (Ladd et al., 1999). Example items are "Is a reliable worker," "Perseveres until the task is finished," "Tends to be lazy" (reverse scored), and "Is easily distracted (reverse scored). The two items from the Social Competence Scale were "Sets and works toward goals" and "Turns in homework." The internal consistency of these 10 items for our sample was 0.94.



## RESULTS

### *Sample Descriptive Statistics and Intercorrelations*

Ten complete data sets were generated using the multiple imputation technique. The sample statistics are reported here for the first complete study data set in Table 1, which contains the means, standard deviations, and inter-correlations for the analysis variables. All study variables, excluding demographic variables, were statistically significantly correlated at  $p < 0.05$ . The zero-order correlation between the predictor at time 1 (ER1) and the time 3 outcome variables (ENG3, WJR3, and WJM3) were statistically significant. This was not surprising, considering previous findings linking resilience with subsequent school performance (Kwok, et al, 2007).

Although economic disadvantage, gender, and age were also considered as covariates, Table 1 demonstrates that these demographic variables were not consistently significantly correlated with all study variables. Full scale IQ was the only demographic variable that was significantly correlated with all the (non-demographic) study variables. As such, full scale IQ was chosen as the sole demographic covariate in the model.

In terms of normality of the data, skewness and kurtosis values were obtained for study variables in the first imputed dataset. Findings indicated that skewness and kurtosis were well within the recommended ranges (e.g., skewness  $< 2$  and kurtosis  $< 7$ ), as outlined by Curran, West, and Finch (1996). The range of skewness values was -0.85 to 0.61 and the range of kurtosis values was -1.99 to 1.88. Normality values may be found in Table 2.

**Table 1**  
*Inter-correlations and Descriptive Statistics for Continuous Analysis Variables*

Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1.ER1	-																									
2.RATE1	.37	-																								
3.PREF1	.36	.82	-																							
4.WARM1	.61	.37	.30	-																						
5.WJM1	.13	.09	.11	.10	-																					
6.WJR1	.35	.12	.14	.16	.36	-																				
7.ENG1	.72	.44	.39	.59	.19	.37	-																			
8.ER2	.38	.29	.27	.33	.26	.25	.43	-																		
9.RATE2	.31	.40	.38	.32	.08	.10	.35	.38	-																	
10.PREF2	.28	.36	.32	.29	.01	.09	.36	.34	.84	-																
11.WARM2	.24	.26	.22	.38	.18	.12	.34	.63	.31	.30	-															
12.WJM2	.18	.08	.10	.08	.68	.28	.24	.25	.12	.09	.17	-														
13.WJR2	.37	.17	.16	.17	.22	.72	.38	.24	.10	.13	.09	.37	-													
14.ENG2	.39	.40	.36	.40	.28	.26	.60	.73	.45	.40	.59	.26	.26	-												
15.ER3	.25	.13	.11	.17	.24	.27	.26	.34	.15	.10	.26	.14	.11	.38	-											
16.RATE3	.27	.31	.28	.29	.13	.15	.35	.35	.47	.40	.27	.11	.14	.38	.26	-										
17.PREF3	.23	.33	.30	.24	.13	.11	.31	.37	.43	.37	.27	.11	.11	.38	.26	.83	-									
18.WARM3	.34	.24	.19	.31	.15	.16	.37	.36	.29	.21	.36	.15	.07	.42	.42	.13	.31	-								
19.WJM3	.25	.09	.10	.16	.61	.37	.30	.24	.10	.09	.12	.76	.45	.27	.17	.15	.15	.16	-							
20.WJR3	.37	.17	.18	.18	.25	.66	.39	.26	.14	.17	.10	.40	.84	.28	.15	.18	.18	.11	.54	-						
21.ENG3	.41	.34	.28	.33	.23	.21	.54	.43	.39	.31	.35	.25	.19	.59	.53	.45	.42	.63	.30	.29	-					
22.AGE	<b>.25</b>	<b>.07</b>	.08	<b>-.01</b>	<b>.05</b>	<b>-.04</b>	<b>.02</b>	<b>-.05</b>	-.12	-.09	<b>.00</b>	<b>.01</b>	<b>-.07</b>	<b>.03</b>	-.04	-.12	-.12	-.09	<b>.00</b>	-.11	<b>-.06</b>	-				
23.GEND	-.12	<b>-.04</b>	<b>-.03</b>	-.18	<b>.05</b>	<b>-.07</b>	-.25	-.09	<b>-.04</b>	<b>-.03</b>	-.17	.08	-.08	-.22	-.11	-.09	-.08	-.16	<b>.04</b>	-.10	-.25	.10	-			
24.ECON	<b>-.06</b>	-.08	-.11	<b>-.07</b>	-.34	<b>-.03</b>	<b>-.06</b>	-.11	<b>-.06</b>	<b>-.06</b>	-.12	-.33	-.12	-.11	<b>.01</b>	<b>-.06</b>	<b>-.04</b>	<b>-.03</b>	-.31	-.18	-.10	<b>.05</b>	.00	-		
25.FSIQ	.18	.08	.09	.13	.35	.24	.22	.15	.12	.12	<b>.06</b>	.30	.23	.21	.09	.12	.11	.13	.35	.27	.18	-.13	<b>.04</b>	-.17	-	
Mean	3.50	-.12	-.07	4.01	462	434	3.24	3.54	3.50	-.09	-.04	3.91	475	461	3.37	3.13	-.13	-.10	3.95	486	477	3.30	6.59	-	-	92.9
SD	.81	.96	.97	.80	13.1	26.8	1.06	.77	1.02	1.09	.86	10.9	22.6	1.08	.73	.97	1.01	.86	11.2	19.9	1.05	.55	-	-	-	14.5

*Note.* Statistics are for the first imputed data set. All correlations are statistically significant ( $p < .05$ ; two-tailed), with the exception of bolded values, which are not statistically significant. The numbers in the variable names refer to the timing of assessment. ER=Ego Resiliency; RATE=Mean peer ratings; PREF=Peer-rated preference; WARM=Teacher-rated warmth; WJM=Woodcock-Johnson III Broad Math age standard score; WJR=Woodcock-Johnson III Broad Reading age standard score; ENG=Teacher ratings of child academic engagement; AGE=Age at beginning of study; GEND=gender; ECON=Economic disadvantage status; FSIQ=Full scale IQ.

**Table 2**  
**Sample Normality Statistics**

	Skewness		Kurtosis	
	Statistic	Standard Error	Statistic	Standard Error
AGE	.105	.094	-.952	.187
GEND	-.109	.094	-1.994	.187
ECON1	-.439	.094	-1.787	.187
FSIQ	-.251	.094	-.050	.187
WJR1	.390	.094	.117	.187
WJM1	-.849	.094	1.879	.187
ENG1	-.108	.094	-.952	.187
ER1	-.235	.094	-.511	.187
RATE1	-.299	.094	-.552	.187
PREF1	-.163	.094	-.382	.187
WARM1	-.583	.094	-.022	.187
WJR2	-.410	.094	.139	.187
WJM2	-.531	.094	.634	.187
ENG2	-.130	.094	-.827	.187
RATE2	-.421	.094	.196	.187
PREF2	-.323	.094	.289	.187
ER2	-.368	.094	-.021	.187
WARM2	-.664	.094	.118	.187
WJR3	-.727	.094	1.684	.187
WJM3	-.417	.094	.433	.187
ENG3	-.042	.094	-.736	.187
ER3	.612	.094	.922	.187
RATE3	-.318	.094	-.324	.187
PREF3	-.259	.094	-.385	.187
WARM3	-.568	.094	.007	.187

*Note.* Statistics are for the first imputed data set. The numbers in the variable names refer to the timing of assessment. ER=Ego Resiliency; RATE=Mean peer ratings; PREF=Peer-rated preference; WARM=Teacher-rated warmth; WJM=Woodcock-Johnson III Broad Math age standard score; WJR=Woodcock-Johnson III Broad Reading age standard score; ENG=Teacher ratings of child academic engagement; AGE=Age at beginning of study; GEND=gender; ECON1=Economic disadvantage status; FSIQ=Full scale IQ.

### *Measurement Model for Social Relatedness*

#### *Confirmatory Factor Analysis*

Confirmatory factor analyses were used to examine the factor structure for a proposed latent construct of social relatedness. Initially, the hypothesized measurement model had a marginally acceptable fit ( $\chi^2=93.882$  (21), comparative fit index [CFI]=.972, root-mean-square error of approximation [RMSEA]=.088, standardized root-mean-square residual [SRMR]=.075). To improve model fit, paths correlating residual variances of Warm1, Warm2, and Warm3 were added. The Warm variable was chosen as opposed to the other two indicators (Rate and Pref) because Warm 1, 2, and 3 were more highly correlated. The revised measurement model, shown in Figure 2 demonstrated somewhat improved fit ( $\chi^2=106.825$  (21), CFI= .969, RMSEA=0.077, SRMR=0.075). A chi-square difference test indicated that the two models were significantly different ( $\chi^2(1) = 5.61, p=.02$ ), with the revised measurement model demonstrating better fit than the original measurement model.

#### *Measurement Model Invariance*

The invariance of factor loadings over time was examined by comparing the chi-square statistics between models with factor loadings constrained to be the same across each assessment wave and by averaging values of across the 10 imputed datasets. The chi-square difference test between the two models (baseline and constrained models) was not significant ( $\chi^2(6) = 8.98, p = .17$ ). From this, we concluded the measurement model fit the data comparably across the three time periods.

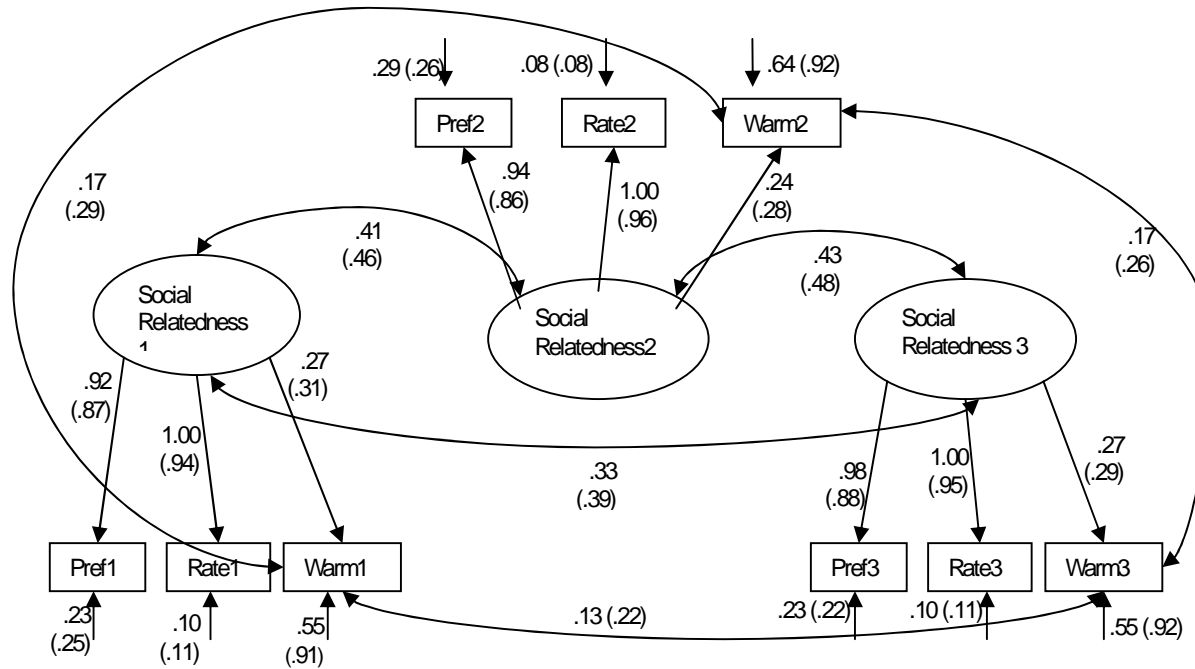


Figure 2. Measurement model. Values are unstandardized parameter estimates, with standardized estimates in parentheses. All coefficients are significant at  $p < .05$  (two-tailed). Warm1, Warm2, and Warm3 were correlated to improve model fit. Pref = Peer-rated preference scores; Rate = Mean Peer rating scores; Warm = Teacher-rated warmth scores. The numbers after each variable name represent the time period of the assessment.

### *Structural Model*

Structural equation modeling (SEM) was used to test the hypothesized longitudinal model (see Figure 1) with the targeted outcome being achievement and academic engagement. The structural model was run on each of 10 imputed datasets to obtain the average coefficients across datasets. The structural model was analyzed using maximum likelihood estimation with robust standard errors and a mean-adjusted chi-square statistic test (MLR: Muthén & Muthén, 2007). The Type=Complex feature in Mplus (Version 5.2; Muthén & Muthén, 2007) was used to account for the nestedness of the data structure (e.g. students within specific classrooms). As noted in Figure 1, controls for prior levels of each variable were included in the model. There were also reciprocal paths between achievement and academic engagement in the model, as those paths had been supported in previous research with an overlapping sample and because those paths made sense in terms of the conceptual model (Hughes et al., 2008).

In order to test the mediational models, the zero order correlations were examined to ensure that correlational relationships between the predictor and outcome variables, predictor and mediator variables, and mediator and outcome variables were statistically significant and in the expected direction. Since each of these variables was significantly correlated, we determined that the mediational model was reasonable and tested the model in MPlus (Version 5.2; Muthén & Muthén, 2007).

As seen in Table 3, full scale IQ was included as a covariate in the math mediational model and was found to predict ENG2, ER2, and MATH3. In Table 4, the parameter estimate of covariance of correlated residuals is presented. Two paths, ER3 and SR3 with MATH3 were constrained to be zero. Figure 3 presents the math mediational model path coefficients.

**Table 3**  
***Full Scale IQ Path Coefficients: Math Mediational Model***

Path	Unstandardized (and standardized) path coefficients
IQ to ER2*	.48 (.09)
IQ to ER3	.06 (.01)
IQ to SR2	.09 (.03)
IQ to SR3	.25 (.08)
IQ to MATH2	.04 (.05)
IQ to MATH3**	.08 (.10)
IQ to ENG2**	.72 (.10)
IQ to ENG3	.19 (.03)

*Note.* Paths with one asterisk are statistically significant at the one-tailed test  $p < 0.05$  level and paths with two asterisks are statistically significant at the  $p < 0.01$  level. ER=ego resiliency; SR=social relatedness; MATH=Woodcock Johnson-III Math achievement scores; ENG=academic engagement. Number after each variable name signifies the time of assessment.

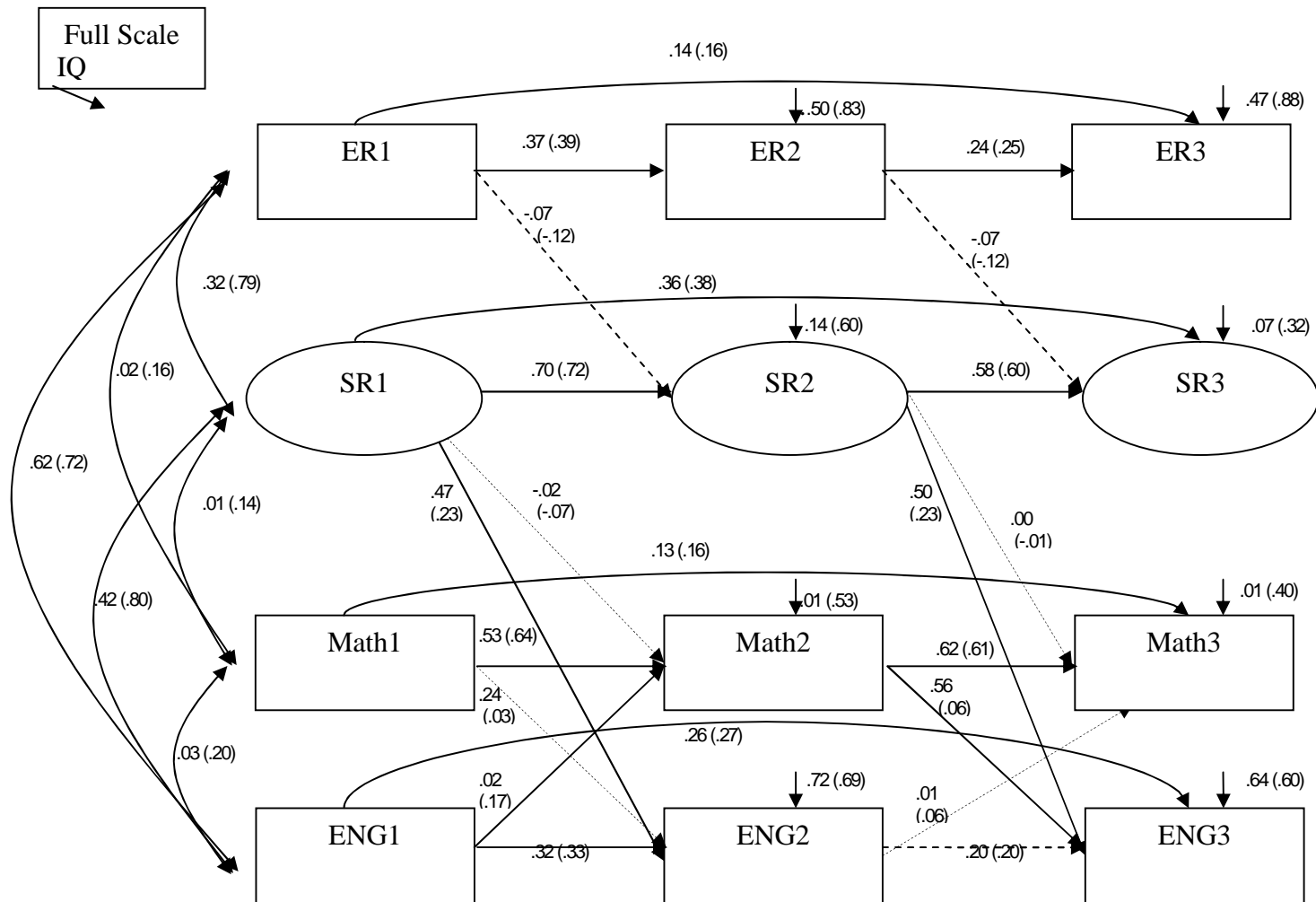


Figure 3. Mediation model of math achievement. Dashed lines represent paths that did not achieve statistical significance. The within-wave correlated residuals are not included in the figure for purposes of presentation clarity. Values are unstandardized parameter estimates, with standardized estimates in parentheses. ER=ego resiliency; SR=social relatedness; MATH=Woodcock Johnson-III Math achievement scores; ENG=academic engagement.



**Table 4**  
***Parameter Estimates of Covariances of Correlated Residuals on the Model Presented in Figure 3: Math Mediation Model***

Parameter	Unstandardized estimate	Standardized Estimate
ER2 with SR2 **	.25	.94
ER2 with MATH2	.00	.07
ER2 with ENG2 **	.40	.66
SR2 with MATH2 *	.00	.14
SR2 with ENG2 **	.26	.83
MATH2 with ENG2	.00	.07
ER3 with SR3 **	.14	.75
ER3 with MATH3†	.00	.00
ER3 with ENG3 **	.27	.49
SR3 with MATH3†	.00	.00
SR3 with ENG3 **	.22	1.00
MATH3 with ENG3*	.01	.09
ER2 with ENG3 *	-.06	-.10
ER3 with SR2	.01	.03
ER3 with ENG2 **	.07	.12

*Note.* Paths with daggers (†) were constrained to be 0. Estimates with 2 asterisks are significant at  $p < .001$ . Estimates with 1 asterisk are significant at  $p < .05$ . ER=ego resiliency; SR=social relatedness; MATH=Woodcock Johnson-III Math achievement scores; ENG=academic engagement. Number after each variable name signifies the time of assessment.

In both the reading and math mediational models, the path from predictor to mediator (ego resiliency to the latent variable social relatedness) was not found to be statistically significant. Because of this, it was determined that testing for mediation using the Sobel test (Sobel, 1982) was unnecessary. The model fit statistics were examined using the overall model chi-square test and other common fit indices including CFI, RMSEA, and SRMR, and theoretically sound modifications made to the model to improve model fit. The fit statistics and specific analyses results for the math and reading mediational models are presented separately in the sections below.

### ***Math Achievement***

The meditational model of math achievement fit the data adequately, with the average  $\chi^2(107) = 403.02$  (SD=21.46), the average CFI = .953 (SD = .003), the average RMSEA = 0.064 (SD = .002), and the average SRMR = 0.075 (SD = .002). The residual error variances amongst most time 2 and time 3 variables were allowed to correlate, as they improved model fit without substantially changing other parameter estimates (Bentler, 2000; Kline, 2004). The only exceptions were the residuals between ego resilience and social relatedness at time 3 with math achievement at time 3, which were constrained to be zero.

Contrary to expectations, ego resiliency did not predict social relatedness at subsequent time periods (e.g., ER1 to SR2 and ER2 to SR3). The latent construct social relatedness predicted subsequent academic engagement, but not subsequent math achievement scores. The path from engagement at time 1 to math achievement at time 2 was statistically significant, as was the path from math achievement at time 2 to engagement at time 3. This partially supported findings by Hughes et al., 2008 regarding the reciprocal relationships between engagement and achievement. However, the other reciprocal paths (e.g., MATH1 to ENG2 and ENG2 to MATH3) were not found to be statistically significant in this model.

### ***Reading Achievement***

The analyses above were repeated with the reading meditational model. The model of reading achievement fit the data adequately, with the average  $\chi^2(107) = 405.569$  (SD=11.480), the average CFI = .955 (SD = .002), the average RMSEA = .064

(SD = .001), and the average SRMR =.068 (SD = .001). Results for the model testing reading achievement and academic engagement as the outcome are presented in Figure 4, with dashed lines representing non-significant paths.

The residual error variances amongst most time 2 and time 3 variables were allowed to correlate within assessment phase, as they improved model fit but did not have a substantial impact on other parameter estimates (Bentler, 2000; Kline, 2004). The covariance estimates between residual errors can be found in Table 5 but are not included in Figure 4 to present a clearer picture of the model.

**Table 5**  
*Parameter Estimates of Covariances of Correlated Residuals on the Model Presented in Figure 4: Reading Mediation Model*

Parameter	Unstandardized estimate	Standardized Estimate
ER2 with SR2 *	.247	.944
ER2 with READ2	.001	.008
ER2 with ENG2 *	.401	.665
SR2 with READ2	-.005	-.082
SR2 with ENG2*	.263	.826
READ2 with ENG2	.005	.038
ER3 with SR3 *	.136	.749
ER3 with READ3†	.000	.000
ER3 with ENG3 *	.265	.479
SR3 with READ3†	.000	.000
SR3 with ENG3 *	.211	.994
READ3 with ENG3*	.013	.147
ER2 with ENG3	-.048	-.085
ER3 with SR2	.005	.019
ER3 with ENG2 *	.079	.134

*Note.* Paths with asterisks are significant at  $p < .001$ . Paths with daggers (†) were constrained to be 0. ER=ego resiliency; SR=social relatedness; READ=Woodcock Johnson-III Reading achievement scores; ENG=academic engagement. Number after each variable name signifies the time of assessment.

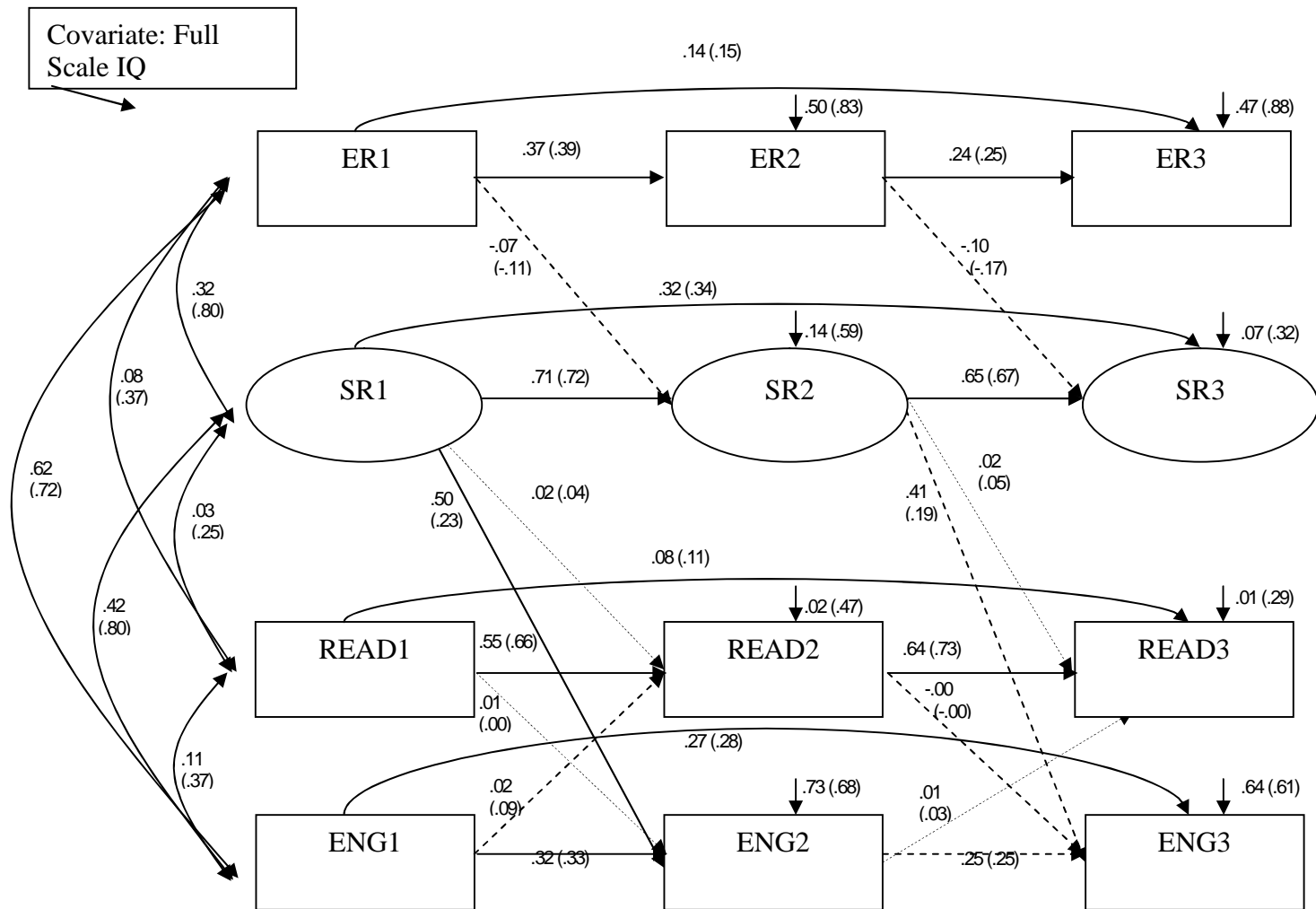


Figure 4. Mediation model of reading achievement. Dashed lines represent paths that did not achieve statistical significance. The within-wave correlated residuals are not included in the figure for purposes of presentation clarity. Values are unstandardized parameter estimates, with standardized estimates in parentheses. ER=ego resiliency; SR=social relatedness; READ=Woodcock Johnson-III Reading achievement scores; ENG=academic engagement.

In the meditational model for reading, ego resiliency did not predict social relatedness at subsequent time periods (e.g., ER1 to SR2 and ER2 to SR3). The social relatedness latent construct predicted subsequent academic engagement in time 2, but not time 3; this finding differed slightly from the math model in which social relatedness predicted subsequent engagement at both times 2 and 3. As in the math model, social relatedness was not found to predict subsequent reading achievement scores at either time period. Table 6 presents the path coefficients for the covariate, Full scale IQ, which significantly predicted ENG2, ER2, and MATH3. Unlike the math model, none of the reciprocal paths between academic engagement and reading achievement were statistically significant.

**Table 6**  
**Full Scale IQ Path Coefficients: Reading Meditational Model**

Path	Unstandardized (and standardized) path coefficients
IQ to ER2*	.48 (.09)
IQ to ER3	.06 (.01)
IQ to SR2	.08 (.02)
IQ to SR3	.27 (.08)
IQ to READ2	.07 (.05)
IQ to READ 3*	.07 (.05)
IQ to ENG2**	.78 (.11)
IQ to ENG3	.27 (.04)

*Note.* Paths with one asterisk are statistically significant at the one-tailed test  $p < 0.05$  level and paths with two asterisks are statistically significant at the  $p < 0.01$  level. ER=ego resiliency; SR=social relatedness; READ=Woodcock Johnson-III Reading achievement scores; ENG=academic engagement. Number after each variable name signifies the time of assessment.

### *Model Revisions*

Revisions were made to the reading and math mediational models, based on the recommended modification indices and theoretical considerations. For the revised math and reading models, a direct path was added from the predictor (ego resilience at time 1) to the outcome variables (math or reading achievement at time 3 and academic engagement at time 3), to determine whether a direct path would fit better than an indirect path through the mediating latent variable social relatedness. Furthermore, two non-significant paths (ego resilience to subsequent social relatedness) were constrained to zero since they were small, slightly negative coefficients and constraining them had minimal impact on model fit (Bentler, 2000; Kline, 2004).

#### *Revised Math Model*

The revised model of math achievement had fair to good fit, with the average  $\chi^2(107) = 389.566$  (SD=20.043), the average CFI = .955 (SD = .003), the average RMSEA = 0.062 (SD = .002), and the average SRMR = 0.073 (SD = .002). Results for the model testing math achievement and academic engagement as the outcome are presented in Figure 5, with dashed lines representing non-significant paths. The indicated that ego resilience at time 1 directly predicted time 3 math achievement, but not time 3 academic engagement. The mediational paths from social relatedness at time 2 to outcome variables remained the same as the mediational model, in that SR2 predicted time 3 engagement, but not time 3 academic achievement. Table 7 presents parameter estimates of covariates and Table 8 presents full scale IQ path coefficients for the revised math model.

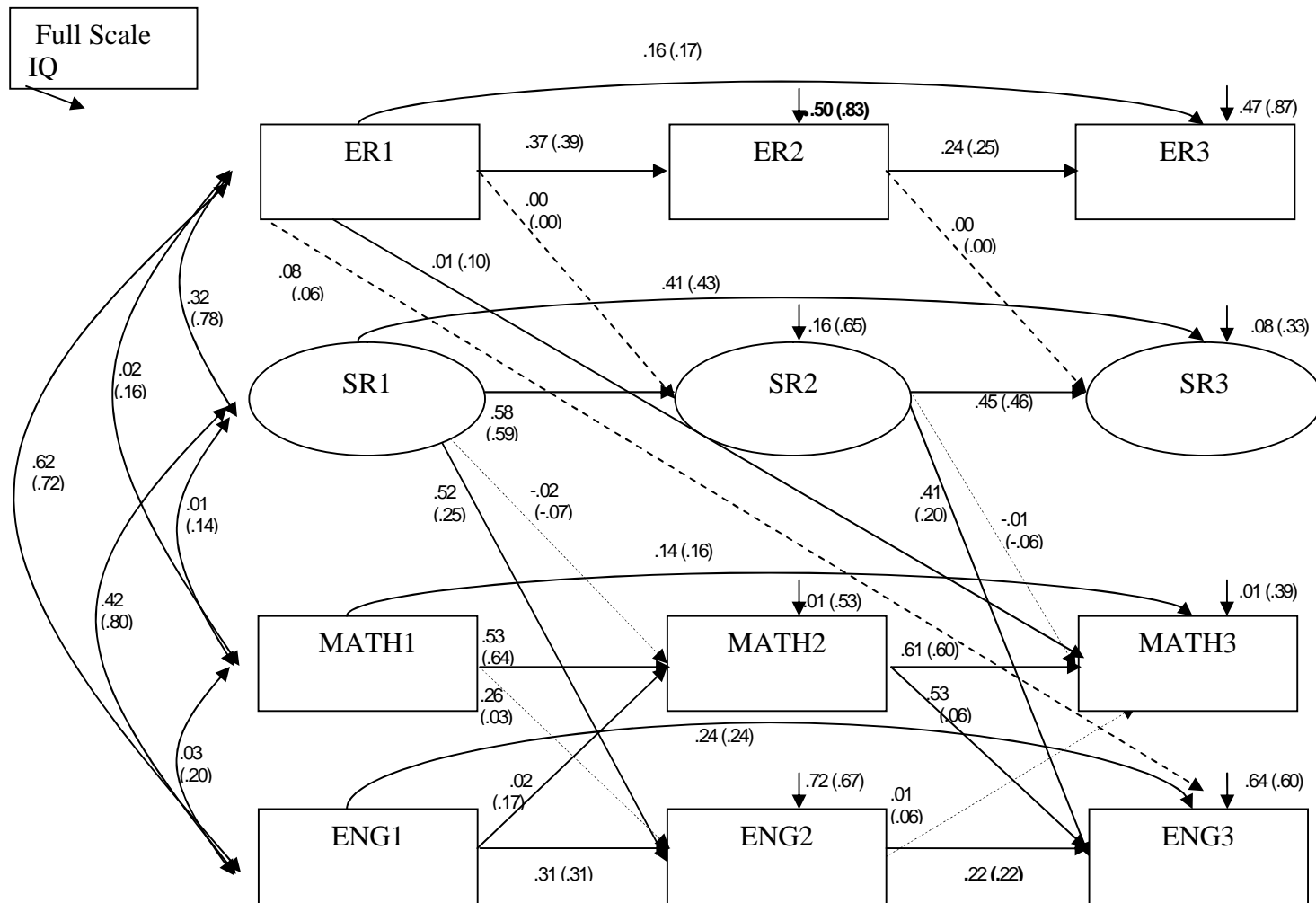


Figure 5. Revised model of math achievement. Dashed lines represent paths that did not achieve statistical significance. The within-wave correlated residuals are not included in the figure for purposes of presentation clarity. Values are unstandardized parameter estimates, with standardized estimates in parentheses. ER=ego resiliency; SR=social relatedness; MATH=Woodcock Johnson-III Math achievement scores; ENG=academic engagement. Paths from ER2 to SR3, from ER1 to SR2, WJ3 with SR3, WJ3 with ER3, and ENG3 with WJ3 were constrained to be 0.

**Table 7**  
***Parameter Estimates of Covariances of Correlated Residuals on the Model***  
***Presented in Figure 5: Math Revised Model***

Parameter	Unstandardized estimate	Standardized Estimate
ER2 with SR2**	.251	.901
ER2 with MATH2	.004	.064
ER2 with ENG2**	.396	.664
SR2 with MATH 2	.004	.125
SR2 with ENG2**	.269	.803
MATH 2 with ENG2	.004	.067
ER3 with SR3**	.134	.725
ER3 with MATH 3†	.000	.000
ER3 with ENG3**	.268	.486
SR3 with MATH 3†	.000	.000
SR3 with ENG3**	.218	1.00
MATH 3 with ENG3*	.005	.089
ER2 with ENG3 *	-.046	-.081
ER3 with SR2	.006	.020
ER3 with ENG2*	.067	.116

*Note.* Paths with daggers (†) were constrained to be 0. Paths with two asterisks are significant at  $p < .01$ , while paths with one asterisk are significant at  $p < .05$ . ER=ego resiliency; SR=social relatedness; MATH=Woodcock Johnson-III math achievement scores; ENG=academic engagement. Number after each variable name signifies the time of assessment.

**Table 8**  
***Full Scale IQ Path Coefficients: Math Revised Model***

Path	Unstandardized (and standardized) path coefficients
IQ to ER2*	.48 (.09)
IQ to ER3	.04 (.01)
IQ to SR2	.09 (.03)
IQ to SR3	.22 (.07)
IQ to MATH2	.04 (.05)
IQ to MATH3**	.07 (.09)
IQ to ENG2*	.70 (.10)
IQ to ENG3	.16 (.02)

*Note.* Paths with two asterisks are significant at  $p < .01$ , while paths with one asterisk are significant at  $p < .05$ . ER=ego resiliency; SR=social relatedness; MATH=Woodcock Johnson-III math achievement scores; ENG=academic engagement. Number after each variable name signifies the time of assessment.



### ***Revised Reading Model***

The revised model of reading achievement had adequate fit, with the average  $\chi^2(107) = 403.405$  (SD=11.940), the average CFI = .955 (SD = .002), the average RMSEA = 0.064 (SD = .001), and the average SRMR = 0.067 (SD = .001). Results for the revised model testing reading achievement and academic engagement as the outcome are presented in Figure 6, with dashed lines representing non-significant paths. The results indicated that the ego resilience at time 1 did not directly predict either of the outcome variables, nor did the mediator variable SR2. Table 9 presents parameter estimates of covariates, and Table 10 presents full scale IQ path coefficients for the revised reading model.

**Table 9**  
***Parameter Estimates of Covariances of Correlated Residuals on the Model Presented in Figure 6: Reading Revised Model***

Parameter	Unstandardized estimate	Standardized Estimate
ER2 with SR2**	.250	.920
ER2 with READ2	.001	.005
ER2 with ENG2**	.400	.666.
SR2 with READ2	-.005	-.082
SR2 with ENG2**	.269	.816
READ2 with ENG2	.005	.038
ER3 with SR3**	.137	.728
ER3 with READ3	.000	.000
ER3 with ENG3**	.263	.476
SR3 with READ3	.000	.000
SR3 with ENG3**	.219	.998
READ3 with ENG3**	.012	.146
ER2 with ENG3	-.031	-.055
ER3 with SR2	.001	.002
ER3 with ENG2*	.074	.127

*Note.* Paths with one asterisk are significant at  $p < .05$ , while paths with two asterisks are significant at  $p < .001$ . ER=ego resiliency; SR=social relatedness; READ=Woodcock Johnson-III Reading achievement scores; ENG=academic engagement. Number after each variable name signifies the time of assessment.

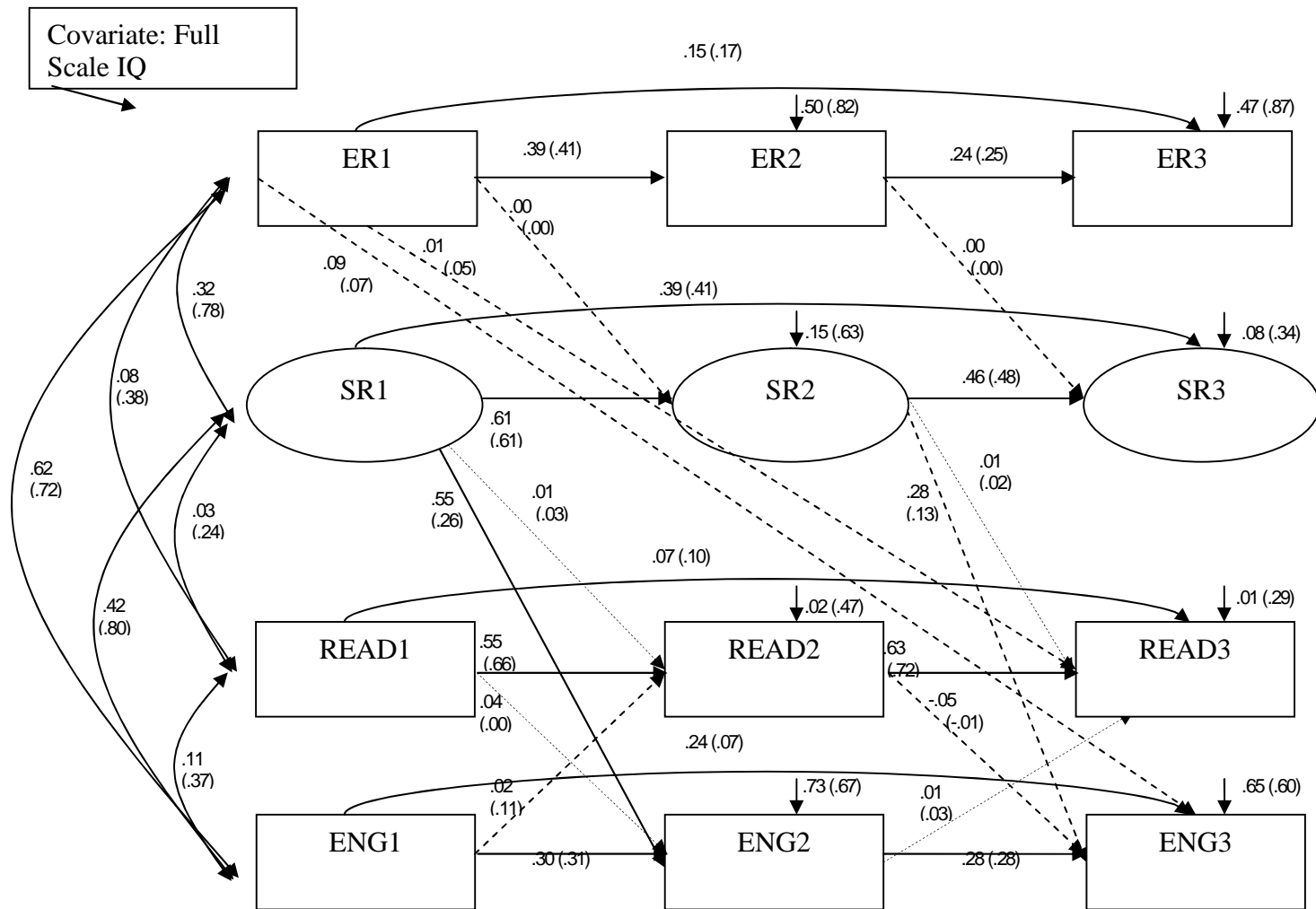


Figure 6. Revised model of reading achievement. Dashed lines represent paths that did not achieve statistical significance. The within-wave correlated residuals are not included in the figure for purposes of presentation clarity. Values are unstandardized parameter estimates, with standardized estimates in parentheses. ER=ego resiliency; SR=social relatedness; READ=Woodcock Johnson-III Reading achievement scores; ENG=academic engagement.

**Table 10**  
***Full Scale IQ Path Coefficients: Reading Revised Model***

Path	Unstandardized (and standardized) path coefficients
IQ to ER2*	.471(.088)
IQ to ER3	.044 (.008)
IQ to SR2	.083 (.024)
IQ to SR3	.227 (.069)
IQ to READ2	.071 (.046)
IQ to READ 3*	.070 (.051)
IQ to ENG2*	.765 (.107)
IQ to ENG3	.233 (.033)

*Note.* Paths with one asterisk are statistically significant at the  $p < 0.05$  level. ER=ego resiliency; SR=social relatedness; READ=Woodcock Johnson-III Reading achievement scores; ENG=academic engagement. Number after each variable name signifies the time of assessment.

### ***Gender Analyses***

Finally, we tested whether theoretically important paths in our models differed for boys and girls, as this has been the case in other studies which considered similar constructs (Letzring, Block, & Funder, 2005). In order to determine whether any of the paths of primary theoretical interest differed for boys and girls, group analyses were conducted using the GROUPING feature in MPlus (Muthén & Muthén, 2007). Only one of the ten imputed datasets was used in the analyses, since the software program did not permit running this analyses using the TYPE= IMPUTATION feature. The baseline math and reading achievement models were compared to models in which one path of interest was constrained to be the same for boys and girls, and a chi-square difference test was conducted to determine whether the models were significantly different.

Paths relevant to the hypotheses were tested for gender differences in the revised reading and math models. These paths included the direct effect of ego resilience at time 1 to time 3 engagement and achievement, social relatedness at time 2 to academic engagement and achievement at time 3, and ego resilience at time 1 to social relatedness at time 2. The hypothesized path that was constrained to zero (ego resilience at time 1 to social relatedness at time 2) was not tested for moderation. The adjusted chi-square differences were calculated using the scaling correction factors provided in the MPlus outputs. Then, p-values for each of the chi-square difference values were calculated.

The paths from ER1 to READ3 ( $\chi^2(1) = 6.49, p = .01$ ) and ER1 to reading ENG3 ( $\chi^2(1) = 7.18, p = .01$ ) were statistically significant, with ego resilience having more effect on boys' reading achievement and academic engagement two years later. However, several of the chi-square difference tests were not statistically significant, including: ER1 to SR2 (math model):  $\chi^2(1) = .42, p = .52$ ; ER1 to SR2 (reading model):  $\chi^2(1) = 3.10, p = .08$ ; SR2 to ENG3 (math model):  $\chi^2(1) = .10, p = .76$ ; SR2 to ENG3 (reading model):  $\chi^2(1) = .85, p = .36$ ; SR2 to READ3:  $\chi^2(1) = .05, p = .83$ ; SR2 to MATH3:  $\chi^2(1) = .76, p = .38$ ; ER1 to MATH3:  $\chi^2(1) = .48, p = .49$ ; ER1 to ENG3 (math model):  $\chi^2(.25), p = .62$  suggesting that these paths did not differ based on gender.

## CONCLUSIONS

The purpose of this study was to explain how ego resilience in children promotes later academic achievement and engagement. The hypotheses were that ego resilience would predict subsequent social relatedness, or students' ability to accrue social resources from peers and teachers. The second part of the hypothesis was that social relatedness would predict subsequent academic achievement and engagement. Finally, the overall conceptual model was that ego resilience would indirectly predict academic engagement and achievement through the mediating latent variable social relatedness. Therefore, the overall hypothesis was that social relatedness was the mechanism by which ego resiliency contributes to subsequent academic success. While particular aspects of this model have been supported in prior research, there is no known study which takes each of these constructs into account in a longitudinal study with such statistically rigorous methods.

In this study, we found the within time correlations to be consistent with theory, as were cross-time zero-order correlations. Despite the models having adequate fit indices, in the larger context of the model the hypothesis that ego resiliency predicts subsequent social relatedness (i.e., paths from ER1 to SR2 and ER2 to SR3) was not supported in either reading or math revised models. Because of this, the overall study hypothesis that social relatedness would mediate the relationship between ego resiliency and subsequent academic engagement and achievement was not supported, and a Sobel test for indirect effects was not conducted.

A strength of the current study is that it utilized multiple reporters and measures (teacher-report, peer-report, and individually-administered student measures of full scale IQ and academic achievement). The longitudinal design and use of structural equation modeling to test the predicted model was also a strong means of testing the hypotheses. The large sample was ethnically diverse and was from both urban and suburban settings.

### *Noteworthy Findings*

There were several noteworthy findings in the study, despite the overall conceptual model not being supported. In the revised math model, the path between social relatedness at time 2 and engagement at time 3 was statistically significant, which is consistent with previous related findings with an overlapping sample (Hughes et al., 2008). This finding is consistent with the reasoning that social relatedness helps children feel more accepted and supported by peers and teachers, therefore promoting more classroom engagement. The current study extended the Hughes et al., 2008 finding in that this study utilized a latent variable consisting of ratings from multiple sources, two peer-ratings and one teacher-rating of relationship, to predict subsequent academic engagement.

Furthermore, it is noteworthy that the correlation between ego resiliency and the teacher warmth component of social relatedness latent construct was high (0.61). Whereas this correlation may be inflated due to source effects, it also suggests that children who have poor ego resiliency may be at increased risk of a lower quality relationship with their teachers. Given literature has consistently demonstrated the importance of a strong teacher-student relationship in promoting school success (Hughes

et al., 2001; Hughes & Kwok, 2007), the practical implications of the correlation between ego resiliency and teacher warmth is that teachers may need help in extending social support and warmth to children who are poorly regulated and not very adaptable.

Contrary to expectations, the path from social relatedness at time 2 to achievement at time 3 was not statistically significant in the math or reading revised model. For this sample, it appears that social interactions and support led to students being more engaged in learning, but did not directly predict improved achievement scores across the years that were available. Considering that previous findings have demonstrated a link between a related construct (effortful engagement) and subsequent achievement (Hughes et al., 2008), it is possible that social relatedness may take more time to impact academic outcomes. Given the reciprocal paths that emerged in the math model, with engagement at time 1 predicting math achievement at time 2, and math at time 2 predicting engagement at time 3, it would be interesting to extend the current study to a fourth year. It is plausible that the effects of social relatedness at time 2 may go on to predict math achievement at time 4, through the mediator engagement at time 3. Perhaps the social processes require more time to unfold than was possible to analyze in the current study. Or, the other variables and controls that were put in place in this model may have altered how the variables related to one another, and resulted in varied findings.

Another finding of interest was that ego resilience at time 1 directly predicted math achievement at time 3, despite controlling for IQ and previous levels of study variables. From this finding we propose that, while social interactions seem to impact

students' academic engagement across in the subsequent year, their level of ego resilience at school entry appears to be an important long-term contributor to math achievement two years later. Furthermore, the gender analyses indicated that ego resilience at time 1 had more effect on boys' subsequent reading achievement and engagement than girls'.

The practical implications of these findings are significant. Previous research has found evidence-based strategies to enhance emotional regulation, a construct related to ego resiliency, to be particularly important in pre-kindergarten and kindergarten (Webster-Stratton, Reid, & Stoolmiller, 2008). Providing screenings for young children who are at-risk for or who demonstrate self-regulatory problems and providing targeted coping/problem-solving interventions may promote improved resiliency and subsequent achievement. Since boys tend to demonstrate less developed executive functioning/self-regulatory skills at young ages (Matthews, Ponitz, & Morrison, 2009), individual differences in ego resilience likely play a larger role on their subsequent learning.

While the hypothesized relationship of ego resilience at time 1 predicting social relatedness at time 3 was not supported by the analyses, it is important to note that each of those factors appear to play an important, yet distinct, role in students' school success.

### ***Study Limitations***

It is possible that other processes not included in this study are responsible for impacting students' level of academic engagement and achievement. This model was only able to take into account a few of the variables and time points than have been associated in previous studies. Or, it may be that the expected results were not obtained



due to flaws in the overall conceptualization of the model. While ego resilience has been shown to relate to a broad array of outcomes, it does not appear to directly affect children's ability to relate to others in the presence of other variables in this study.

While other studies have found a connection between constructs similar to ego resilience and social relatedness (Block & Block, 1980; Hart et al., 1998), their methodologies were different than the ones used here. For example, Hart et al. (1998) found that ego resiliency at age 7 predicted social-cognition at ages 12 and 15, after they controlled for age 7 social cognition, IQ, and ego-control. Perhaps the current study was limited by the number of data points used, in that only the first three years of school were analyzed. It may be that as children enter late elementary, middle, and high school years, the impact of ego resiliency at the time of school entry on social relatedness would have been more substantial. Furthermore, it is likely that teacher-student relationships are more critical at this young age than are peer-relationships. The use of a latent variable containing both teacher and peer-relational components may have impacted the findings.

Though this model is similar in some ways to previous studies with an overlapping sample, it was unique in many ways. For example, the endogenous variables were measured differently in this study. The latent construct social relatedness was comprised of teacher and sociometric ratings, whereas previous studies relied on teacher-ratings of teacher-support to study a related construct. Kwok, et al. (2007) considered a construct they referred to as *resilient personality*, which was measured differently than was this study's ego resiliency. In this study, items that were construed

to involve relationship-factors were removed from the model so as to provide a more distinct or 'pure' view of ego resiliency, separate from social factors. Despite attempting to parse out these social factors from the exogenous variable (ego resiliency), it is possible that the results of the study were affected by suppression effects.

Another possible study limitation is the requirement that the participants scored below the median on a measure of literacy in order to qualify for participation. While this enables us to study how school entry characteristics and social interactions impact academic outcomes in a sample demonstrating higher risk for school failure, these findings may differ in a sample that includes higher achieving students.

Furthermore, the problem of missing data arose, as would be expected with a large longitudinal sample. To limit the effect of missing data on the results, attrition analyses were conducted. The overall rate of missingness for the 683 participants was 8.11%, thus the assumption that data were missing at random was deemed tenable.

Lastly, it is plausible that some findings were not consistent with previous studies due to the rigorous methodologies used in this study. By controlling for previous time periods and within wave covariates, and because of the complexity of the model, it is possible that these findings are a truer representation of how the variables relate to one another. While it is possible that the conceptual model is incorrect, it is also plausible that it has merit but was not proven in the context of these analyses or sample.

### *Implications*

Despite the lack of support for the hypothesis that social relatedness is the mechanism by which ego resilience positively impacts achievement and engagement,

there are important factors that require further study. In light of findings, future studies may seek to analyze whether ego resilience is linked directly with subsequent achievement and social relatedness directly impacts classroom engagement. Perhaps these two variables (ego resilience and social relatedness) work more independently in predicting these two distinct yet important components of school success. It is vital to continue studying how positive characteristics such as the ability to bounce back from challenges and accrue social resources can be cultivated in youth and how those characteristics work to promote success.

## REFERENCES

- Alexander, K. L., Entwisle, D. R., & Horsey, C. S. (1997). From first grade forward: Early foundations of high school dropout. *Sociology of Education*, *70*, 87–107.
- Asher, S. R., & Dodge, K. A. (1986). Identifying children who are rejected by their peers. *Developmental Psychology*, *22*, 444-449.
- Bentler, P. (2000, September 2). Judea's parameter overidentification. Message posted to SEMNET, archived at <http://bama.ua.edu/cgi-bin/wa?A2=ind0009&L=semnet&P=R1330&I=1>
- Block, J. H., & Block J. (1980). The role of ego-control and ego-resiliency in the organization of behavior. In W. A. Collins (Ed.), *Minnesota Symposia on Child Psychology, Vol. 13*, (pp. 39-101). Hillsdale, NJ: Erlbaum.
- Block, J. & Kremen, A. M. (1996). IQ and ego-resiliency: Conceptual and empirical connections and separateness. *Journal of Personality and Social Psychology*, *70*, 349-361.
- Bracken, B.A., & McCallum, R.S. (1998). *Universal nonverbal intelligence test examiner's manual*. Itsaka, IL: Riverside Publishing.
- Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press.
- Buhrmester, D., & Furman, W. (1987). The development of companionship and intimacy. *Child Development*, *54*, 1386-99.

- Buhs, E. S. (2005). Peer rejection, negative peer treatment, and school adjustment: Self-concept and classroom engagement as mediating process. *Journal of School Psychology, 43*, 407-424.
- Buhs, E. S., Ladd, G. W., & Herald, S. L. (2006). Peer exclusion and victimization: Processes that mediate the relation between peer group rejection and children's classroom engagement and achievement? *Journal of Educational Psychology, 98*, 1-13.
- Chen, Q., Liew, J., & Hughes, J. N. (2007). *The joint contribution of teachers' warmth and child effortful control on academic and social adjustment in the early elementary grades*. Paper presented at the meeting of the Society for Research in Child Development, Boston, MA.
- Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology, 18*, 557-570.
- Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology, 112*, 558-577.
- Conduct Problems Prevention Research Group (2004). *Teacher social competence*. Accessed September 29, 2007. Available from <http://www.fasttrackproject.org/techrept/t/tsc/>
- Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. Gunnar & L. A. Sroufe (Eds.),

*Minnesota symposium on child psychology* (Vol. 22, pp 43-77). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cumberland-Li, A., Eisenberg, N., & Reiser, M. (2004). Relations of young children's agreeableness and resiliency to effortful control and impulsivity. *Social Development, 13*, 193-212.

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

Diehl, D. S., Lemerise, E. A., Caverly, S. L., Ramsay, S., & Roberts, J. (1998). Peer relations and school adjustment in ungraded primary children. *Journal of Educational Psychology, 90*, 506-515.

Digman, J. M. (1989). Five robust trait dimensions: Development, stability, and utility. *Journal of Personality, 57*, 195-214.

Dodge, K. A., & Pettit, G. S. (2003). A biopsychosocial model of the development of chronic conduct problems in adolescence. *Developmental Psychology, 39*, 349-371.

Flook, L., Repetti, R. L., & Ullman, J. B. (2005). Classroom social experiences as predictors of academic performance. *Developmental Psychology, 41*, 319-327.

Fredrickson, B. L., & Losada, M. F. (2006). Positive affect and the complex dynamics of human flourishing. *American Psychologist, 60*, 678-686.

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology, 95*, 148-162.

- Garnezy, N., Masten, A., Tellegen, A. (1984). The study of stress and competence in children: A building block for developmental psychopathology. *Child Development*, 55, 97-111.
- Goodenough, C. (1993). Classroom belonging among early adolescent students: Relationships to motivation and achievement. *Journal of Early Adolescence*, 13, 21-43.
- Guay, F., Boivin, M., & Hodges, E. V. E. (1999). Predicting change in academic achievement: A model of peer experiences and self-system processes. *Journal of Educational Psychology*, 91, 105-115.
- Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development*, 72, 625-638.
- Hart, D., Keller, M., Edelstein, W., & Volker, H. (1998). Childhood personality influences on social-cognitive development: A longitudinal study. *Journal of Personality and Social Psychology*, 74, 1278-1289.
- Huey, S., & Weisz, J. (1997). Ego control, ego resiliency, and the five-factor model as predictors of behavioral and emotional problems in clinic-referred children and adolescents. *Journal of Abnormal Psychology*, 106, 404-415.
- Hughes, J. (1990). Assessment of children's social competence. In C. R. Reynolds & R. Kamphaus (Eds.), *Handbook of psychological and educational assessment of children* (pp. 423-444). New York: Guilford.

- Hughes, J. N., Cavell, T. A., & Willson, V. (2001). Further evidence of the developmental significance of the teacher-student relationship. *Journal of School Psychology, 39*, 289-302.
- Hughes, J. N., Gleason, K., & Zhang, D. (2005). Relationships as predictors of teachers' perceptions of academic competence in academically at-risk minority and majority first-grade students. *Journal of School Psychology, 43*, 303-320.
- Hughes, J. N., & Kwok, O. (2006). Classroom engagement mediates the effect of teacher-student support on elementary students' peer acceptance: A prospective analysis. *Journal of School Psychology, 43*, 465-480.
- Hughes, J. N., & Kwok, O. (2007). Influence of student-teacher and parent-teacher relationships on lower achieving readers' engagement and achievement in the primary grades. *Journal of Educational Psychology, 99*, 39-51.
- Hughes, J. N., Luo, W., Kwok, O., & Loyd, L. K. (2008). Teacher-student support, effortful engagement, and achievement: A three year longitudinal study. *Journal of Educational Psychology, 100*, 1-14.
- Hughes, J. N., Yoon, J., & Cavell, T. A. (1999). *Child, teacher, and peer reports of teacher-student relationship: Cross-informant agreement and relationship to school adjustment*. Paper presented at the biennial meeting of the Society for Research in Child Development. Albuquerque, NM, April 4, 1999.
- John, O. P., Caspi, A., Robins, R. W., & Moffitt, T. E. (1994). The "Little Five": Exploring the nomological network of the five-factor model of personality in adolescent boys. *Child Development, 65*, 160-178.



- John, O.P. & Sirvastava, S. (1999). The big five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin, & O. P. John (Eds.), *Handbook of personality: Theory and research* (pp.102-138). New York: The Guilford Press.
- Kline, R. B. (2004). *Principles and practice of structural equation modeling, Second edition*. New York: The Guilford Press.
- Klohnen, E. C. (1996). Conceptual analysis and measurement of the construct of ego-resiliency. *Journal of Personality and Social Psychology, 70*, 1067-1079.
- Kwok, O., Hughes, J. N., & Luo, W. (2007). Role of resilient personality on lower achieving first grade students' current and future achievement. *Journal of School Psychology, 45*, 61-82.
- Ladd, G. W., Birch, S. H., & Buhs, E. S. (1999). Children's social and scholastic lives in kindergarten: Related spheres of influence? *Child Development, 70*, 1373– 1400.
- Ladd, G. W., Kochenderfer, B. J., & Coleman, C. C. (1997). Classroom peer acceptance, friendship, and victimization: Distinct relational systems that contribute uniquely to children's school adjustment? *Child Development, 68*, 1181-1197.
- Letzring, Block, & Funder (2005). Ego-control and ego-resiliency: Generalization of self-report scales based on personality descriptions from acquaintances, clinicians, and the self. *Journal of Research in Personality, 39*, 395-422.
- Lewit, E. M., & Baker, L. S. (1995). School readiness. *Future of Children, 5*, 128-139.
- Little, M., & Koback, R. (2003). Emotional security with teachers and children's stress reactivity: A comparison of special education and regular-education classrooms. *Journal of Clinical Child and Adolescent Psychology, 32*, 127-138.

- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71*, 543-562.
- Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist, 56*, 227-238.
- Matthews, J. S., Ponitz, C. C., Morrison, F. J. (2009). Early gender differences in self-regulation and academic achievement. *Journal of Educational Psychology, 101*, 689-704.
- Meehan, B. T., Hughes, J. N., & Cavell, T. A. (2003). Teacher-student relationships as compensatory resources for aggressive children. *Child Development, 74*, 1145-1157.
- Muthén, L. K., & Muthén, B. O. (2007). *Mplus user's guide, Fifth edition*. Los Angeles, CA: Muthén & Muthén.
- Normandeau, S., & Guay, F. (1998). Preschool behavior and first-grade school achievement: The mediational role of cognitive self-control. *Journal of Educational Psychology, 90*, 111-121.
- Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research, 70*, 323-367.
- Pallas, A. M., Entwisle, D. R., Alexander, K. L., & Cadigan, D. (1987). Children who do exceptionally well in first grade. *Sociology of Education, 60*, 257-271.
- Rimm-Kaufman, S. E. & Pianta, R. C. (1999). An ecological perspective on the transition to kindergarten: A theoretical framework to guide empirical research. *Journal of Applied Developmental Psychology, 21*, 491-511.

- Rothbart, M. K., & Ahadi, S. A. (1994). Temperament and the development of personality. *Journal of Abnormal Psychology, 103*, 55-66.
- Sameroff, A. J. (1975). Transactional models in early social relations. *Human Development, 18*, 65-79.
- SAS. (2004). *Institute SAS/STAT software version 9*. Cary, NC: SAS Institute, Inc.
- Schafer, J. (1997). *Analysis of incomplete multivariate data*. London: Chapman & Hall.
- Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist, 55*, 5-14.
- Skinner, E., & Belmont, M. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*, 571-581.
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological methodology 1982* (pp. 290-312). San Francisco: Jossey-Bass.
- Thompson, R., & Goodvin, R. (2005). The individual child: Temperament, emotion, self, and personality. In M. Bornstein & M. Lamb (Ed.), *Developmental science: An advanced textbook, fifth edition* (pp. 391-428). Mahwah, NJ: Lawrence Erlbaum Associates.
- Valiente, C., Lemery-Chalfant, K., Swanson, J., & Reiser, M. (2008). Prediction of children's academic competence from their effortful control, relationships, and classroom participation. *Journal of Educational Psychology, 100*, 67-77.

- Webster-Stratton, C., Reid, M. J., & Stoolmiller, M. (2008). Preventing conduct problems and improving school readiness: Evaluation of the Incredible Years Teacher and Child Training Programs in high risk schools. *Journal of Child Psychology and Psychiatry, 49*, 471-488.
- Wentzel, K. R. (1991). Relations between social competence and academic achievement in early adolescence. *Child Development, 62*, 1066-1078.
- Woodcock, R. W., & Johnson, M. B. (1989). *Woodcock-Johnson psycho-educational battery-revised*. Allen, TX: DLM Teaching Resources.
- Woodcock, R. W., McGrew, K. S., & Mather, N. (2001). *Woodcock-Johnson III tests of achievement*. Itasca, IL: Riverside Publishing.
- Woodcock, R. W., & Munoz-Sandoval, A. F. (1993). *Woodcock-Munoz language survey*. Itasca, IL: Riverside Publishing.
- Zimmer-Gembeck, M. J., Chipuer, H. M., Hanisch, M., Creed, P. A., McGregor, L. (2006). Relationships at school and stage-environment fit as resources for adolescent engagement and achievement. *Journal of Adolescence, 29*, 911-933.

**VITA**

Name: Linda Loyd Dreke

Address: MS 4225  
704 Harrington Tower  
c/o Dr. Jan Hughes  
College Station, TX 77843-4225

Email Address: lkloyd@alumni.princeton.edu

Education: B.A., Psychology, Princeton University, 2002  
Ph.D., School Psychology, Texas A&M University, 2009