

CHILDREN'S SOCIAL COMPETENCE ACROSS THE TRANSITION TO  
KINDERGARTEN: A LATENT GROWTH CURVE ANALYSIS

Adam Holland

A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill  
in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the  
School of Education.

Chapel Hill  
2013

Approved by:

Rebecca New

Sharon Ritchie

Lynne Vernon-Feagans

Jeffrey Greene

Sam Oertwig

© 2013  
Adam Holland  
ALL RIGHTS RESERVED

## **ABSTRACT**

ADAM HOLLAND: Children's Social Competence across the Transition to Kindergarten: A Latent Growth Curve Analysis  
(Under the direction of Rebecca New)

This research examined children's social competence trajectories across the transition to kindergarten for three racial groups using a sample of children in the National Center for Early Development and Learning's Multi-State Study of Pre-Kindergarten. The analytic sample contained 939 children attending public pre-kindergarten programs in six states, with data collected in both the children's pre-kindergarten and kindergarten years.

Children's social competence was modeled as a function of an underlying trajectory, defined by initial status at pre-kindergarten entry but not a linear or non-linear slope. Poverty status, gender, and math achievement were used to predict trajectory intercepts while classroom emotional climate, teacher race, and teacher experience were used to explain deviations from anticipated trajectories. Model parameters were constrained to equality across groups to investigate the possibility of moderation by race. Key findings from the analysis indicated that children possessed flat social competence trajectories across the transition, which were influenced positively by math achievement and negatively by poverty and male status. Classroom emotional climate did not predict substantively significant deviations from trajectories in pre-kindergarten or kindergarten.

## **DEDICATION**

For my parents, to whom I owe all.

## TABLE OF CONTENTS

LIST OF TABLES.....	vii
---------------------	-----

LIST OF FIGURES.....	viii
----------------------	------

### Chapter

I.	STATEMENT OF THE PROBLEM.....	1
	Purpose and Significance.....	3
II.	LITERATURE REVIEW.....	5
	Developmental Systems.....	5
	The Transition to Formal Schooling.....	9
	Social Competence.....	11
	Factors Relating to Social Competence.....	13
	Social Competence across the Transition to Kindergarten: Rationale and Benefits.....	22
	Study Hypotheses.....	23
III.	METHODS.....	26
	NCEDL Study.....	26
	Instrumentation.....	28
	Analytic Method.....	32
IV.	RESULTS.....	38

	Descriptive Statistics.....	38
	Longitudinal Invariance.....	39
	Unconditional Models.....	40
	Exploratory Model and Cross-Validation.....	41
	Multiple Group Model.....	42
V.	DISCUSSION.....	46
	Social Competence Trajectories.....	47
	Factors Associated with Children’s Social Competence Trajectories.....	49
	Limitations.....	56
	Conclusion.....	58
	REFERENCES.....	70

## LIST OF TABLES

### Table

1. Sample descriptive statistics – child level.....	60
2. Sample descriptive statistics – classroom level.....	61
3. Continuous variable descriptive statistics for entire sample.....	62
4. Continuous variable descriptive statistics by race.....	63
5. Parameter estimates for the final multiple group model.....	64

## LIST OF FIGURES

Figure

1. Unconditional linear model.....	65
2. Unconditional quadratic model.....	66
3. Conditional intercept-only model.....	67
4. Hypothesized reference group intercept-only model.....	68
5. Final multi-group latent growth curve model.....	69



## **Chapter One: Statement of the Problem**

Since the Coleman report drew attention to racial differences in student academic outcomes in the United States, the achievement gap between white students and their minority counterparts has raised concerns from policy makers, educators, and researchers (Coleman et al., 1966; Lee, 2002; National Center for Educational Statistics, 1995). This achievement gap has been argued by many to have lifetime consequences, limiting opportunities for minority students as they seek employment, higher earnings, or to enroll in higher education (Lee, 2002; Murnane & Levy, 1996; Ogbu, 1994). Although the gap has narrowed considerably between 1971 and 2007, there continues to be a wide discrepancy between racial groups overall, with recent trends suggesting that progress on closing the gap has stalled or slowed (Lee, 2002; Hemphill, Vanneman, & Rahman, 2011; Vanneman, Hamilton, Anderson, & Rahman, 2009).

Research studies examining the nature of the achievement gap suggest that it is smallest at school entry but grows over the course of children's schooling careers (Entwisle, Alexander, & Olson, 1997; Murnane et al., 2006; Phillips & Chin, 2004). Such a phenomenon is known in common social science nomenclature as a Matthew effect and suggests that, as time goes on, those who begin with much will gain more while those with less will fall further behind (Walberg & Tsai, 1983). Moreover, it appears that the expansion of the achievement gap is concurrent with a similarly

widening class gap that further threatens American ideals of social equity and mobility (Putnam, Frederick, & Snellman, 2012; Reardon, 2011).

Although researchers have sought for decades to better understand the achievement gap, recent availability of large, nationally representative data sets and more sophisticated analytic techniques have allowed investigators to gain a more nuanced understanding of the factors that relate to it. In one such study, Phillips, Brooks-Gunn, Duncan, Klebanov, and Crane (1998) examined the gap by including in their analysis a number of correlates shown by past studies to relate to the achievement gap. They found that variables relating to family background and socioeconomic status (SES), in combination, explain roughly two thirds of the achievement gap in young children, but still leaving a full third of the variance in scores unaccounted for. Building upon this and similar findings, subsequent studies (e.g., Krueger, Rothstein, and Turner; 2006) have suggested that much of the remaining variance may be explained by *de facto* segregation of schools, which causes black and Latino children to attend lower quality schools than their white counterparts.

While a number of theories focus on the role of prior academic skills and instruction in the achievement gap (e.g., Allington, 1983; Krueger et al., 2004), they do not acknowledge explicitly other factors that researchers now understand to affect students' academic trajectories. One such factor is the development of social skills, a developmental accomplishment repeatedly found to affect children's adjustment to school as well as their later academic performance (Cooper & Farran, 1988; McClelland, Morrison, & Holmes, 2000). There are a number of possible mechanisms that explain this relationship. One such mechanism that has received empirical support suggests that

poor social skills lead to increased aggressive behavior which often results in conflict with teachers; in turn leading to decreased engagement on the part of the child in academic tasks (Stipek & Miles, 2008). However, this explanation simplifies what is likely a more complex, reciprocal interaction between social skills and academic achievement, wherein low academic achievement may also negatively influence engagement, thereby leading to further increases in externalizing behaviors (Hinshaw, 1992). With recent research highlighting the critical nature of what is conceptualized as social competence in influencing children's academic trajectories and schooling experiences, any comprehensive understanding of the achievement gap also requires a better understanding of children's social competence as it changes over time.

### **Purpose and Significance**

In this study, I examined the concept of social competence during children's transition to kindergarten. Social competence is poorly represented in the achievement gap literature in spite of the fact that the transition marks a time when children are being socialized to the demands and opportunities of formal schooling. Although many researchers have examined how children's environments prior to the transition relate to children's social skills (e.g., Mashburn et al., 2008), very little attention has been paid to the dynamic interactions between children and the unique classroom ecologies across the *entire* transition in relation to children's social-emotional development and their teachers' interpretations of their social competence. Without this knowledge, those working to reform children's schooling experiences are working against the odds in their efforts to reduce the achievement gap. This study employs a contextual theory of child development, along with advanced analytic techniques, to explore the degree to which

multiple ecological and within-child factors differentially relate to children's social competence in the classroom across both the pre-kindergarten and kindergarten years for children from racial groups on both sides of the achievement gap

## **Chapter Two: Literature Review**

Developmental Systems Theory serves as the conceptual framework for this study on social competence and children's successful transitions to and beyond kindergarten. Several bodies of scholarship inform this study, including developmental and educational research on transitions, particularly the transition to formal schooling, social competence, race and poverty, academic achievement, and the classroom emotional climate.

### **Developmental Systems**

Developmental Systems Theory (Ford & Lerner, 1992; Sameroff, 1983; Sameroff, 2010) posits that a dynamic interplay between individuals and their situated context drives development across the lifespan. That is, it is not only children and their environments themselves but also how the two interact and influence one another that drives children's development. This theory suggests that children will be differentially influenced by environments based on how their individual differences allow them to elicit and benefit from different things in their settings (Sameroff & Fiese, 2000). Synergies promoting positive development may be conferred to those children whose assets allow them to take greater advantage of environmental offerings while synergies restraining positive development may befall those whose assets leave them ill-equipped to benefit from positive environmental factors.

Taken together, children and their environments function as a system, with both within-child and environmental factors bi-directionally influencing one another (Gottlieb,

1996). Over time, such systems come to include structures and processes that work together, forming correlated constraints that place children on stable developmental trajectories (Magnusson & Cairns, 1996). When consisting largely of factors that positively influence development, such correlated constraints may place children on more stable, adaptive developmental trajectories. On the other hand, when such a system consists largely of factors that negatively affect development; children are more likely to be placed on trajectories typified by problematic patterns of adjustment (Cairns & Cairns, 1994; Farmer & Farmer, 2001). Because correlated constraints tend to produce stable trajectories, altering children's trajectories may require that a number of negative factors be improved upon in order to facilitate a lasting change in children's adaptive behavior and cognitions. This poses a challenge to those seeking to intervene for the purpose of promoting children's social competence, as multiple ecological factors may need to be altered in order to positively affect children's developmental and academic trajectories.

**Transitions.** Developmental psychologists and early childhood educators refer to changes from one context to another as *transitions*. Although the term may refer to something as small as movement from one classroom activity to another, an ecological transition is generally defined as a major change, such as the transition from school to post-scholastic career. These ecological transitions have been conceptualized as a crisis, providing unique opportunities for growth as well as for decline (Caplan, 1964). Because of rapidly changing ecologies, children's development undergoes a concurrent rapid shift. Some of these changes result from new roles and expectations for the child while others arise from new players and personalities (e.g., teachers, peers). Regardless of the source, changing environments generally cause disruption in social regularities, resulting in

disturbances in trajectories across a broad range of developmental domains (Bronfenbrenner & Evans, 2001; Seidman, 1988). The disruption of a wide variety of factors within a child's environments provides those interested in intervention an opportunity to radically change children's developmental trajectories. As many environmental factors change, children's systems are re-organized, potentiating a positive deflection in their developmental trajectories (Cairns & Cairns, 1994).

In order to intervene, though, stakeholders must first understand the manner in which critical factors affect and relate to one another during these transition periods. Pianta, Rimm-Kaufman, and Cox (1999) note that as systems become re-organized, new competencies may emerge, creating qualitative change for the child. In some cases, competencies which served to help a child succeed in the old ecology become valueless in the new one. Other times, skills and perspectives that provided little value before a transition allow children to blossom in new situations. For example, a child who previously experienced significant gross motor development in the fourth year of life where he spent much of the day playing outside, may be constrained developmentally in this area when recess is limited to 30 minutes or less per day. That same child's self-regulatory skills may develop significantly after the transition, as he is called to sit quietly in class for longer periods of time. Conversely, the child may resist or have difficulty adapting to the new, more sedentary environment. This example serves to highlight the nature of the environment in promoting or hindering children's competencies and in distinguishing between those competencies that are valued and those that are not. This fit (or lack of fit) between children's abilities and those deemed appropriate for the school setting is particularly evidenced in schools where cultural

values particular to that ecology serve to privilege some students and their ways of behaving and learning over others. Such a concept is similar to goodness of fit issues explored by researchers concerned with attachment and temperament, constructs that serve as precursors to social competence (Thomas & Chess, 1977; Crockenberg, 1981). In this case, because the dominant white, middle class culture of U.S. schools is often at odds with the funds of knowledge that accompany increasingly diverse populations of children. As a result of narrow and ethnocentric interpretations of competence, minority children – and especially black and Latino children, may be at a disadvantage, with their own social capital, skills, and prior knowledge ignored or undervalued (Moll, Amanti, Neff, & Gonzalez, 1992; Valenzuela, 1999; Vernon-Feagans, 1996). Teachers' interpretations of developmentally appropriate practice may be similarly out of sync with children's home routines, thus setting up a cycle of failure for the child (Mallory & New, 1994) in spite of continued efforts to make the concept more inclusive of cultural and sub-cultural differences (Bredekamp & Copple, 1997; Copple & Bredekamp, 2009).

Given the exceptionally broad range of child-care arrangements currently utilized in the United States (Morissey, 2009), the transition to formal schooling is not the first educational transition for most children. However, it is significant as it marks children's first entrance into an ecology which they will likely inhabit for the subsequent 11 to 13 years of their lives. The ecology of formal schooling, beginning in kindergarten, is markedly different from homes and pre-school settings due to its intentionality and focus on academic learning (Rimm-Kaufman & Pianta, 2000). As with most ecological transitions, the transition to formal schooling requires children to rapidly adapt to changing academic demands, routines, and new social and physical environments (Berlin,



Dunning, & Dodge, 2011). Sometimes the abruptness of such transitions is further exacerbated by the radically different nature of classrooms on each side of the transition (Preschool Curriculum Evaluation Research Consortium, 2008). Children's abilities to adapt to this change in priorities will influence their schooling careers, which will in turn affect their school achievement and its subsequent life-long consequences.

### **The Transition to Formal Schooling**

For most of the 20<sup>th</sup> century, the kindergarten was where children were socialized for formal schooling, beginning in the first grade. However, kindergarten has become increasingly academic in its own right due to new understandings of children's early learning potentials accompanied by a persistent curriculum pushdown (Bowman, Donovan, & Burns, 2000; New, 2003). As of 2011, approximately 74% of four year-olds were enrolled in some form of pre-kindergarten, the highest percentage of any year to date (Barnett, Carolan, Fitzgerald, & Squires, 2011). Acknowledging the growing importance of pre-kindergarten as a site for children's early learning and school readiness, the President, in his 2013 State of the Union Address, has advocated for universal preschool as it prepares children for formal schooling. Currently, then, the pre-kindergarten classroom has become the site for readiness activities and the transition demands have shifted to those associated with entering the kindergarten (Graue, 2011). A growing body of research highlights the importance of this ecological shift to children's subsequent school experiences.

Those children whose transitions to kindergarten are positive tend to excel socially and academically later in school (Pianta & Kraft-Sayre, 2003; Schulting, Malone, & Dodge, 2005). These children, who adapt quickly to the changing roles and demands

that accompany the shift to formal schooling, have better relationships with their peers and teachers, demonstrate greater academic achievement, and are happier with school in general. These early successes, in turn, provide children with the necessary tools to succeed in later years of schooling (Gutman, Sameroff, & Cole, 2003).

Unfortunately, not all children experience successful transitions into formal schooling. A national survey found that, according to kindergarten teachers, only half of all children made a successful transition to kindergarten (Rimm-Kaufman, Pianta, & Cox, 2000). A wide variety of factors are associated with these teachers' judgments, including the teacher's expectations for incoming students, family resources, children's social and cognitive development, pre-academic and readiness skills, and their socialization for life in the classroom. Many of these same factors affect how children themselves experience the transition. Clearly, some of these elements are particular to the child while others are particular to the home and school contexts, highlighting the dynamic relationships among the various systems associated with children's successful transition to formal schooling.

Regardless of the etiology of children's transition difficulties, there are a number of consequences. Just as success in navigating the transition to kindergarten may confer benefits that endure long after the transition is complete, so too have problems some students encounter in navigating the transition been associated with difficulties that continue to plague them throughout their school careers. Entwisle and Alexander (1993, 1998, 1999) in particular have demonstrated that differences between students at the transition into school are often exacerbated by a variety of factors that cumulatively lead to social stratification in later years. While many of these factors are endemic to the system and not necessarily the transition itself, this research makes a compelling

argument that children's levels of development and competence at the transition often form the basis for the system's subsequent stratification of children which, in turn, influences their long-term school trajectories.

### **Social Competence**

Wherever it occurs, schooling is inherently a social activity, wherein children participate in groups within confined settings that include peers, guided by a central adult or adults. In the United States, the typical arrangement for young children includes a classroom setting designed for specific age-graded populations within larger contexts that are also age specific (e.g., infant/toddler centers, pre-schools, elementary schools). Thus, the concept of readiness is also age- or grade-level specific, such that toddlers are increasingly expected to be toilet trained, preschoolers must be capable of an array of self-help skills, and kindergarten expectations include more than pre-academic skills. Research on children's successful transitions to kindergarten, increasingly interpreted as the first year of elementary school, points to the critical importance of an array of social and emotional skills deemed necessary to succeed in a formal schooling environment (Duncan et al., 2007). Although expectations related to readiness were once largely contextualized by the local community and school (Graue, 1992), an increased focus on literacy and math outcomes at the national level has caused greater homogenization of school readiness expectations (Graue, 2011). Research on topics such as self-regulation and executive functioning has added to the expectations associated with children's transitions to formal schooling (Blair & Diamond, 2008).

Dunn (1994), among others, has found that, prior to their entrance into formal schooling, many children have already developed some facility with skills of emotional

competence. Ladd, Birch, and Buhs (1999), on the other hand, have shown that there is significant variability in the socioemotional skill levels children bring with them as they transition to kindergarten. Because of the social nature of the educational system, children with more well-developed social and emotional skills possess a distinct advantage as they transition over those whose social and emotional skills are less mature (McClelland, Acock, & Morrison, 2006; Raver & Knitzer, 2002). That is, children who are able to effectively regulate their emotions stand to experience more positive social relationships with their peers as they are able to inhibit negative emotional outbursts while more effectively recognizing and appropriately responding to the emotions of others (Blair, 2002). Possessing such characteristics makes students more desirable to their peers as playmates while lacking such skills leads students to be rejected.

In order to experience a positive transition, it is not peers alone to whom children must relate. Relating positively to the teacher in the classroom also has significant benefits. Additionally, just as emotional competence influences peer relationships, it also relates strongly, for similar reasons, to child-teacher relationships (Furrer & Skinner, 2003; Howes, 2000; Pianta & Stuhlman, 2004). Teachers find children who are capable of regulating and understanding their emotions are pleasant to be around while those who suffer from emotional dysfunction tend to create negative situations which cause stress for the adults who must deal with them. Positive teacher-child relationships, therefore, tend to be associated with fewer behavior problems, greater levels of social adjustment, and higher academic achievement throughout children's elementary school years (Howes, 2000; Ladd et al., 1999). Here, the process of asset accumulation is clearly displayed. Children who enter school with high levels of social and emotional competence have

more positive peer relationships, successful child-teacher relationships, and higher levels of achievement than their peers for whom social competence is rated lower. These assets lead to children benefiting more from their transactions with others in the environment, thereby facilitating greater success in school (Pianta & Stuhlman, 2004).

### **Factors Relating to Social Competence**

**Gender.** Although biological development plays some independent role in dictating children's social competence trajectories, its effects are also moderated and mediated by the ecology in which the child develops (Sameroff, 2010). In few instances is this premise as evident as when researchers examine the role of gender in social competence. Disentangling the effects of biological and sociological gender differences is nearly impossible, but it remains clear that sex affects children's social competence beginning at an early age (Geary, Byrd-Craven, Hoard, Vigil, & Numtee, 2003).

In general, girls appear to possess greater levels of social competence as rated by parents and teachers. Geary and colleagues (2003) found that girls were more likely to show higher levels of emotional support through empathetic speech and actions, a greater ability to solve social problems, and more freely talked about their problems in ways that allowed them to cope with social difficulties. Sbarra and Pianta (2001) found similarly that girls exhibited fewer behavior problems and greater social competence than boys in early schooling situations. Winsler and Wallace (2002) found that both parents and teachers rated boys as having more problematic externalizing behaviors than girls. These findings collectively suggest that, statistically speaking, boys are likely to have both lower starting points and lower trajectory slopes as they develop social competence more slowly over time.

**Race and Poverty.** In the context of the United States, black and Latino children experience the burden of poverty at a much higher rate than their white counterparts, putting them at risk for a wide variety of problems in school (McLoyd, 1990). Because of this, race and poverty are often conflated in research dealing with young children's social competence. While much recent research continues to highlight their combined contributions, some is focused on disentangling the effects of one from another.

In general, research on children from poverty has documented lower levels of social competence in the classroom than their middle and upper class peers (Zill, Moore, Smith, Stief, & Coiro, 1991). Just as correlated constraints tend to limit the cognitive growth trajectories of these children, so too do they limit their social-emotional growth. Low maternal education, lack of adequate nutrition, exposure to dangerous neighborhoods, familial instability, and variable parent status all predict social adjustment issues, particularly when such risk factors accumulate in high numbers concurrently (Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999).

Each of these risk factors point to processes that serve to inhibit healthy development. In some cases, these factors directly affect the child. For example, inadequate access to food can serve to inhibit healthy brain development (Monckeberg, 1992). In other cases, risk factors may affect individuals surrounding the child in negative ways, leading to behaviors on their part which serve to negatively affect the child's development. For example, poverty and economic loss often lead to psychological distress for parents. This stress negatively affects parental behaviors and relations toward the child, contributing to later social problems (Abidin, 1992; Cabrera & Mitchell, 2009; McLoyd, 1990; Ritchie & Holden, 1998).

With respect to poverty's relationship with ratings of social competence, the direction of effects is confounded by other factors. Although poverty tends to be negatively associated with ratings of children's social competence in the classroom, research conducted over the last decade suggests that its influence may be different for individuals of different races. Black families, for example, in addition to being more likely to face poverty, are also more likely to face racial discrimination while seeking employment, more extensive segregation into poorer neighborhoods, and lower access to both monetary and social capital (Duncan & Aber, 1997; McLoyd, 1990; Murry, Smith, & Hill, 2001; Spalter-Roth & Deitch, 1999; Wilson, Tienda, & Wu, 1995). These factors could serve to further increase the negative effects of poverty beyond those experienced by a white family. On the other hand, a number of studies suggest that families of color draw support from their cultural and ethnic communities in ways substantially different from how white families seek support when entrenched in poverty (Garcia Coll et al., 1996; McLoyd, 1998). Such support structures could moderate the effects of poverty on children's social competence.

Raver, Gershoff, and Aber (2007) have used Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K) data to investigate some detailed mediating models examining the influences of income and parenting on children's school readiness with a particular focus on differences between white, black, and Hispanic families. They found, reassuringly, that the measures used to examine children's social-emotional readiness appear to function equivalently across groups. Additionally, the overall relationships between variables remained largely similar, with decreased family income predicting material hardship, which in predicted parent stress. Such increased parent stress was

associated with decreased levels of positive parenting behavior which in turn predicted lower levels of children's social competence. However, some of the individual paths within the model showed significant differences between groups. For example, although positive parenting behaviors predicted higher levels of social competence for all groups, the relationship was stronger for white families than for black or Hispanic families. Additionally, material hardship was more highly associated with increased parent stress in white and black families than in Hispanic families. Together, these differences suggest that race may serve as a protective factor, particularly for Hispanic children, as material hardship among Hispanic families carries a weaker association with stress and resulting reductions in positive parenting behavior have less of an association with decreased social competence.

Although Raver and colleagues (2007) found that being Hispanic or black may moderate the effects of poverty in a positive way with regard to social competence, other studies suggest that the opposite may be true. Shanahan, Davey, and Brooks (1998), for example, have found that Hispanic boys are particularly at risk for developing internalizing and externalizing behaviors when they live in prolonged periods of poverty at an early age. Additionally, Kalil and DeLeire (2002) found that a father's job loss was more negatively related to measures of school engagement and achievement among black youths than among white. Studies by Guttman and Eccles (1999) and Mistry and colleagues (2002) have shown no differences between children of different races with regard to poverty's effects on adjustment and functioning. There are a number of possible reasons for such disparate findings. The studies finding that being a person of color is a disadvantage deal largely with adolescent populations. It is possible that the



nature of the relationship between poverty and race shifts for children as they develop from young children into adolescence. Also, the methodology utilized in these studies involves varying degrees of sophistication. Because the study by Raver and colleagues (2007) involves the use of a multivariate approach with a large, nationally representative sample, it may provide more accurate information than studies that rely on a large number of linear regressions with smaller samples.

**Academic achievement.** Academic achievement is known to correlate strongly with teacher ratings of social competence (Miles & Stipek, 2006; Ray & Elliott, 2006). The nature of the relationship between the two, however, is complicated. Largely, studies utilize social competence as a predictor of academic achievement. However, other studies suggest that academic achievement may predict social competence. Very few studies have used an experimental design that would permit strong causal inferences. One study by Coie and Krehbiel (1984) provides some evidence of a causal effect. Specifically, improving students' social skills served to improve their reading comprehension. This study, though, had a small sample size and failed to control for the amount of time tutors spent with children, leaving some doubt as to the generalizability of the findings.

In more recent research, there is evidence for effects moving both ways, possibly suggesting a dynamic relationship between social competence and academic achievement. Theories centered on social competence driving development imply multiple possible mechanisms. For example, Coie and Dodge (1988) found that aggression and low social competence were related to children being off task and more likely to be reprimanded by teachers. Additionally, low social competence often leads to

poor relationships with school adults, which in turn leads to disengagement from academic work (Arnold, 1997; Chen, Rubin, & Li, 1997). Hinshaw (1992), reviewing work in the field, has found evidence to support this prediction, showing that aggressive behavior early in elementary school predicts poor literacy in later elementary or middle school. Studies focusing on work-related skills also point toward the possibility that this type of social skill influences early academic achievement by promoting children's ability to profitably engage in self-regulated learning (Cooper & Farran, 1988; McClelland et al., 2000).

On the other hand, theories suggesting that academic achievement affects social competence posit that struggling in school leads to frustration, which in turn leads to lower pro-social behavior and increased aggression. Miles and Stipek (2006) examined associations between aggression, pro-social behavior, and literacy achievement in children over the course of their elementary school years in order to provide evidence regarding the direction of the relationship. They found significant concurrent associations between aggression and literacy achievement as well as between social competence and literacy achievement at all time points when data were collected. The association between social competence and literacy achievement was strongest in children's early years in school but waned later. Further comparison of competing models suggested that it was poor literacy achievement in early years that led to higher aggression rather than the opposite.

While the relationship between literacy achievement and social competence has a fairly strong research base, research examining the relationship between math achievement and social competence in early childhood is less robust. However, research

concerning older children as well as math achievement and related constructs such as work-related skills and self-regulation/executive function may inform an understanding of the relationship between social competence and math achievement. For example, a study by Welsh, Parke, Widaman, and O'Neil (2001) focusing on children in grades one through five suggested that a reciprocal relationship exists between academic achievement as measured by both literacy and math scores and social competence. A study by McClelland, Acock, and Morrioso (2006) also showed that early learning-related skills were related to children's later math achievement trajectories. Finally, another study by McClelland and colleagues (2007) showed strong links between children's behavioral regulation and math skills, suggesting that the constructs are even more related than behavioral regulation and literacy achievement. It is possible that there is a causal relationship between math and various aspects of social competence. It is also possible that there is a single construct underlying success in both these areas (e.g., executive functioning).

Collectively, the findings from these studies suggest that the relationship between social competence and academic achievement is neither uni-directional nor static. It appears that early social competence and lack of aggression predict later academic success while a lack of early academic success may lead to increased aggression later. There is also likely to be a reciprocal relationship between the two as Wentzel (1991) has implicated social competence in middle school as a predictor of later academic achievement. Such findings highlight the importance of understanding the role of social competence in young children as it pertains to the achievement gap. These bodies of

scholarship converge on the premise that children's social competence at school entry plays a critical role in contributing to children's subsequent academic trajectories.

**Classroom emotional climate.** As the importance of social competence has become more recognized in the field, professionals and researchers have sought to improve children's social competence through classroom practices. Unfortunately, positively affecting children's social competence prior to the transition has proven more elusive than promoting their academic development. For example, the randomized Head Start Impact Study recently found that Head Start programs failed to impact children's social skills and social competence (Administration for Children & Families, 2005). Classroom approaches to affecting children's social competence often occur in one of two ways: through explicit interventions or through the classroom environment as a whole. There is mixed evidence with regard to both types of efforts to improve children's social competence prior to their enrollment in kindergarten. For example, the Stars program, an explicit intervention which focuses on behavioral and social behaviors during the summer prior to kindergarten, has been shown to significantly improve girls' transitions to kindergarten as reported by their teachers but not boys' (Berlin et al., 2011). The Getting Ready intervention, which focuses on working with parents among impoverished preschool children, has been shown to positively affect children's attachment behaviors and increase their initiative while decreasing anxiety and withdrawal behaviors after they transitioned to school (Sheridan, Knoche, Edwards, Bovaird, & Kupzyk, 2012). However, no effects were found on children's externalizing behaviors after a two year period.

Studies examining the effects of overall classroom environments on children's social and emotional development show mixed results as well. Mashburn and colleagues (2008), using data from two NCEDL studies, found that a positive emotional climate in preschool predicted greater social competence for children but also an increased number of problem behaviors at the end of pre-kindergarten. Burchinal and colleagues (2008) found similar results when examining the effects of pre-kindergarten climates on children's attributes at the end of kindergarten. Peisner-Feinberg and colleagues (2001) found that children's relationships with their preschool teachers predicted higher levels of sociability and fewer behavior problems over time with the effect tapering off as children grew older. Within that study, maternal education also appeared to moderate the relationship such that behavior problems tended to decrease for children whose mothers had completed college, regardless of initial closeness scores, while the trajectory for behavior problems remained stable for children whose mothers had only completed high school. This finding suggests that, as previously posited, children from lower SES families carry higher risk for social difficulties, particularly when their relationships with teachers are poorer.

In elementary classrooms, Wilson, Pianta, and Stuhlman (2007) analyzed not only whether classroom climate affected children's social competence but also which attributes of the emotional and instructional climate had significant effects. They found that classrooms in which children in classrooms characterized by greater positivity, sensitivity, allowance for autonomy, and evaluative feedback showed greater gains in social competence. Measures of social competence included not only teacher report but also observations by data collectors. Effect sizes, however, were small and these

classrooms did not appear to improve social competence more for children who were at risk for academic failure as the authors had predicted.

Examined together, these findings suggest that there is a small positive effect on children's social competence when they are in an emotionally supportive environment. Effect sizes appear to be larger in preschool than in elementary school classrooms. However, in nearly all the studies examined, some children benefited from positive classroom environments more than others. The mixed findings in some of these studies show the clear need for more research in this area.

### **Social Competence across the Transition to Kindergarten: Rationale and Benefits**

Developmental Systems Theory (Ford & Lerner, 1992; Sameroff, 1983; Sameroff, 2010) provides a broad theoretical framework for this study of children's social competence trajectories in the pre-kindergarten and kindergarten years. Within this framework, transitions may prove especially advantageous times during which to alter children's developmental trajectories (Cairns & Cairns, 1994; Seidman & French, 2004). While a majority of studies have focused on the contributions of child characteristics and classroom processes prior to the transition to children's development following the move into formal schooling, there is ample support and need for more focused attention to schooling immediately following the transition as a potential influence on those same outcomes.

This exploratory study was motivated by the goal of gaining a better understanding of how children's social competence as it is perceived by teachers changes across the transition to kindergarten. Using a multi-group latent curve analysis, the study examined how multiple time-invariant factors (i.e., poverty, gender, and academic

achievement) relate to children's changing social competence over time as well as how the time-variant factor of the classroom emotional climate perturbs such trajectories in both preschool and kindergarten. The multi-group analysis examined whether these trajectories remain the same and whether variables maintain similar relationships for children on each side of the achievement gap (i.e., black and Latino children versus white children).

### **Study Hypotheses**

Based on the prior review of the literature, this study tests the following hypotheses.

**Hypothesis 1.** A synthesis of research on the dynamic and developmental natures of children's social competence over time and in the diverse contexts in relation to transitions, classroom environments, and academic achievement warrants the hypothesis that the final reference model will adequately fit the data in this sample. That is, the model will correctly specify all the important relationships within the data, thereby permitting confidence in the resulting parameters.

**Hypothesis 2.** Research concerning the moderating effects of race on the aforementioned variables provides little clear guidance. Some studies suggest that being black or Latino may be a protective factor for children living in poverty (Raver, Gershoff, & Aber, 2007) while other studies suggest that it may exacerbate poverty's effects (e.g., Kalil & DeLeire, 2002). Males of color appear to have additional challenges beyond those predicted by their race and gender alone (Shanahan, Davey, & Brooks, 1998). Given these findings, I predict that models fit to white children will not fit adequately for black and Latino children. Further, significant differences will exist regarding the

associations between poverty and gender as well as between the starting points and trajectories.

**Hypothesis 3.** Far too much literature has confirmed the negative consequences of poverty on children's early development and subsequent school achievement. This literature supports the hypothesis that lower income (i.e., greater poverty) in the households of children in this study will be negatively associated with both the initial status and rate of growth for children's social competence trajectories.

**Hypothesis 4.** Research on the relationship between gender and social competence (e.g., Geary et al., 2003) supports the hypothesis that males will be rated by their teachers as possessing lower initial status and less positive growth with regard to their social development trajectories when compared to females.

**Hypothesis 5.** Literature regarding the nature of the relationship between math achievement and social competence is less clear for children of this age. However, sufficient new research exists on the relationship between learning-related skills and math (e.g., McClelland, Acock, and Morrison; 2006) to support the hypothesis that math achievement will be positively associated with both children's initial status and their social competence trajectories.

**Hypothesis 6.** Studies on classroom emotional climate and children's social competence have produced mixed findings. In some cases, classroom climate has a significant positive relationship, while in others the relationship is trivial or only exists for some groups of individuals. Effects of classroom climate on development appear to be greater in preschool (Peisner-Feinberg et al., 2001) than in elementary classrooms (Wilson, Pianta, & Stuhlman, 2007). Therefore, I hypothesize that preschool classroom



climate will be positively associated with children's social competence while the relationship with elementary classroom climate will be negligible. Consistent with Burchinal and colleagues' (2008) findings, I predict that pre-kindergarten classroom emotional climate will also be positively associated with children's social competence scores at both time points in kindergarten.

### **Chapter Three: Methods**

Developmental Systems Theory posits that children develop along trajectories in multiple domains. In this dissertation, children's social competence is framed as a process rather than merely as an incremental change from one time point to a second. Prior literature on children's development suggests that multiple factors affect this process as it unfolds over time. Because of the nature of this analysis, a large, diverse sample is needed. Such a sample is available in the Multi-State Study of Pre-Kindergarten (Early et al., 2005).

#### **NCEDL Study**

Data for this dissertation come from a large-scale study on the characteristics of pre-kindergarten conducted by the National Center for Early Development and Learning (NCEDL) from 2001-2003. The NCEDL Multi-State Study of Pre-Kindergarten examined the pre-kindergarten experiences of children in publicly funded pre-kindergarten classes in six states: California, Georgia, Illinois, Kentucky, New York, and Ohio (Early et al., 2005). These states were originally selected because each of them had spent significant money to develop large, state-funded pre-kindergarten programs. In addition to examining the pre-kindergarten experiences of the children, the NCEDL study also conducted observations and assessments during the children's kindergarten year.

Although the pre-kindergarten data from this study have been extensively examined and written about, the kindergarten data have received little attention in the literature.

In the original study, a multi-stage stratified random sampling procedure was used to recruit individuals. Prior to the fall of 2001, the researchers selected 40 sites at random from each state using a list provided by each state's department of education. In Georgia, Illinois, Kentucky, and Ohio, sites were selected from the entire state. In California and New York, due to the size of these states, specific regions were selected for participation. In California, 20 sites were selected from the greater Los Angeles area and 20 sites were selected from the Central Valley region. In New York, 20 sites were selected from the New York City area with the other 20 being selected from within a 50-mile radius of Albany.

Approximately 77% of eligible programs that were initially contacted agreed to participate in the study. When programs declined to participate, researchers replaced them with another randomly selected program when possible. In total, 238 sites participated in the initial data collection wave during the fall of 2001, with two additional sites joining in the spring of 2002. At each site, one classroom was randomly selected to participate. Approximately 94% of teachers recruited agreed to participate. At sites where the initially selected teacher declined participation, researchers randomly selected a new teacher. Researchers asked the parents of all children in participating classrooms to participate. Of those asked, 61% of the parents agreed to be a part of the study. From the pool of children with parental consent, data collectors randomly selected four students to participate in each classroom. Selected children had to be present on the date of the

first classroom observation. In total, 939 children participated in the study during the initial year of data collection.

In addition to understanding children's experiences in pre-kindergarten, researchers were also interested in how children participating in state-funded pre-kindergarten performed in kindergarten. Therefore, this study also includes data collected on the same children during their kindergarten year. Due to attrition, 882 children nested in 747 kindergarten classrooms participated in this portion of the study. The demographic characteristics of the children and classrooms participating in the sample may be found in Tables 1 and 2, respectively. It should be noted that this sample is meant to generalize to students participating in publicly funded pre-kindergarten programs in the study states rather than all children. Demographic characteristics highlight differences between these two populations (e.g., a higher incidence of children living in poverty).

### **Instrumentation**

Data for this dissertation represent a sub-set of the variables from the original NCEDL study. Those data selected for use in the following analyses were chosen based on their relevance to this study's conceptual framework and previously reviewed research literatures. In this study, data were drawn from four key sources: parent and teacher questionnaires, child assessments of math achievement, classroom observations, and teacher ratings of children's social competence. Parent questionnaires and child assessments were conducted during the fall and spring of the pre-kindergarten year. Teacher questionnaires were filled out by participating teachers in the fall of each year. Teacher ratings were collected in the spring and fall of both pre-kindergarten and

kindergarten. Child assessments were conducted in the fall of the pre-kindergarten year. Classroom observations were conducted twice during the pre-kindergarten year and three times during the kindergarten year with scores being averaged across observations to formulate an individual classroom's score.

**Teacher-Child Rating Scale (TCRS).** The TCRS (Hightower et al., 1986) provided scale scores of teachers' perceptions of children's social and behavioral problems. For this dissertation, only the Social Competence scale was of interest. Employing Rose-Krasnor's (1997) broad definition of social competence, the construct is defined as effectiveness in interaction with others resulting from a system of organized behaviors that serve to meet individuals' short- and long-term needs. This scale included 20 items measuring assertiveness, frustration tolerance, task orientation, and peer social skills. For each of the items, teachers rated children on a scale from one to five, indicating how well statements describe the child. Final scores on the scale consisted of the average of sub-scale scores. Internal consistency for the scale was high ( $\alpha = .94$  in the spring of pre-kindergarten). Data were collected using the TCRS in both the fall and the spring of each year. Scores from the fall and spring of both pre-kindergarten and kindergarten were used in this study. To address concerns of rater bias (c.f., Wigelsworth et al., 2010), teacher race and experience were included in the model as control variables.

**Child race, gender, and family income.** Demographic characteristics for each child were measured using a parent survey completed by parents in the fall of the pre-kindergarten year. Although the NCEDL study included children from a variety of racial identities, this study only utilizes data on children identified as white, black, or Latino. Although disaggregation of students who speak primarily Spanish from those Latino

students whose primary language is English may be of interest, the sample size did not permit such groups to be formed while maintaining enough power to detect meaningful differences between the groups.

Parents reported family income as belonging within one of a number of ordered categories. The original study researchers then converted this information to a binary variable indicating whether a family's income fell above or below 150% of the Federal poverty line at the time of the study. This binary variable was used in this study to indicate children's poverty status.

Finally, child gender was also reported by the parents at the beginning of the study. Each of these variables, including poverty, was treated as time-invariant. Preliminary analyses suggested that, for families in this data set, poverty status was largely stable. Using it as a time-invariant variable allows for an analysis of the degree to which time moderates its effects over the transition to kindergarten.

**Woodcock-Johnson III Tests of Achievement: Applied Problems Subtest.** In the NCEDL study, a number of instruments were used as measures of student achievement. For this study, I selected the applied problems subtest from the Woodcock-Johnson III Tests of Achievement (Woodcock, McGrew, & Mather, 2001). The applied problems subtest is part of a battery of measures, administered by trained data collectors, that examines the child's ability to analyze and solve math problems. The full battery took between 45 minutes and an hour to administer and took place during the school day outside the classroom. In order to ensure that the battery was correctly administered, data collectors submitted tapes of themselves conducting the assessments to a study supervisor. Internal consistency for the subtest in this sample was good ( $\alpha = .80$ ). It

should be noted that only students deemed proficient in English by their scores on the PreLAS completed this assessment. Although Spanish-speaking students also completed a Spanish version of the measure, the scores were not deemed valid by original study authors (D. Early, personal communication, October, 2012).

I selected this measure over other, similar measures in the study for a two reasons. First, the measure itself has been thoroughly examined by experts to establish that the scores it provides are valid and reliable for making inferences regarding student achievement. Second, scores on this measure are standardized and, unlike scores on some other measures administered through this project, approximate a normal distribution in this sample.

**Classroom Assessment Scoring System (CLASS).** The emotional climate of the classroom was measured using the CLASS (La Paro, Pianta, Hamre, & Stuhlman, 2002), an observational measure that focuses on interactions. Data collectors using this instrument were trained during the summer prior to the beginning of the study using both videos and live classroom visits. Inter-rater agreement for the CLASS was derived by comparing data collectors' coding of video tapes with gold standard coders' results. CLASS data collectors were initially tested prior to the pre-kindergarten year and re-certified prior to collection in kindergarten classes. During the re-certification phase, data collectors' mean weighted kappa was .60 ( $SD = .06$ ) on their final test. On average, 86% of data collector responses were exactly the same or within one point of matching gold-standard collectors' responses.

At the time of the NCEDL study, the CLASS assessed classroom quality in two domains (factors): emotional climate and instructional methods. This study will focus

only on the five dimensions measuring the emotional climate factor: positive climate, negative climate, teacher sensitivity, overcontrol, and behavior management. Positive Climate examines the enthusiasm and enjoyment teachers communicate to students about learning as well as the respect shown to children. Negative Climate reflects the degree to which a classroom has negative socioemotional tone and is indicated by aggression, frustration, harshness, and displays of anger. Teacher Sensitivity focuses on teachers' provision of reassurance, encouragement, and comfort to students. Overcontrol focuses on the degree to which teachers infringe upon students' autonomy in the classroom. Finally, behavior management concerns the degree to which teachers set clear, reasonable expectations for their students' behavior and consistently enforce those standards. Negative climate and overcontrol were reverse scored. Coefficient alphas for all dimensions were fairly high (positive climate  $\alpha = .77$ ; negative climate  $\alpha = .80$ ; teacher sensitivity  $\alpha = .78$ ; overcontrol  $\alpha = .90$ ; behavior management  $\alpha = .78$ ). Overall domain internal consistency was also high ( $\alpha = .84$ ).

An average of the scores on these five dimensions across all observations in pre-kindergarten and kindergarten were used to define two latent variables in accordance with the CLASS's structure at the time of the study: pre-kindergarten emotional climate and kindergarten emotional climate. Because the same measure was used to define the latent variable at two different time points, I tested the CLASS for longitudinal invariance prior to fitting the latent curve model.

### **Analytic Method**

**Latent curve modeling overview.** Latent curve modeling (LCM) was selected as the primary analytic method for this study based on its capacity to represent children's



social competence scores as a trajectory over time, incorporate both latent and manifest variables, and to test the equivalence of models across groups (Curran & Hussong, 2003). Using LCM, the patterns of scores across the sample allow an underlying pattern of change may be inferred. Since this pattern is unobserved, it is a latent trajectory. This latent trajectory is described by multiple latent variables. The intercept factor represents the starting point for the trajectory while the slope factor represents the direction as well as the rate at which change occurs across time points. An additional quadratic factor may also be added should a curvilinear trajectory exist. Individuals' social competence trajectories are modeled as a function of the average intercept and slope for the sample plus a residual which represents that individuals' deviation from the average trajectory. The variance of individual differences in trajectories is of interest as it indicates the degree to which individuals differ with regard to their development.

Within a conditional LCM, variables are added that predict the latent variables defining the growth curve (time-invariant predictors) as well as the scores at individual time points (time-variant predictors). Time, unlike in hierarchical linear modeling, is incorporated in LCM not as a variable itself but via the factor loading matrix. One interesting benefit of this approach is that time-invariant predictors (e.g., gender) may interact with time itself to affect the scores differently at different time points (Curran, Bauer, & Willoughby, 2004). Time-variant predictors, on the other hand, may be interpreted as predictors of individuals' scores at a specific time point above and beyond what can be accounted for by the individual's latent trajectory (Curran & Hussong, 2003). Put differently, time-variant predictors explain perturbations in scores at individual time points from values predicted by the individual's trajectory.

**Assumptions and issues.** Like all statistical analyses, LCM produces valid results only when researchers make certain assumptions regarding the data they use. For example, default SEM procedures assume that manifest variables follow normal distributions (Bowen & Guo, 2012). In order to assess the degree to which this assumption holds true, all manifest variables were visually inspected using histograms. Additionally, Bollen (1989) recommends examining data for influential outliers prior to conducting analyses. Such cases may lead to inadmissible solutions (Chen, Bollen, Paxton, Curran, & Kirby, 2001) or cause other issues with regard to estimation and interpretation. Therefore, stem and leaf plots of univariate distributions and scatterplots of bivariate distributions were also visually inspected. Outliers were handled on a case-by-case basis. All descriptive statistics were calculated using SAS Version 9.2 (Sas Institute, Cary, NC).

Default SEM procedures also assume independence of residuals. However, because children are clustered in classrooms, particularly in the pre-kindergarten year, these data violate this assumption. In order to account for the effects of this violation, though, I used robust standard errors that allow for correct inferences, accounting for the dependency in the data.

Another salient issue in correctly modeling the data concerns missing values within the data set. With such missing data, it is possible that these values are missing completely at random, missing at random (MAR) or missing not at random (MNAR). Older methods of dealing with this issue such as listwise deletion have been shown to lead to spurious conclusions and incorrect inferences when data are MAR or MNAR. However, modern analytic techniques, particularly full information maximum likelihood

estimation (FIML), allow researchers to more accurately model data while maintaining optimal type I error rates (Enders & Bandalos, 2001). Although the possibility exists that some of the data in this study are MNAR, adapting the model to account for this possibility would involve adding significant complexity to an already complex model. In order to maintain parsimony, I proceeded on the assumption that a majority of the data were MAR, allowing for the use of FIML to estimate the models using all available information in the data matrix.

Because teacher race and experience introduce known bias into the scores on the TCRS, it is important to control for these variables in the analysis. Teachers disclosed their race and experience as part of a questionnaire administered at the beginning of the pre-kindergarten and kindergarten years. In order to maintain parsimony, the race variable was converted to one with three values: black, white, and other.

**Model fitting.** Analysis of the data proceeded in four distinct steps. First, prior to using the CLASS measure as a latent variable in analyses, it was important to ensure that it was longitudinally invariant. That is, it should be measuring emotional climate in the same way in kindergarten that it is in pre-kindergarten. Tests for invariance identify varying levels of invariance on a continuum from weak to strong. Weak factorial invariance requires that a unit change in the latent variable, classroom climate, effect the same change in its indicators at both time points. Strong factorial invariance requires equivalent factor loadings and, additionally, that a zero score on the latent variable accompany the same intercepts on indicators at both time points. Weak factorial invariance was tested by estimating a model in which item intercepts were allowed to vary but factor loadings were fixed to be equal across groups. Finally, strong factorial

invariance was tested by fixing factor loadings and item intercepts to be equal across groups. Each model was compared to one in which both groups' models are freely estimated using the Satorra-Bentler scaled chi-square difference test statistic (Satorra & Bentler, 2001). Partial strong factorial invariance, a situation in which some loadings and intercepts were required to be equivalent while others were freely estimated, was also considered. For all models, the factor loading and intercept for the Positive Climate indicator were fixed to zero and one, respectively, for the purpose of model identification.

The next step in the analysis was to fit unconditional models to the reference group data in order to determine the shape of the growth curve. In this study, the reference group consisted of white children as this group contained the largest portion of the sample. Figure 1 shows the hypothesized unconditional linear model while Figure 2 shows the hypothesized unconditional quadratic model. A simpler, intercept-only model was also tested. Because these models are nested and estimated using robust maximum likelihood, Satorra-Bentler scaled chi square difference testing was used to compare the simpler intercept-only model to the more complex linear and quadratic models (Satorra & Bentler, 2001). Results of this test were used to aid in my decision regarding whether or not to retain the linear and quadratic terms.

The third step in the analysis was to include the covariates in a conditional model for the reference group. Figure 3 shows a full conditional linear model including all the relevant exogenous and endogenous variables. Due to the complexity of the model, it was anticipated that the model as specified may be prone to misfit due to unforeseen relationships. Therefore, a smaller random sample of 100 participants in the reference group was selected to fit the model in an exploratory manner. Then, the model was

cross-validated using the remainder of the reference sample. This model describes the relationships between the time-invariant and time-variant covariates and children's social competence trajectories for children in the reference group.

The final step was to fit the cross-validated conditional model from step three to the other two groups as well. In order to do this, all parameters within the model (variances, covariances, and means) with the exception of the residuals of the social competence measure were forced to be equal between the groups. This model was then compared to a less parsimonious model in which terms were not constrained to equality. Satorra-Bentler chi-square difference testing allowed for conclusions to be drawn regarding the similarity or differences between the groups with regard to children's social competence and how it relates to other variables within the model. All covariance structure modeling was conducted using Mplus Version 6.1 (Muthén & Muthén, 2007). Reports of model fit follow guidelines outlined by MacCallum and Austin (2000) and Hu and Bentler (1999) while effect sizes for path coefficients are reported as partial correlations.

## **Chapter Four: Results**

This chapter presents the results of this study in six sections based upon the plan of analysis: descriptive statistics, establishing longitudinal invariance, fitting unconditional models for the reference group, exploratory modeling with a smaller sample and cross-validation of the exploratory model, and comparing multi-group models.

### **Descriptive Statistics**

I calculated descriptive statistics, including distributions, in order to ensure decisions regarding my analytic approach adhered to recommended practices for dealing with statistical challenges. Means and standard deviations for all continuous variables within the entire sample are shown in Table 3; means and standard deviations for each racial group are shown in Table 4. Histograms revealed that most variables included in the full conditional models approximated a normal distribution. Notable exceptions to this were the Overcontrol indicator for the CLASS in both pre-kindergarten and kindergarten as well as the Negative Climate indicator in both pre-kindergarten and kindergarten. In all four cases, distributions were positively skewed and leptokurtic. However, because the robust maximum likelihood estimator (MLR) used in this study provides more accurate standard errors for data that are both non-normal and MAR than

full information maximum likelihood estimation, this should not be a concern (Yuan & Bentler, 2000). Stem and leaf plots confirmed the non-normal nature of these four variables but also suggested that there were no severe outliers on the continuous variables in this sample. Bivariate plots showed some small outliers but none major enough to warrant removal of a data point.

Examination of descriptive statistics suggests that, overall, children in this sample's social competence scores were slightly above average at all four time points. Scores on the Woodcock Johnson Applied Problems subtest were below the national average for both black and Latino children but very slightly above the national average for white children. The difference between CLASS scores for white, Latino, and black children's classrooms were quite small but white children's kindergarten classroom CLASS scores were nearly two points higher than black children's and one point higher than Latino children's. Black children's teachers had, on average, two more years of teaching experience than did the teachers of white children's and approximately 1.5 years of additional experience when compared to Latino children's teachers. White and black children's kindergarten teachers possessed comparable amounts of experience but the kindergarten teachers of Latino students had almost three years less experience.

### **Longitudinal Invariance**

The initial model for testing longitudinal invariance in the CLASS, in which no parameters were forced to equality, exhibited rather poor model fit,  $\chi^2(10) = 188.44$ ,  $p < .001$ ,  $CFI = .96$ ,  $SRMR = .05$ ,  $RMSEA$  C. I. = .122 - .156. Examination of modification indices suggested that errors for a number of the indicators were correlated. The model was re-run, allowing errors for Teacher Sensitivity to correlate with errors for Positive

Climate and Negative Climate and errors for Overcontrol to correlate with errors for Negative Climate and Behavior Management. Model fit was significantly improved,  $\chi^2(1) = 0.131, p < .718, CFI = 1.00, SRMR = .001, RMSEA \text{ C. I.} = .000 - .044$ .

The results from the test of weak factorial invariance suggested that weak invariance was supported, scaled  $\chi^2_{diff}(5) = 2.60, p = .761$ . Strong factorial invariance, however, was not supported, scaled  $\chi^2_{diff}(9) = 98.42, p < .001$ . Examination of modification indices suggests two main areas of misfit in the model. Specifically, the constrained factor loadings and intercepts of the Behavior Management and Positive Climate indicators were leading to model misfit. In order to test partial strong factorial invariance, the factor loadings and intercepts for the Behavior Management indicator were allowed to be freely estimated for both time points while the factor loadings and intercepts for the Positive Climate indicator remained fixed to identify the model. Partial strong factorial invariance was not supported as the remaining restrictions continued to cause a significant decrement in model fit, scaled  $\chi^2_{diff}(7) = 41.03, p < .001$ . Because partial strong factorial invariance was not supported, sum scores from the indicators were used to represent emotional climate. Although SEM explicitly models error correlations, this is not possible with sum scores. Due to the fact that high correlations between indicators' errors may suggest that they are providing redundant information (Wainer & Thissen, 2009), Negative Climate was not included in the sum scores so that they might provide a more accurate approximation of a classroom's underlying emotional climate score.

### **Unconditional Models**



The three unconditional models tested included a flat trajectory defined only by initial status (intercept-only), one defined by initial status and a linear slope, and one including a component of acceleration or deceleration (quadratic). Originally, covariances among latent growth terms were freely estimated while error terms for each social competence score were freely estimated and assumed to be uncorrelated with one another. However, initial intercept-only and linear slope models fit with these guidelines fit quite poorly (e.g., intercept-only:  $\chi^2(8) = 176.88, p < .001, CFI = .621, SRMR = .137, RMSEA C. I. = .197 - .254$ ). Modification indices suggested that errors for scores within each year (e.g., pre-kindergarten fall and prekindergarten spring) were correlated with one another. Because this correlation would be theoretically supported by the contextual nature of the social competence variable, scores were allowed to correlate with one another within each year. Comparison of the models after adjustment suggested that the fit of the intercept-only model,  $\chi^2(6) = 27.09, p < .001, CFI = .953, SRMR = .058, RMSEA C. I. = .058 - .128$ , was not significantly different than that of the linear model, scaled  $\chi^2_{diff}(3) = 4.46, p = .216$ , while also maintaining greater parsimony. Addition of the correlated error terms did not permit the estimation of the originally planned quadratic growth model as doing so would have required more degrees of freedom than were available. Unconditional modeling with the other two racial groups suggested similar trajectory shapes.

### **Exploratory Model and Cross-Validation**

Figure 4 shows the proposed model as fit to the exploratory sample from the reference group. Because this model fit the data quite well,  $\chi^2(29) = 38.32, p = .12, CFI = .942, SRMR = .059, RMSEA C. I. = 0 - .12$ , there was no need to make modifications.

**Hypothesis 1.** Results supported the hypothesis that the model would accurately describe the important relationships in the data. After fitting the proposed model to a small portion of the reference group sample, I then cross-validated the model by fitting it to the remaining members of the sample ( $N = 197$ ). Model fit was quite good,  $\chi^2(29) = 33.04$ ,  $p = .28$ ,  $CFI = .987$ ,  $SRMR = .045$ ,  $RMSEA$  C. I. = 0 - .051. Because the model fit well in the entire sample, it appeared to be accurately portraying the relationships within the data.

### **Multiple Group Model**

**Hypothesis 2.** Results did not support the second hypothesis, which predicted that models fit to white children would not fit adequately for black and Latino children. In order to compare models across groups, the model configuration shown in Figure 4 was fit to the data for all three groups (Reference  $N = 300$ ; Latino  $N = 94$ ; Black  $N = 159$ ), allowing parameters to be freely estimated for all three models. Then a more restrictive model, in which all parameters, with the exception of residuals on the social competence measures, were forced to equality across the groups, was estimated. (Because the residual variance terms for the repeated measures were not of substantive interest in this study, they were allowed to remain free.) The fit between the models was not significantly different, scaled  $\chi^2_{\text{diff}}(17) = 48.02$ ,  $p = .13$ . Therefore, the hypothesis of equivalence between groups cannot be rejected. This suggests that the model as estimated accurately portrays the relationships between variables for students in all groups. Results from the final model are shown in Figure 5 and Table 5, with the latter including standard errors,  $p$ -values, and partial correlation values for parameter estimates

as well. Final model fit, as with the reference group model, was quite good,  $\chi^2(119) = 128.75$ ,  $p = .26$ ,  $CFI = .989$ ,  $SRMR = .074$ ,  $RMSEA$  C. I. = 0 - .04.

**Hypothesis 3.** The hypothesized negative relationship between poverty and students' latent intercepts was supported. Specifically, expected social competence scores for children in poverty were 0.17 points lower than their counterparts in families whose incomes were above 150% of the poverty line. Because the model does not contain a slope term, this influence persists across all time points. The partial correlation between poverty status and children's intercepts was -.192.

**Hypothesis 4.** This hypothesis, which predicted that male status would be negatively associated with students' latent intercepts, was also supported. Males' social competence scores were predicted to 0.255 points lower than girls. As with poverty, this influence persists across the entire transition. The partial correlation between gender and children's social competence intercepts was .282.

**Hypothesis 5.** Results of this study also confirmed Hypothesis 5, such that math problem solving would be positively related to children's social competence intercepts, was supported. A one standard deviation increase in a student's Woodcock-Johnson Applied Problems subtest predicted a .42 standard deviation increase in their scores on the TCRS. The partial correlation between math scores and social competence intercepts was .421, making it the strongest predictor of children's social competence.

**Hypothesis 6.** The final hypothesis, which predicted that pre-kindergarten emotional climate would predict both pre-kindergarten and kindergarten emotional competence scores more strongly than kindergarten emotional climate, received partial support as pre-kindergarten classroom emotional climate had a significant positive

relationship with students' social competence scores at the end of pre-kindergarten after accounting for their existing trajectory. However, kindergarten emotional climate scores were not a significant predictor of students' social competence scores at the end of kindergarten after accounting for their trajectories. That said, a one standard deviation increase in emotional climate scores in pre-kindergarten only predicted a 0.02 standard deviation perturbation in social competence scores. While this is statistically significant in this sample, it does not represent a substantively significant association. Pre-kindergarten emotional climate scores were not significantly associated with children's social competence scores in fall and spring of kindergarten.

**Other results.** In addition to the results pertaining to specific hypotheses, this study also contained a number of other substantively meaningful parameter estimates relevant to the understanding of children's social competence across the transition to kindergarten. I outline some of the parameters and discuss their statistical significance as well as effect sizes in the following discussion.

The mean of the latent intercept was estimated as 2.107,  $p < .001$ , and may be interpreted as the expected value for a boy from a home with income at or below 150% of the poverty line who scored a 0 on the Woodcock-Johnson Applied Problems subtest. Although mean centering the Woodcock-Johnson scores may have eased interpretation of this parameter, doing so caused model mis-specification issues, necessitating the use of the traditional standardized scores. There was also significant variance of individuals' intercepts, suggesting a heterogeneous group with regard to social competence levels.

Although the literature suggested that teacher race was a significant predictor of student competence scores, this was not the case in this sample. Teacher race was not a

significant predictor of students' social competence scores after accounting for their latent trajectories at any time point. Teacher experience, on the other hand, was a significant predictor of student social competence score perturbations in the fall of pre-kindergarten and the fall of kindergarten. In both cases, greater experience predicted lower scores. In the fall of pre-kindergarten, each year of teaching experience predicted a score reduction of .007,  $p = .03$ , while in the fall of kindergarten, each year of teaching experience predicted a score reduction of .009,  $p = .007$ . These associations are substantively meaningful, particularly in kindergarten, where a teacher with 30 years of experience would be predicted to rate a child almost a half of a standard deviation lower than a first year teacher. Teacher experience was not, however, associated significantly with students' scores in the spring of either year after accounting for their latent trajectories.

Finally, within-year TCRS scores covaried significantly with one another. After children's intercepts were accounted for, scores possessed correlations of .53 in pre-kindergarten and .62 in kindergarten. This is consistent with the theoretical nature of the social competence construct as scores in the same year were generally provided by the same teacher and children were largely situated in the same environment at the time both sets of scores were assigned.

## **Chapter Five: Discussion**

Through the lens of Developmental Systems Theory (Ford & Lerner, 1992; Sameroff, 1983; Sameroff, 2010), this study capitalized on the potentials of a multiple group latent growth curve modeling approach to examine children's social competence trajectories across the transition to kindergarten as well as a number of factors that contemporary research has suggested are associated with this construct. More specifically, this study has improved upon past research methodologically in three key areas. First, as opposed to a mean difference model, I modeled children's social competence scores over time as representing a trajectory, with variables either influencing the trajectory itself or perturbing scores off that trajectory at specific time points. Second, I have focused on factors across the entire transition rather than simply examining the influence of events that occur before on outcomes after children begin kindergarten. Third, I used SEM techniques to examine whether or not model differences exist between three racial groups.

This study also provides a number of substantive contributions to understandings of children's social competence and their transitions to kindergarten, many of which have implications for classroom practice and policy. In this study, classroom emotional climate had no substantively significant relationship with social competence in either pre-

kindergarten or kindergarten. Child race was also not a significant contributor to social competence trajectories nor did race moderate the relationships between other factors and children's social competence. Variables that did matter point to new directions for research and classroom practices. Specifically, boys from low-income households were more likely to be rated as socially less-competent by their teachers; and this relationship persisted over time. Math problem solving achievement at the beginning of pre-kindergarten, on the other hand, was strongly and positively associated with children's social competence trajectories. In this chapter, I will discuss these key findings, noting their implications for practice and future research. I will conclude by noting the limitations of this study.

### **Social Competence Trajectories**

Given the dearth of literature on children's social competence trajectories during the time frame under consideration in this study, an exploratory approach was used to fit trajectories for the reference group in this sample (white children). Out of the unrestricted models fit to this sample, the intercept-only model provided the best fit, such that children's social competence trajectories were flat rather than growing or declining. In non-statistical terms, this means that teachers' ratings of children's social competencies did not change over time. Given that similar trajectories for elementary students between kindergarten and second grade contained positive slopes (Peisner-Feinberg et al., 2001), this was surprising. I will explore two possible explanations for this key finding.

First, although the TCRS is a criterion-referenced measure of social competence that does not seek to compare children to one another, it is possible that teachers

normalize results by making those comparisons of students in their classes to one another. One outcome of such a practice would be that, although individuals might make progress from year to year with regards to their social competence, their relative standing to their peers may remain unchanged. If their scores on the TCRS represent such a comparison, scores would remain largely stable from year to year.

Another intriguing explanation for stable scores over time concerns the nature of social competence as a contextual variable. That is, social competence is defined as much by the environment in which the child develops as it is defined by characteristics internal to the child. Should the environment increase expectations of children's social competence at the same rate children develop the competencies and skills that underlie the construct, scores would also remain stable. For example, as children's brains develop, their increasing facility with behavioral self-regulation permits them to remain still and attentive for longer in whole group settings (Blair, 2002). In a stable environment, this would result in increased scores on the TCRS. If, however, the amount of time children were asked to sit still was also increased at a pace consonant with their ability to self-regulate, scores would remain stable.

Support for this hypothesis arises from a close examination of the TCRS sample means at each time point. For all three sub-groups, scores start fairly low in the fall of the pre-kindergarten year. In the spring, scores rise as children develop greater facility in navigating the expectations of their classrooms. Scores then fall to their lowest points in fall of the kindergarten year when expectations for children's self-regulation radically shift, requiring much longer periods of inactivity. Scores then rise again in the spring of the kindergarten year as children's developmental capacities "catch up" to the



expectations of the new environment. The implication of such a finding is that the transition from pre-kindergarten to kindergarten with regard to expectations for children's self-regulation is abrupt. In order to create a smoother transition, kindergarten teachers should be mindful of the expectations they have for children's self-regulation as current kindergartens more closely resemble third grade classrooms than the pre-kindergartens from which children come (Holland, Ritchie, & Oertwig, 2013).

Further research is necessary to substantiate this explanation for the results in this study. An experimental or quasi-experimental design in which classroom activity settings (e.g., the length of time children are asked to spend in whole group) are manipulated would provide support for the causal nature of the environment's role in suppressing children's social competence scores. A study with a longer time frame would also rule out the possibility that every new year in school brings a drop in social competence scores as children enter new environments with new expectations. An increased number of data points within each year may also elucidate how children develop social competence within each individual classroom year. Better determining the classroom environment's role in dictating children's social competence trajectories remains an area ripe for future research.

### **Factors Associated with Children's Social Competence Trajectories**

**Race.** The hypothesis that the reference group model would not adequately fit the data for the other two racial groups was not supported. Such a finding implies that the pattern and strengths of relationships as well as the variance and mean of the intercepts within the model are equivalent across the three groups. This finding was surprising, as a number of studies have suggested that the relationships between social competence,

poverty, and gender have differing relationships in different racial groups. For example, Raver, Gershoff, and Aber (2007) examined the relationship between poverty and social-emotional readiness using the ECLS-K data set, finding a number of differences between racial groups including the relationships between parenting, material hardship, and social-emotional readiness for children in elementary school. In that sample, race served as a protective factor, buffering children from the negative effects of poverty. Other research by Shanahan, Davey, and Brooks (1998), has suggested that being Latino places students at greater risk of developing internalizing and externalizing issues when coupled with poverty.

The findings in this sample, however, suggest that for children making the transition to kindergarten, significant differences do not exist between poverty, math achievement, or gender's relationship to social competence across groups of white, black, and Latino children. Nor does classroom emotional climate appear to be differentially related to children's social competence. It is possible that such differences emerge later in children's schooling careers as the aforementioned studies examined older children. Specifically, factors that emerge later as risk or protective factors for children may not have time to significantly affect children's classroom social competence at this young age. Another possibility is that the transition is similarly challenging for all children, such that factors which buffer or exacerbate difficulties during typical periods of development do not make a significant difference around the transition to kindergarten. Qualitative research may serve to provide a more nuanced understanding of how children and families of different races construct this transition, allowing for a more nuanced

understanding of which factors lead to these similar models during this period of development.

**Poverty and gender.** The hypothesis that poverty status would be negatively associated with children's social competence trajectories was supported by the final model. This finding expands on findings in other research by a number of researchers (Ackerman et al., 1991; Zill et al., 1991), who have found that children from poverty in elementary school possess lower scores on measures of social competence than their peers who do not come from poverty, by suggesting that a similar relationship exists between poverty and social competence across the pre-kindergarten and kindergarten years.

The findings with regard to gender were similar. Prior research has suggested that significant differences exist for social competence between boys and girls before children arrive in school (Geary et al., 2003) and after (Winsler & Wallace, 2002). This study replicates those results for children in pre-kindergarten and kindergarten. As with those studies, boys were predicted to possess scores that were lower than girls' scores at all time points.

Interestingly, the effect sizes for both gender and poverty were similar. This is not entirely surprising as classrooms have not traditionally been hospitable places for boys or children from poverty (Davis, 2003; Lewis, Simon, Uzzell, Horwitz, & Casserly, 2010). Adding these influences together, boys from poverty are predicted to have social competence scores almost half of a standard deviation lower than their more well off, female peers at all time points. The skills many children from poverty bring to schools are often de-valued by the dominant culture in the educational systems in general; and

boys frequently have difficulty conforming to the expectations of their white, middle class female teachers specifically (Valenzuela, 1999; Vernon-Feagans, 1996). It seems likely that some of the negative association between gender and poverty status and social competence arises from this phenomenon. These findings add to the large body of data suggesting that schools have yet to accommodate to the diversity of children and learning styles in the classroom. Tolerance for the differing behavioral styles of children, valuing of additional skill sets, and altering of classroom structures to better fit with children's assets may yield opportunities to positively shape their social competence trajectories in the future, leading in turn to a narrowing of the achievement gap. Qualitative research may prove especially beneficial in describing the experiences of youth from poverty and boys during this time period to inform a richer understanding of their transition experiences.

**Math achievement.** The hypothesis that children's math problem solving scores would be positively associated with their trajectories was also supported by the final model. Of all the trajectory predictors, the relationship between math achievement and social competence was the strongest. As compared to the other predictors in the model, this effect size was twice that of poverty status and 1.5 times the size of gender's relationship with social competence. This finding expands research from Miles and Stipek (2006) as well as Ray and Elliott (2006), suggesting that a strong relationship exists between these constructs across the transition to kindergarten as well as in elementary school as prior research has suggested.

Current theory suggests that the relationship between these constructs is dynamic (Hinshaw, 1992; Welsh, Parke, Widaman, & O'Neil, 2001). However, there is also

research indicating that the strong relationship between these constructs is due to their joint reliance on children's executive functioning (Blair & Razza, 2007; McClelland, Cameron, Wanless, & Murray, 2007). This finding, therefore, reinforces the critical importance of fostering executive function in young children. This finding points to the need for teachers and teacher educators to better understand the sources and consequences of children's executive functioning as foundational to children's academic and social development. Further, it highlights the need for more focused attention to the qualities of early learning environments that are supportive of this early brain development. Longitudinal and experimental research on young children that examines these three variables (social competence, mathematical problem solving, and executive functioning/self-regulation) simultaneously would aid in providing a clearer picture of the direction of effects among these constructs in early childhood.

**Emotional climate.** I hypothesized that the pre-kindergarten classroom emotional climate would be positively associated with children's social competence scores while kindergarten emotional climate would have a weaker relationship. However, emotional climate did not appear to have a strong, substantive relationship with children's social competence at any time point. These findings are similar to some studies surrounding the transition while running counter to others. In a study by Hamre and Pianta (2005), for example, classroom emotional climate was not strongly related to reductions in teacher-student conflict, a construct related to social competence. A study conducted by Mashburn and colleagues (2008), however, found emotional climate to be a strong predictor of children's teacher-rated social competence at the end of the pre-kindergarten year. What is interesting about the difference between the results in the

study by Mashburn and colleagues (2008) and this study is that they utilize the same data set. It is likely, then, that these differences arise from the different approaches other studies have utilized in conceptualizing social competence over time. The study by Mashburn and colleagues (2008), for example, is a mean difference study focused solely on pre-kindergarten while this study conceptualizes children's social competence as a trajectory over a two year period. Another study, conducted by Burchinal, Vandergrift, Pianta, and Mashburn (2010), has found that relationships between certain aspects of classroom quality and outcomes such as academic achievement and social competence may only exist within certain ranges on each variable. Therefore, it is possible that classroom emotional climate relates to mean differences over a short period of time or in certain ranges of quality but not to perturbations off a child's social competence trajectory as it unfolds between the beginning of pre-kindergarten and the end of kindergarten across classrooms of more varying quality.

The finding that emotional climate was not associated with children's social competence trajectories is not optimal, given the conceptual congruence between the two; and yet, this study should not be interpreted as meaning that emotional climate does not matter. Nor do these results suggest that children's emotional competence may not be affected by processes in the classroom. Past research has clearly established the strong positive relationship between emotional climate as measured by the CLASS and children's academic achievement (Hamre & Pianta, 2005) in elementary classrooms. Other studies (e.g., Howes, Hamilton, and Matheson; 1994) have found that teachers can have a positive effect on young children's social competence by purposefully scaffolding their peer interactions throughout the year. Therefore, while emotional climate did not

have a strong positive relationship with social competence in this study, it is possible that it has a more complex relationship with children's broader development. For example, positive climate may influence academic achievement, which in turn may influence later social competence. It is also possible that a positive emotional climate is foundational for children in classrooms, providing them with a safe, stable environment that allows other, more purposeful interventions to operate more effectively. Last but not least, the CLASS is a global measure of classroom quality. Therefore, it may not capture the experiences of the individual children whose social competence was measured in this study. A more focused instrument may have yielded different results. More research is necessary to clarify the role emotional climate plays in young children's development around the transition to kindergarten.

**Teacher characteristics.** While teacher experience was a significant predictor of children's social competence scores, teacher race was not. Although past research has suggested that black teachers tend to assign higher scores to children on the TCRS (Pigott & Cowen, 2000), that was not found to be the case in this sample. Teacher experience, on the other hand, had a negative relationship with children's initial scores in both pre-kindergarten and kindergarten. Specifically, the longer a teacher had taught, the lower the scores they assigned. Teachers with more experience may benchmark children against more well-behaved children from that teacher's past while newer teachers lack as many children against which to compare them. It is also possible, though, that age and experience are confounded here, with older teachers being less tolerant of their young children's difficulties with issues such as self-regulation. Regardless of the reason behind it, this finding is important for researchers in future studies to keep in mind, as

teacher experience will need to be entered into models as a covariate to prevent it from biasing children's scores downward.

### **Limitations**

As with all research, there are limitations to this study. First, this study was correlational in nature, suggesting relationships rather than allowing causal inferences. Although it is often tempting to infer cause, care should be taken in drawing such conclusions from the analyses performed here.

This sample is also not nationally representative. While it spans a number of states and contains a large number of children, it may not adequately represent the experiences of children in parts of the country from which children were not drawn. Similarly, the study from which these data emerged was focused on public pre-kindergarten programs. Even within the states from which these data came, children attending private pre-kindergarten or no pre-kindergarten may develop in markedly different environments and possess trajectories unlike those in this study. Also, because Latino children proficient in English were mixed with those who were not, generalizations regarding this sub-group should be made with caution. Future studies are necessary to extend the generalizability of these findings beyond children attending public pre-kindergarten in the aforementioned states and to bolster the findings for Latino children.

The time frame for this study was relatively small. Two years is a short period in a child's life. A broader view may affect the conclusions drawn here as more data would provide greater insight into children's social competence trajectories and place the transition itself more accurately in the course of children's development. Specifically,



the flat trajectories found in this study, when expanded, may be better fit with sinusoidal trajectories. Only examination of children's social competence over a longer time period after kindergarten would allow for the fitting of such models. On the other hand, expanding studies to include younger children would better account for previous transitions as well as better elucidate how social competence develops in younger children prior to this important transition.

Because this study consisted of a secondary data analysis, I was unable to select my own measures and survey questions. It is possible that the measure of social competence used in this study was not sensitive enough to capture children's development of social competence in the classroom. That is, because it is designed to be stable over short amounts of time, it may not be capturing legitimate changes in children's social competence over the two year span of this study. Additionally, the inclusion of more ordered categories in the parent survey questions pertaining to family income would have allowed for more cut points, allowing me to explore more fully the relationship between poverty, social competence, and race. Finally, there was very little variance in the CLASS emotional climate scores in this sample, inter-rater agreement was low, and longitudinal invariance was not achieved. Any of these issues may have led to attenuation of the relationship between emotional climate and children's social competence scores.

Finally, statistical modeling nearly always involves a balance between parsimony and accuracy. No social science model ever contains all the relevant variables. The best a researcher may hope for is to accurately capture the most important relationships. In estimating the models here, I have worked within the bounds of the data set to which I

had access, choosing variables that past research had suggested are important in crafting an understanding of children's social competence. However, it is not only possible but likely that other variables exist which affect children's classroom social competence. The failure to include these variables could affect the validity of the conclusions I have drawn from the models estimated in this study.

## **Conclusion**

This study was motivated in response to growing concerns regarding the achievement gap and the need for greater understanding of its origins in early childhood. By focusing on children's social competence during their early transitions to formal schooling, I have sought to provide new insights into one factor related to the gap as well as potential avenues and analytic techniques for future inquiry. Of special interest is the finding that race is not significantly associated with different social competence trajectories as children enter formal schooling. Rather, their social competence trajectories were more likely to be predicted by poverty, gender, and prior math problem solving ability. Specifically, boys from low income families with low math achievement scores tended to possess lower social competence as rated by their teachers. Given that children of color are more likely to bear the burden of poverty in the United States (McLoyd, 1990), these findings add support to research noting that boys of color with lower levels of pre-kindergarten academic achievement are at greater risk for difficulties as they seek to successfully navigate the schooling system. There is a strong need for schools to find ways to better address the strengths and needs of these young students if there is ever to be a hope of closing the achievement gap.

Also, given that math problem solving was the strongest predictor of students' social competence trajectories, researchers and educators may wish to pay increased attention to the link between these constructs. More research is necessary to establish whether the relationship during this time period is due to a dynamic relationship, such that providing opportunities for students to solve complex problems and explain their thinking would boost social competence; or to a shared underlying cause, such that boosting executive function would serve to improve both children's problem solving abilities and their social competence in the classroom.

The purpose of any good research is to expand the base of human knowledge and understanding. In doing so, researchers gain a better understanding of phenomena but also elucidate what has yet to be learned. That is, research provides information but is also generative, provoking new questions. In this study, I have modeled children's social competence across the transition to kindergarten as a trajectory that unfolds over time. The findings from this study indicate that scores remain stable over time and are influenced negatively by poverty and male gender, positively by math achievement. The patterns of relationships were similar for young white, Latino, and black children. These findings suggest that social competence is rightly viewed as a contextual variable rather than as one internal to the child and that in light of that fact, contexts must change if trajectories are to take on a positive slope. Although these findings illuminate certain aspects of children's social development, they also beg new questions, providing the groundwork for more research on the subject of children's social competence.

Table 1  
*Sample descriptive statistics – child level*

	<i>n</i>	Percent
Sample Size	939	100%
Gender		
Male	480	51.1%
Female	459	48.9%
Ethnicity		
Asian	13	1.4%
Black	220	24.1%
Latino	229	25.1%
White	370	40.6%
Other	79	8.7%
Family Income Below 150% of Poverty Line	387	43.5%
Home Language		
English	808	86.0%
Spanish	181	19.9%

*Note.* Survey data from spring of pre-kindergarten year

Table 2

*Sample descriptive statistics – classroom level*

	<i>n</i>	Percentage
Sample Size	747	100%
Teacher Education Level		
Associates	13	1.5%
Bachelors	456	61.0%
Masters	269	36.0%
Teacher Race		
Asian	14	2.0%
Black	68	9.6%
Latino	56	7.8%
White	544	76.6%
Multiracial	29	4.1%
Full Day Kindergarten	621	83.1%

*Note.* Survey data from fall of kindergarten year

Table 3

*Continuous variable descriptive statistics for entire sample*

	<i>n</i>	Mean	Std. Dev.	Skewness Ratio	Kurtosis Ratio
Social Competence I	927	3.41	0.75	-0.09	-0.58
Social Competence II	949	3.58	0.77	-0.22	-0.60
Social Competence III	823	3.38	0.76	-0.23	-0.49
Social Competence IV	821	3.47	0.76	-0.11	-0.64
PreK Positive Climate	1015	5.06	0.92	-0.68	-0.02
PreK Negative Climate	1015	1.72	0.79	2.04	5.42
PreK Overcontrol	1015	1.91	0.87	1.50	2.53
PreK Teacher Sensitivity	1015	4.47	1.07	-0.54	-0.20
PreK Behavior Management	1015	4.79	0.99	-0.58	-0.19
K Positive Climate	885	5.17	0.78	-0.57	0.31
K Negative Climate	885	1.51	0.65	2.22	6.09
K Overcontrol	885	1.88	0.76	1.02	1.20
K Teacher Sensitivity	885	4.69	0.89	-0.31	-0.07
K Behavior Management	885	5.22	0.80	-0.60	0.40
Woodcock Johnson Applied Problems	790	97.14	13.14	-0.26	0.24
PreK Teacher Experience	989	13.20	9.30	1.00	1.72
K Teacher Experience	860	14.41	9.96	0.78	0.44

*Notes.* CLASS scores composed of averages of all observations conducted during the year; Woodcock Johnson Applied Problems sub-test administered in the Fall of the pre-kindergarten year

Table 4  
*Continuous variable descriptive statistics by race*

	<i>N</i>	Mean	Std. Dev.	Skewness Ratio	Kurtosis Ratio
Social Competence I					
White	386	3.53	0.75	-0.22	-0.57
Latino	226	3.34	0.67	0.17	-0.24
Black	222	3.32	0.78	-0.13	-0.66
Social Competence II					
White	393	3.66	0.77	-0.26	-0.65
Latino	233	3.51	0.82	0.01	-0.71
Black	225	3.54	0.82	-0.36	-0.47
Social Competence III					
White	393	3.45	0.77	-0.35	-0.36
Latino	196	3.31	0.67	-0.23	0.16
Black	195	3.33	0.80	-0.15	-0.83
Social Competence IV					
White	340	3.53	0.78	-0.12	-0.81
Latino	201	3.46	0.66	0.12	-0.38
Black	195	3.41	0.78	-0.12	-0.61
PreK CLASS Sum Score					
White	418	20.8	3.07	-0.68	-0.49
Latino	250	20.45	2.81	-0.83	0.43
Black	240	19.64	3.60	-0.54	-0.45
K CLASS Sum Score					
White	367	21.95	2.48	-0.49	0.39
Latino	261	21.08	2.12	-0.15	-0.41
Black	210	20.02	2.81	-0.34	-0.05
Woodcock Johnson Applied Problems					
White	377	100.29	13.08	-0.40	0.55
Latino	117	94.30	11.78	-0.16	1.65
Black	217	93.22	12.43	-0.17	-0.09
PreK Teacher Experience					
White	408	12.52	8.67	0.57	-0.63
Latino	240	13.14	8.11	0.85	0.66
Black	238	14.67	10.99	1.16	2.13
K Teacher Experience					
White	360	15.26	10.03	0.67	0.39
Latino	203	12.83	9.87	0.93	0.66
Black	208	15.16	10.28	0.84	0.49

*Note.* CLASS Sum Score refers to total score on Emotional Climate indicators

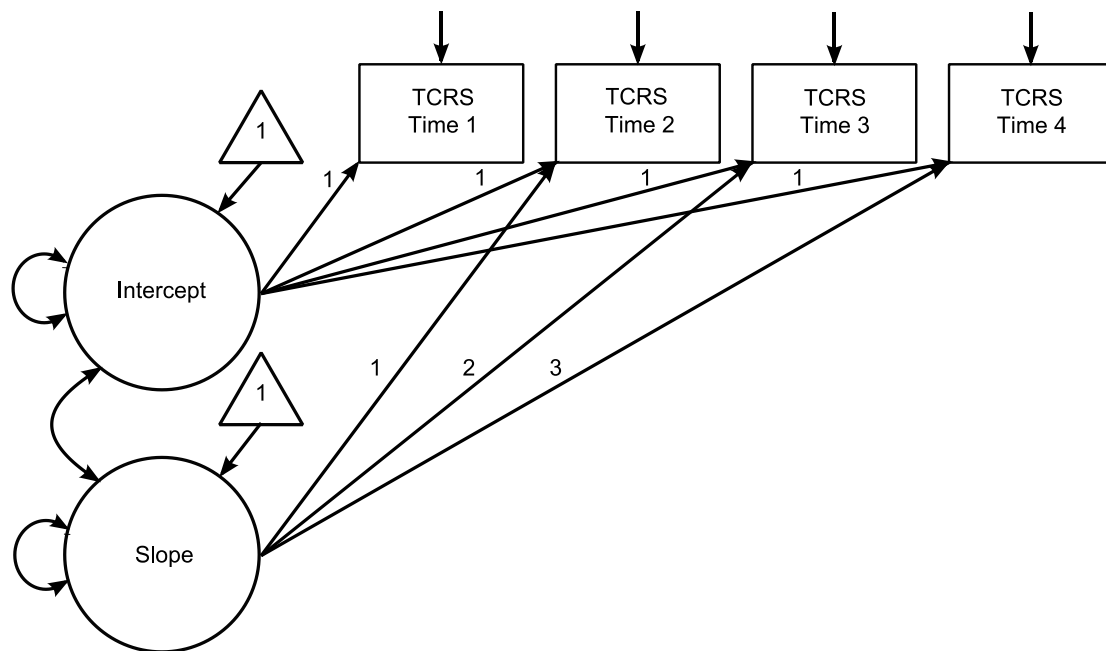
Table 5

*Parameter estimates for the final multiple group model*

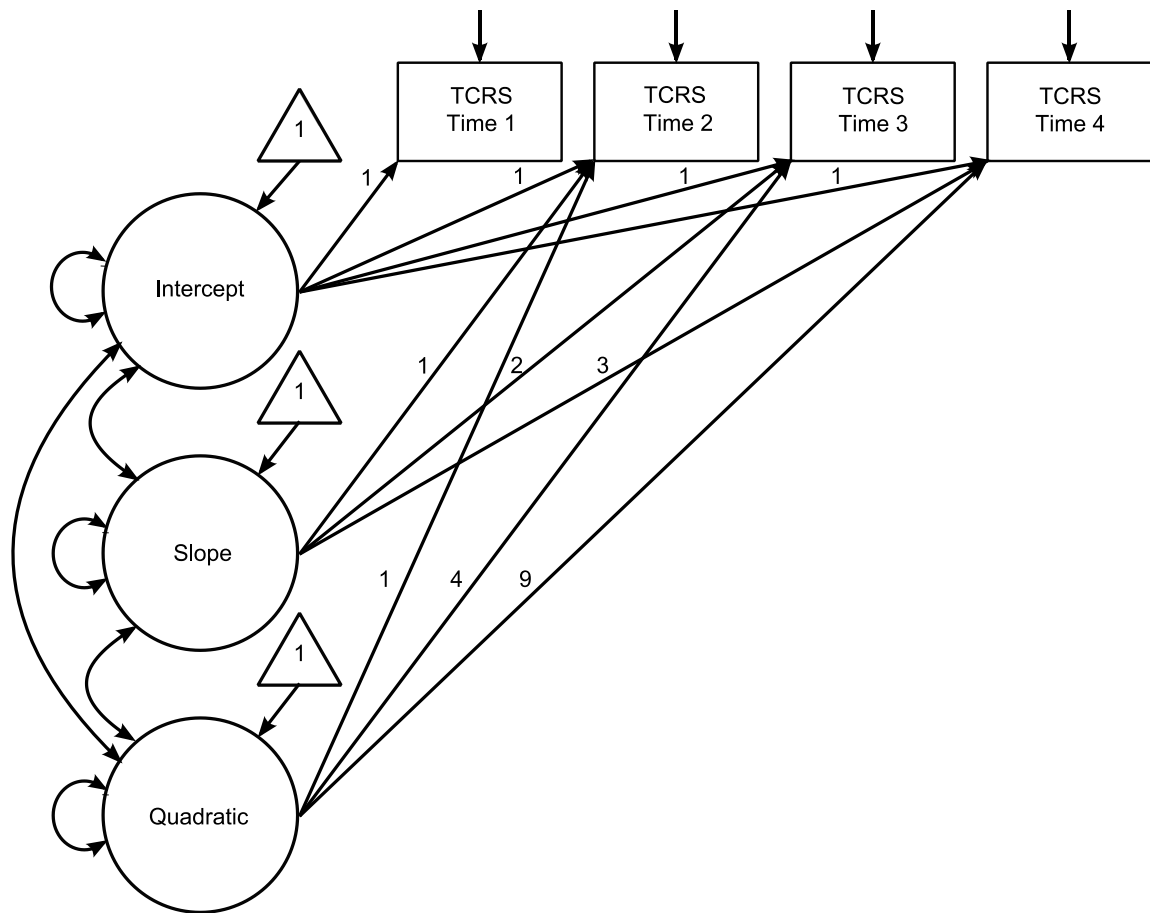
Parameter	PE	SE	p-value	r
Intercept Mean	2.102	0.192	<.001	-
Intercept Residual Variance	0.136	0.022	<.001	-
Intercept on				
Poverty Status (Poverty=1)	-0.171	0.045	<.001	-.191
Math Achievement	0.015	0.002	<.001	.422
Gender (Female=1)	0.250	0.045	<.001	.284
PreK Fall TCRS on				
Teacher Race (Non-White=1)	0.014	0.069	.838	.006
Teacher Experience	-0.006	0.003	.041	-.078
PreK Spring TCRS on				
Teacher Race	-0.002	0.079	.979	-.001
Teacher Experience	-0.003	0.004	.424	-.038
PreK Emotional Climate	0.005	0.002	.022	.019
K Fall TCRS on				
Teacher Race	0.115	0.081	.157	.038
Teacher Experience	-0.010	0.003	.001	-.144
PreK Emotional Climate	-0.002	0.003	.573	-.008
K Spring TCRS on				
Teacher Race	0.132	0.080	.099	.042
Teacher Experience	-0.004	0.003	.249	-.049
PreK Emotional Climate	-0.008	0.007	.573	-.035
K Emotional Climate	-0.001	0.002	.754	-.002
Covariances				
PreK TCRS Scores	0.182	0.027	<.001	.517
K TCRS Scores	0.211	0.026	<.001	.612
White Residual Variances				
PreK Fall TCRS	0.329	0.030	<.001	-
PreK Spring TCRS	0.374	0.034	<.001	-
K Fall TCRS	0.322	0.030	<.001	-
K Spring TCRS	0.370	0.033	<.001	-
Latino Residual Variances				
PreK Fall TCRS	0.336	0.052	<.001	-
PreK Spring TCRS	0.379	0.056	<.001	-
K Fall TCRS	0.309	0.045	<.001	-
K Spring TCRS	0.340	0.043	<.001	-
Black Residual Variances				
PreK Fall TCRS	0.373	0.044	<.001	-
PreK Spring TCRS	0.468	0.053	<.001	-
K Fall TCRS	0.401	0.036	<.001	-
K Spring TCRS	0.372	0.040	<.001	-

Notes. r = Partial Correlations; TCRS = Teacher-Child Rating Scale

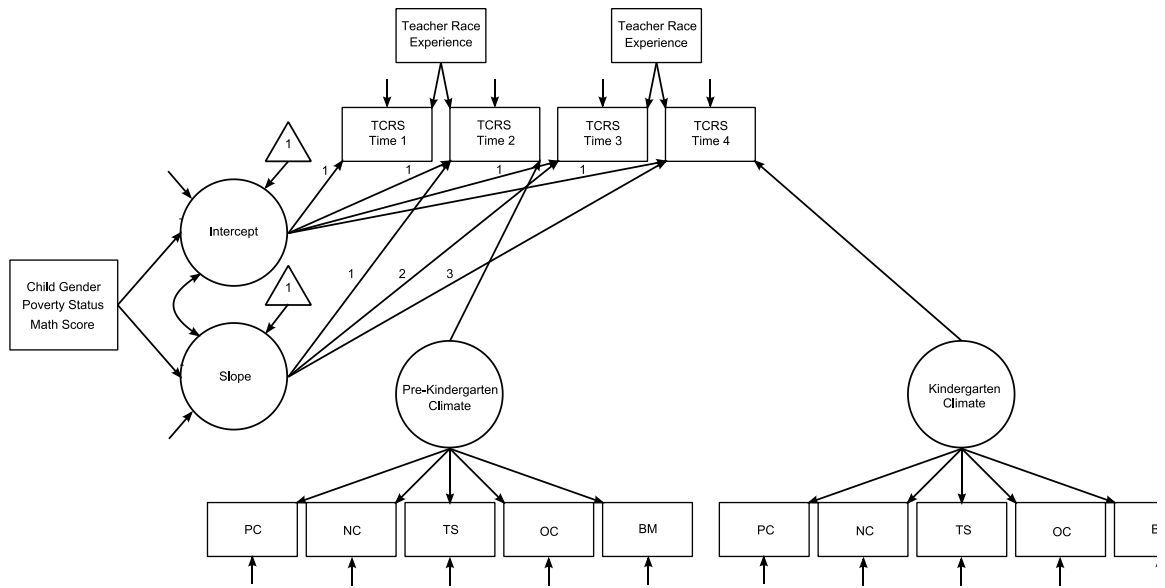




*Figure 1.* Unconditional Linear Model  
TCRS = Teacher-Child Rating Scale



*Figure 2.* Unconditional Quadratic Model  
TCRS = Teacher-Child Rating Scale



*Figure 3. Conditional Intercept-only Model*

TCRS = Teacher-Child Rating Scale; PC = Positive Climate; NC = Negative Climate; TS = Teacher Sensitivity; OC = Over-Control; BM = Behavior Management

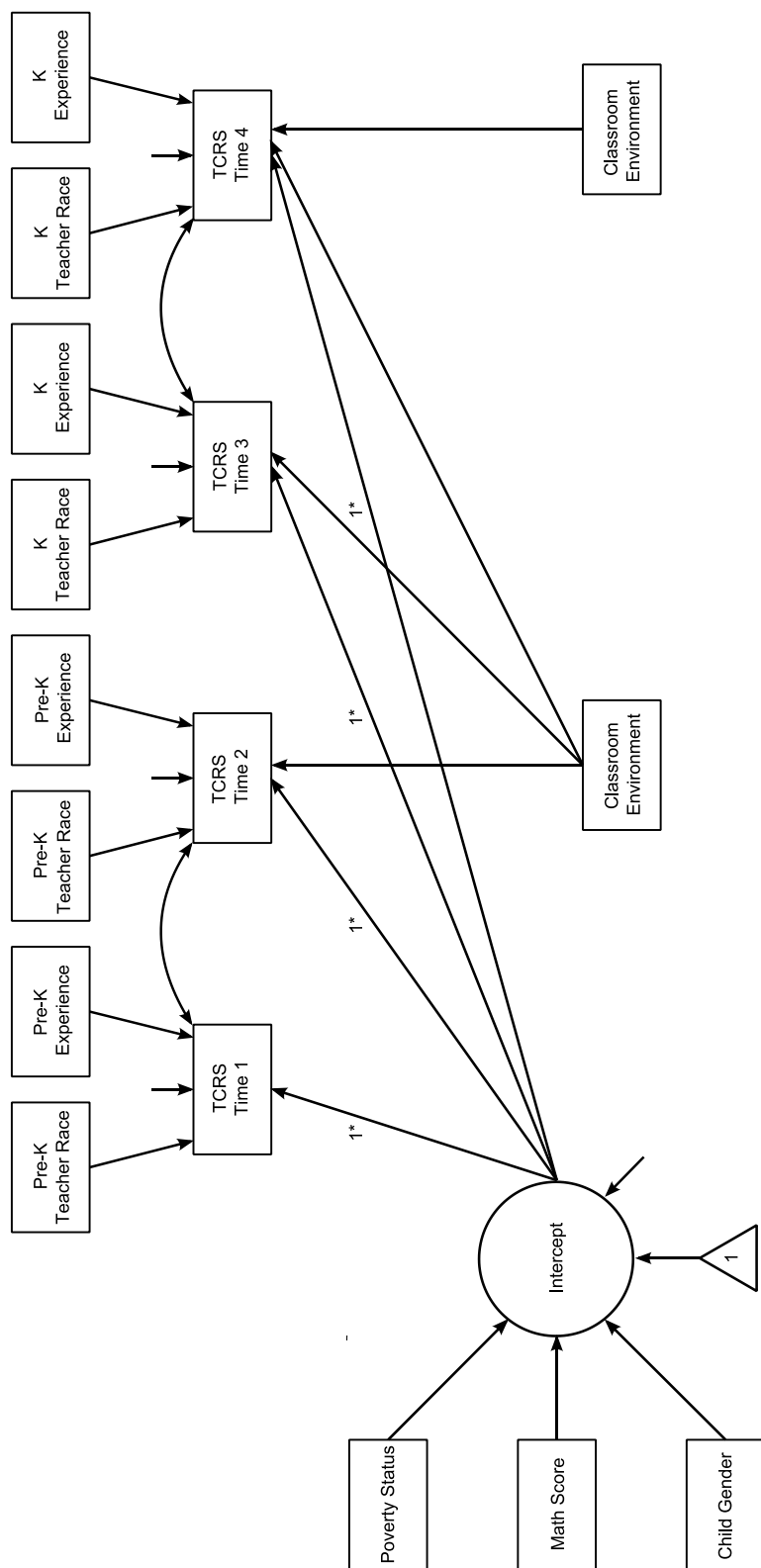
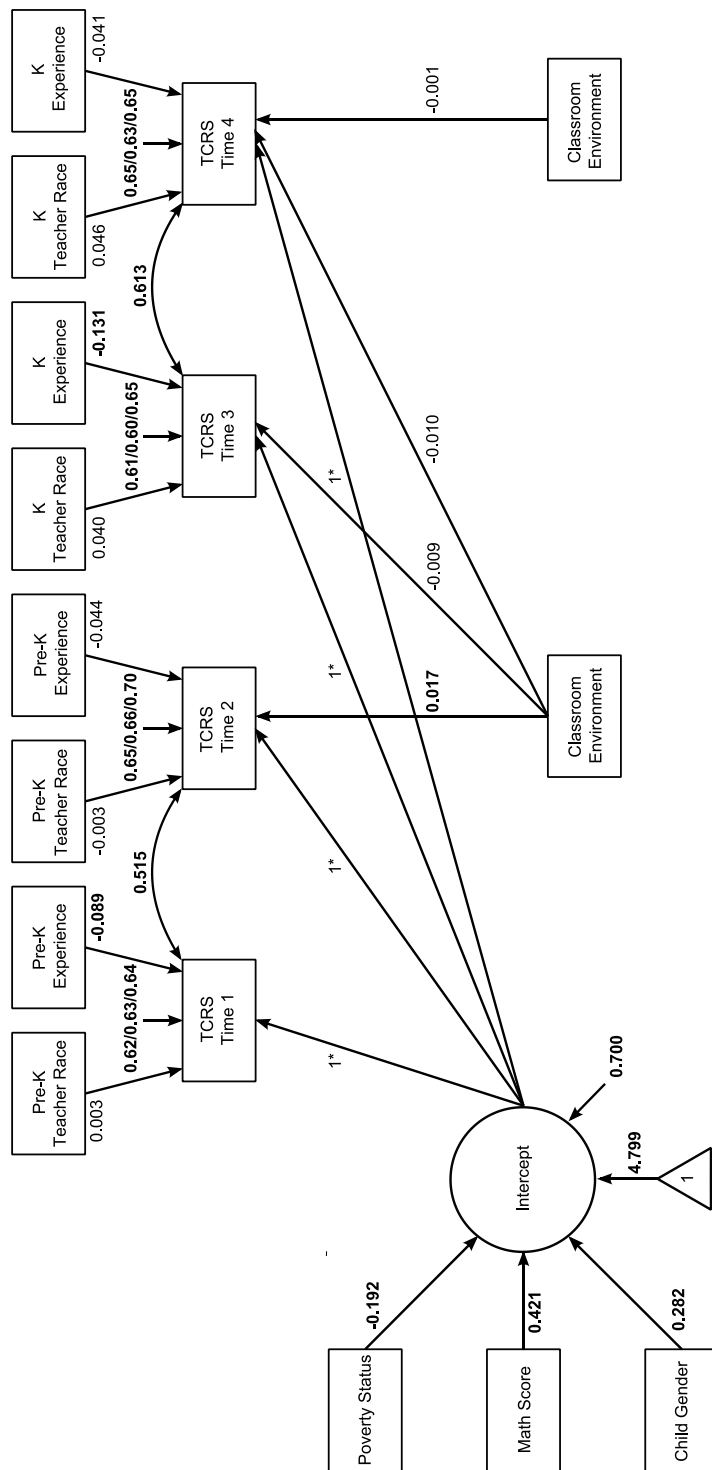


Figure 4. Hypothesized reference group intercept-only model  
TCRS = Teacher-Child Rating Scale; \* Path fixed at unity



*Figure 5. Final Multi-Group Latent Curve Model*  
 All estimate parameters standardized; TCSR = Teacher-Child Rating Scale; \* Path fixed at unity; Bold parameters significant at .05 level; Residual variances listed in the following order: white, Latino, black

## References

- Abidin, R. R. (1992). Presidential address: The determinants of parenting behavior. *Journal of Clinical Child Psychology*, 21, 407-412.
- Ackerman, B. P., Kogos, J., Youngstrom, E., Schoff, K., & Izard, C. (1999). Family instability and the problem behaviors of children from economically disadvantaged families. *Developmental Psychology*, 35, 258-268.
- Administration for Children & Families. (2005). *Head Start impact study: First year findings*. Retrieved September 13, 2012 from [http://www.acf.hhs.gov/programs/impact\\_study/reports/first\\_yr\\_finds/firstyr\\_find\\_s\\_title.html](http://www.acf.hhs.gov/programs/impact_study/reports/first_yr_finds/firstyr_find_s_title.html).
- Allington, R. L. (1983). The reading instruction provided readers of differing reading abilities. *The Elementary School Journal*, 83, 548-559.
- Arnold, D. (1997). Co-occurrence of externalizing behavior problems and emergent academic difficulties in young high-risk boys: A preliminary evaluation of patterns and mechanisms. *Journal of Applied Developmental Psychology*, 18, 317-330.
- Barnett, W., Carolan, M., Fitzgerald, J., & Squires, J. (2011). *The state of preschool 2011*. New Brunswick, NJ: National Institute for Early Education Research. Retrieved from <http://nieer.org/yearbook>.
- Berlin, L. J., Dunning, R. D., & Dodge, K. A. (2011). Enhancing the transition to kindergarten: A randomized trial to test the efficacy of the “Stars” summer kindergarten orientation program. *Early Childhood Research Quarterly*, 26, 247-254.
- Birch, S., & Ladd, G. W. (1998). Children’s interpersonal behaviors and the teacher-child relationship. *Developmental Psychology*, 32, 137-151.
- Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children’s functioning at school entry. *American Psychologist*, 57, 111-127.
- Blair, C., & Diamond, A. (2008). Biological processes in prevention and intervention: The promotion of self-regulation as a means of preventing school failure. *Development and Psychopathology*, 20, 899-911.
- Bodrova, E., & Leong, D. J. (2007). *Tools of the mind: The Vygotskian approach to early childhood education* (2nd ed.). New York, NY: Merrill-Prentice Hall.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York, NY: Wiley.

- Bowen, N. K., & Guo, S. (2012). *Structural equation modeling*. New York, NY: Oxford University Press.
- Bowman, B., Donovan, M. S., & Burns, S. (Eds.). (2000). *Eager to learn: Educating our preschoolers*. Washington, DC: National Research Council.
- Bredekamp, S., & Copple, C. (Eds.). (1997). *Developmentally appropriate practice in early childhood programs* (Revised edition). Washington, DC: National Association for the Education of Young Children.
- Bronfenbrenner, U., & Evans, G. W. (2001). Developmental science in the 21<sup>st</sup> century: Emerging questions, theoretical models and empirical findings, *Social Development*, 9, 115-125.
- Burchinal, M., Howes, C., Pianta, R., Bryant, D., Early, D., Clifford, R., & Barbarin, O. (2008). Predicting child outcomes at the end of kindergarten from the quality of pre-kindergarten teacher-child interactions and instruction. *Applied Developmental Science*, 12, 140-153.
- Burchinal, M., Vandergrift, N., Pianta, R., & Mashburn, A. (2010). Threshold analysis of association between child care quality and child care outcomes for low-income children in pre-kindergarten programs. *Early Childhood Research Quarterly*, 25, 166-176.
- Burris, C. C., & Welner, K. G. (2005). Closing the achievement gap by detracking. *Phi Delta Kappan*, 86, 594-598.
- Cabrera, N., & Mitchell, S. (2009). An exploratory study of fathers' parenting stress and toddlers' social development in low-income African American families. *Fathering*, 7, 201-225.
- Cairns, R. B., & Cairns, B. D. (1994). *Lifelines and risks: Pathways of youth in our time*. New York, NY: Harvester Wheatsheaf.
- Caplan, S. (1964). *Principles of preventive psychiatry*. New York, NY: Basic Books.
- Chen, F., Bollen, K. A., Paxton, P., Curran, P. J., & Kirby, J. B. (2001). Improper solutions in structural equation models: Causes, consequences, and strategies. *Sociological Methods Research*, 29, 468-508.
- Chen, X., Rubin, K. H., & Li, D. (1997). Relation between academic achievement and social adjustment: Evidence from Chinese children. *Developmental Psychology*, 33, 518-525.
- Clotfelter, C., Ladd, H., & Vigdor, J. (2006). *The academic achievement gap in grades 3*

- to 8 (Working Paper No. 12207). Cambridge, MA: National Bureau of Economic Research.
- Coie, J. D., & Dodge, K. A. (1988). Multiple sources of data on social behavior and social status in school: A cross-age comparison. *Child Development*, 59, 815-829.
- Coie, J. D., & Krehbiel, G. (1984). Effects of academic tutoring on the social status of low achieving, socially rejected children. *Child Development*, 55, 1465-1478.
- Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, A. D., & York, R. L. (1966). *Equality of educational opportunity*. Washington, B. DC: U.S. Government Printing Office.
- Cooper, D. H., & Farran, D. C. (1988). Behavioral risk factors in kindergarten. *Early Childhood Research Quarterly*, 3, 1-19.
- Copple, C., & Bredekamp, S. (2009). *Developmentally appropriate practice in early childhood programs serving children birth through age 8*. Washington, DC: National Association for the Education of Young Children.
- Curran, P. J., Bauer, D. J., & Willoughby, M. T. (2004). Testing and probing main effects and interactions in latent curve analysis. *Psychological Methods*, 9, 220-237.
- Curran, P. J., & Hussong, A. M. (2003). The use of latent trajectory models in psychopathology research. *Journal of Abnormal Psychology*, 112, 526-544.
- Davis, J. E. (2003). Early schooling and the academic achievement of African American males. *Urban Education*, 38, 515-537.
- Denham, S. A. (2005). *Assessing social-emotional development in children from a longitudinal perspective for the National Children's Study*. Columbus, OH: Battelle Memorial Institute.
- Denham, S. A., Blair, K. A., DeMulder, E., Levitas, J., Sawyer, K., Auerbach-Major, S., & Queenan, P. (2003). Preschool emotional competence: Pathway to social competence?. *Child Development*, 74, 238-256.
- Deater-Deckard, K., & Dodge, K. (1997). Externalizing behavior problems and discipline revisited: Nonlinear effects and variation by culture, context, and gender. *Psychological inquiry*, 8, 161-175.
- Diamond, A., Barnett, W. S., Thomas, J., & Munro, S. (2007). Preschool program improves cognitive control. *Science*, 318, 1387-1388.
- Duncan, G., & Aber, J. L. (1997). Neighborhood models and measures. In J. Brooks-Gunn, G. Duncan, & J. L. Aber (Eds.), *Neighborhood poverty: Vol. 1. Context*



- and consequences for children* (pp. 62-78). New York, NY: Russell Sage Foundation.
- Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., ... Japel, C. (2007). School readiness and later achievement. *Developmental Psychology*, 43, 1428-1446.
- Dunn, J. (1994). Understanding others and the social world: Current issues in developmental research and their relation to preschool experiences and practice. *Journal of Applied Developmental Psychology*, 15, 571-583.
- Early, D., Barbarin, O., Bryant, D., Burchinal, M., Chang, F., Clifford, R., ... Barnett, W. S. (2005). Pre-Kindergarten in eleven states: NCEDL's Multi-State Study of Pre-Kindergarten & Study of State-Wide Early Education Programs (SWEEP). NCEDL Working Paper. Chapel Hill, NC: University of North Carolina at Chapel Hill, FPG Child Development Institute, NCEDL. Retrieved May 20, 2010 from [http://fpg.unc.edu/~ncedl/pdfs/SWEEP\\_MS\\_summary\\_final.pdf](http://fpg.unc.edu/~ncedl/pdfs/SWEEP_MS_summary_final.pdf).
- Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data structural equation models. *Structural Equation Modeling: A Multidisciplinary Journal*, 8, 430-457.
- Entwisle, D. R., & Alexander, K. L. (1993). Entry into school: The beginning school transition and educational stratification in the United States. *Annual Review of Sociology*, 19, 401-423.
- Entwisle, D. R., & Alexander, K. L. (1998). Facilitating the transition to first grade: The nature of transition and research on factors affecting it. *The Elementary School Journal*, 98, 351-364.
- Entwisle, D. R., & Alexander, K. L. (1999). Early schooling and social stratification. In R. C. Pianta & M. J. Cox (Eds.), *The transition to kindergarten* (pp. 13-38). Baltimore, MD: Paul H. Brooks.
- Fagan, J., & Fantuzzo, J. W. (1999). Multirater congruence on the Social Skills Rating System: Mother, father, and teacher assessments of urban Head Start children's social competencies. *Early Childhood Research Quarterly*, 14, 229-234.
- Farmer, T. W., & Farmer, E. M. Z. (2001). Developmental science, systems of care, and prevention of emotional and behavioral problems in youth. *American Journal of Orthopsychiatry*, 71, 171-181.
- Ford, D. H., & Lerner, R. M. (1992). *Developmental systems theory: An integrative approach*. Newbury Park, CA: Sage.
- 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.
- García Coll, C., Lamberty, G., Jenkins, R., McAdoo, H. P., Crnic, K., & Wasik, B. H., & Vázquez G. (1996). An integrative model for the study of developmental competencies in minority children. *Child Development*, 67, 1891-1914.
- Geary, D. C., Byrd-Craven, J., Hoard, M. K., Vigil, J., & Numtee, C. (2003). Evolution and development of boys' social behavior. *Developmental Review*, 23, 444-470.
- Gershoff, E. T. (2002). Physical punishment by parents and associated child behaviors and experiences: A meta-analytic and theoretical review. *Psychological Bulletin*, 128, 539-579.
- Gonzales, N. A., Pitts, S. C., Hill, N. E., & Roosa, M. W. (2000). A mediational model of the impact of interparental conflict on child adjustment in a multiethnic, low-income sample. *Journal of Family Psychology*, 14, 365-379.
- Gottlieb, G. (1996). Developmental psychobiology theory. In R. B. Cairns, G. H. Elder, & E. J. Costello (Eds.), *Developmental science* (pp. 63-77). New York, NY: Cambridge University Press.
- Graue, E. (1992). Social interpretations of readiness for kindergarten. *Early Childhood Research Quarterly*, 7, 225-243.
- Graue, E. (2011). Are we paving paradise?. *Educational Leadership*, 68, 12-17.
- Gutman, L. M., Sameroff, A. J., & Cole, R. (2003). Academic growth curve trajectories from 1<sup>st</sup> grade to 12<sup>th</sup> grade: Effects of multiple social risk factors and preschool child factors. *Developmental Psychology*, 39, 777-790.
- Guttman, L. M., & Eccles, J. S. (1999). Financial strain, parenting behaviors, and adolescents' achievement: Testing model equivalence between African American and European American single- and two-parent families. *Child Development*, 70, 1464-1476.
- Hemphill, F., Vanneman, A., & Rahman, T. (2011). *Achievement gaps. How Hispanic and White students in public schools perform in mathematics and reading on the National Assessment of Educational Progress. Statistical analysis report.* Washington, DC: Institute of education Sciences National Center for Education Statistics.
- Hightower, A. D., Work, W. C., Cohen, E. L., Lotyczewski, B. S., Spinell, A. P., Guare, J. C., & Rohrbeck, C. A. (1986). The Teacher-Child Rating Scale: A brief objective measure of elementary children's school problem behaviours and competences. *School Psychology Review*, 15, 393-409.

- Hill, N. E., Bush, K. R., & Roosa, M. W. (2003). Parenting and family socialization strategies and children's mental health: Low-income, Mexican-American, and Euro-American mothers and children. *Child Development, 74*, 189-204.
- Hinshaw, S. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin, 111*, 127-155.
- Holland, A. L., Ritchie, S., & Oertwig, S. (2013). The transition to formal schooling: Examining structural differences between preschool and kindergarten. Unpublished manuscript.
- Hong, G., & Hong, Y. (2008). Reading instruction time and homogeneous grouping in kindergarten: An application of marginal mean weighting through stratification. *Educational Evaluation and Policy Analysis, 31*, 54-81.
- Howes, C. (2000). Social-emotional classroom climate in child care, child-teacher relationships and children's second grade peer relations. *Social Development, 9*, 191-204.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.
- Humphrey, N., Kalamouka, A., Bolton, J., Lendrum, A., Wigelsworth, M., Lennie, C., & Farrell, P. (2008). *Primary social and emotional aspects of learning: Evaluation of small group work*. Research Report RR064. Nottingham, England: DCSF Publications.
- Kalil, A., & Deliere, T. (2002). *Parental job loss and early adolescence in Black and White families*. Paper presented to the Annual Meeting of the Population Association of America, Atlanta, GA.
- Krueger, A., Rothstein, J., & Turner, S. (2006). Race, income, and college in 25 years: Evaluating Justice O' Connor's conjecture. *American Law and Economics Review, 8*, 282-311.
- La Paro, K., Pianta, R., Hamre, B., & Stuhlman, M. (2002). *CLASS: PreK version*. Unpublished measure, University of Virginia.
- Ladd, G. W. (2008). Social competence and peer relations: Significance for young children and their service-providers. *Early Childhood Services: An Interdisciplinary Journal of Effectiveness, 2*, 129-148.
- 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., & Burgess, K. (1999). Charting the relationship trajectories of aggressive, withdrawn, and aggressive/withdrawn children during early grade school. *Child Development, 70*, 910-929.
- Ladd, G. W., & Price, J. M. (1987). Predicting children's social and school adjustment following the transition from preschool to kindergarten. *Child Development, 58*, 1168-1189.
- Lee, J. (2002). Racial and ethnic achievement gap trends: Reversing the progress toward equity. *Educational Researcher, 31*, 3-12.
- Lee, V. E., & Burkam, D. T. (2002). *Inequality at the starting gate: Social background differences in achievement as children begin school*. Washington, DC: Economic Policy Institute.
- Lewis, S., Simon, C., Uzzell, R., Horwitz, A., & Casserly, M. (2010). *A call for change: The social and educational factors contributing to the outcomes of Black males in urban schools*. Washington, DC: The Council of the Great City Schools.
- MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology, 51*, 201-226.
- Magnusson, D., & Cairns, R. B. (1996). Developmental science: Toward a unified framework. In R. B. Cairns, G. H. Elder, & E. J. Costello (Eds.), *Developmental science* (pp. 7-30). New York, NY: Cambridge University Press.
- Main, M. (1990). Cross-cultural studies of attachment organization: Recent studies, changing methodologies and the concept of conditional strategies. *Human Development, 33*, 48-61.
- Mallory, B. L., & New, R. S. (Eds.). (1994). *Diversity and developmentally appropriate practices: Challenges for early childhood education*. New York, NY: Teachers College Press.
- Maldonado-Carreño, C., & Votruba-Drzal, E. (2011). Teacher-child relationships and the development of academic and behavioral skills during elementary school: A within- and between-child analysis. *Child Development, 82*, 601-616.
- Marvin, R. S., & Britner, P. A. (1999). Normative development: The ontogeny of attachment. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 44-67). New York, NY: Guilford.
- Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O. A., Bryant, D., ... & Howes, C. (2008). Measures of classroom quality in prekindergarten and

- children's development of academic, language, and social skills. *Child Development*, 79, 732-749.
- McClelland, M., Acock, A. C., & Morrison, F. J. (2006). The impact of kindergarten learning-related social skills on academic achievement at the end of elementary school. *Early Childhood Research Quarterly*, 21, 471-490.
- McClelland, M. M., Cameron, C. E., Wanless, S. B., & Murray, A. (2007). Executive function, behavioral self-regulation, and social-emotional competence. In O. N. Saracho & B. Spodek (Eds.), *Contemporary perspectives on social learning in early childhood education* (pp. 113-137). Charlotte, NC: Information Age.
- McClelland, M. M., Morrison, F. J., & Holmes, D. L. (2000). Children at risk for early academic problems: The role of learning-related social skills. *Early Childhood Research Quarterly*, 15, 307-329.
- McLoyd, V. C. (1990). The impact of economic hardship on black families and children: Psychological distress, parenting, and socioemotional development. *Child Development*, 61, 311-346.
- McLoyd, V. C. (1998). Socioeconomic disadvantage and child development. *American Psychologist*, 53, 185-204.
- Merrell, K. W., & Poppinga, M. R. (1994). Parent-teacher concordance and gender differences in behavioral ratings of social skills and social-emotional problems in primary-age children with disabilities. *Assessment for Effective Intervention*, 19, 1-14.
- Miles, S. B., & Stipek, D. (2006). Contemporaneous and longitudinal associations between social behavior and literacy achievement in a sample of low-income elementary school children. *Child Development*, 77, 103-117.
- Mistry, R. S., Vandewater, E. A., Huston, A. C., & McLoyd, V. C. (2002). Economic well-being and children's social adjustment: The role of family processes in an ethnically diverse low-income sample. *Child Development*, 73, 935-951.
- Moll, L. C., Amanti, C., Neff, D., & Gonzalez, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory into Practice*, 31, 132-141.
- Monckeberg, F. (1992). Nutrition, emotional factors, and growth. In M. Hernandez & J. Argente (Eds.), *Human growth: Basic and clinical aspects*. Amsterdam, Netherlands: Elsevier Science Publishers.
- Morissey, T. W. (2009). Multiple child-care arrangements and young children's behavioral outcomes. *Child Development*, 80, 59-76.

- Murnane, R., & Levy, R. J. (1996). *Teaching the new basic skills*. New York, NY: The Free Press.
- Murnane, R. J., Willett, J. B., Bub, K. L., McCartney, K., Hanushek, E., & Maynard, R. (2006). Understanding trends in the Black-White achievement gaps during the first years of school. *Brookings-Wharton Papers on Urban Affairs*, 2006, 97-135.
- Murry, V. M., Smith, E. P., & Hill, N. E. (2001). Race, ethnicity, and culture in studies of families in context. *Journal of Marriage and Family*, 63, 911-914.
- Muthén, B. O. (2002). Beyond SEM: General latent variable modeling. *Behaviormetrika*, 29, 81-117.
- Muthén, L. K., & Muthén, B. O. (2008). *Mplus user's guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.
- National Center for Education Statistics. (1995). *The educational progress of Hispanic students* (NCES Publication No. 95-767). Washington, DC: Author.
- New, R. (2003). Culture, child development research, and early childhood education: Rethinking the relationship. In D. Wertleib, F. Jacobs, & R. Lerner (Eds.), *Handbook of applied developmental science, Vol. 3: Promoting positive youth and family development: Community systems, citizenship, and civil society* (pp. 223-252). Thousand Oaks, CA: Sage Publications.
- Oakes, J., Gamoran, A., & Page, R. N. (1992). Curriculum differentiation: Opportunities, outcomes, and meanings. In P. Jackson (Ed.), *Handbook of Research on Curriculum* (pp. 570-608). New York, NY: Macmillan.
- Ogbu, J. U. (1994). Racial stratification and education in the United States: Why inequality persists. *Teachers College Record*, 96, 264-298.
- Peisner-Feinberg, E., Burchinal, M. R., Clifford, R. M., Culkin, M. L., Howes, C., Kagan, S. L., & Yazejian, N. (2001). The relation of preschool child-care quality to children's cognitive and social developmental trajectories through second grade. *Child Development*, 72, 1534-1553.
- Phillips, M., Brooks-Gunn, J., Duncan, G. J., Klebanov, P., & Crane, J. (1998). Family background, parenting practices, and the Black-White test score gap. In C. Jenks & M. Phillips (Eds.), *The Black-White test score gap* (pp. 103-145). Washington, DC: Brookings Institution Press.
- Phillips, M., & Chin, T. (2004). School inequality: What do we know?. In K. Neckerman (Ed.), *Social inequality* (pp. 467-519). New York, NY: Russell Sage Foundation.

- Pianta, R. C. (2001). *Student teacher relationship scale*. Lutz, FL: Psychological Assessment Resources.
- Pianta, R. C., & Kraft-Sayre, M. (2003). *Successful kindergarten transition*. Baltimore, MD: Brookes.
- Pianta, R. C., Rimm-Kaufman, S. E., & Cox, M. J. (1999). Introduction: An ecological approach to kindergarten transition. In R. C. Pianta & M. J. Cox (Eds.), *The transition to kindergarten* (pp. 3-12). Baltimore, MD: Paul H. Brooks.
- Pianta, R. C., & Stuhlman, M. W. (2004). Teacher-child relationships and children's success in the first years of school. *School Psychology Review*, 33, 444-458.
- Piggott, R. L., & Cowen, E. L. (2000). Teacher race, child race, racial congruence, and teacher ratings of children's school adjustment. *Journal of School Psychology*, 38, 177-195.
- Preschool Curriculum Evaluation Research Consortium. (2008). *Effects of preschool curriculum on school readiness*. Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education.
- Putnam, R. D., Frederick, C. B., & Snellman, K. (2012). *Growing class gaps in social connectedness among American youth, 1975-2009*. Unpublished manuscript.
- Raver, C. C., Gershoff, E. T., & Aber, J. L. (2007). Testing equivalence of mediating models of income, parenting, and school readiness for white, black, and Hispanic children in a national sample. *Child Development*, 78, 96-115.
- Raver, C. C., & Knitzer, J. (2002). *Ready to enter: What research tells policymakers about strategies to promote social and emotional school readiness among three- and four-year old children*. New York, NY: National Center for Children in Poverty.
- Ray, C., & Elliott, S. N. (2006). Social adjustment and academic achievement: A predictive model for students with diverse academic and behaviors competencies. *School Psychology, Review*, 35, 493-501.
- Reardon, S. F. (2011). The widening academic achievement gap between the rich and poor: New evidence and possible explanations. In G. J. Duncan & R. Murnane (Eds.), *Whither opportunity? Rising inequality, schools, and children's life chances* (pp. 91-116). Thousand Oaks, CA: Russell Sage Foundation.
- Rimm-Kaufman, S. E., & Pianta, R. C. (2000). An ecological perspective on the transition to kindertargen: A theoretical framework to guide empirical research. *Journal of Applied Developmental Psychology*, 21, 491-511.

- Rimm-Kaufman, S. E., Pianta, R. C., & Cox, M. J. (2000). Teachers' judgments of problems in the transition to kindergarten. *Early Childhood Research Quarterly*, 15, 147-166.
- Ritchie, K. L., & Holden, G. W. (1998). Parenting stress in low income battered and community women: Effects on parenting behavior. *Early Education and Development*, 9, 97-112.
- Rose-Krasnor, L. (1997). The nature of social competence: A theoretical overview. *Social Development*, 6, 111-135.
- Rothstein, R. (2004). *Class and schools: Using social, economic, and educational reform to close the Black-White achievement gap*. Washington, DC: Economic Policy Institute.
- Ruffalo, S. L., & Elliott, S. N. (1997). Teachers' and parents' rating of children's social skills: A closer look at cross-informant agreements through an item analysis protocol. *School Psychology Review*, 26, 489-501.
- Sameroff, A. J. (1983). Developmental systems: Contexts and evolution. In W. Kessen (Ed.), *Handbook of child psychology: Vol. 2, History, theory, and methods* (4th ed., pp. 237-294). New York, NY: John Wiley.
- Sameroff, A. J. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development*, 81, 6-22.
- Sameroff, A. J., & Fiese, B. H. (2000). Transactional regulation: The developmental ecology of early intervention. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (pp. 135-159). New York, NY: Cambridge University Press.
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, 66, 507-514.
- Sbarra, D. A., & Pianta, R. C. (2001). Teacher ratings of behavior among African American and Caucasian children during the first two years of school. *Psychology in the Schools*, 38, 229-238.
- Schulting, A., Malone, P., & Dodge, K. (2005). The effect of school-based kindergarten transition policies and practice on child academic outcomes. *Developmental Psychology*, 41, 860-871.
- Seidman, E. (1988). Back to the future, community psychology: Unfolding a theory of social intervention. *American Journal of Community Psychology*, 16, 3-21.
- Seidman, E., & French, S. E. (2004). Developmental trajectories and ecological



- transitions: A two-step procedure to aid in the choice of prevention and promotion interventions. *Development and Psychopathology*, 16, 1141-1159.
- Shanahan, M. J., Davey, A., & Brooks, J. (1998). Dynamic models of poverty and psychosocial adjustment through childhood. *Journal of Human Resources*, 36, 500-519.
- Sheridan, S. M., Knoche, L. L., Edwards, C. P., Bovaird, J. A., Kupzyk, K. A. (2010). Parent engagement and school readiness: Effects of getting ready intervention on preschool children's social-emotional competencies. *Early Education and Development*, 21, 125-156.
- Spalter-Roth, R., & Deitch, C. (1999). I don't feel right-sized; I feel out-of-work sized. *Work and Occupations*, 26, 446-483.
- Stipek, D., & Miles, S. (2008). Effects of aggression on achievement: Does conflict with the teacher make it worse?. *Child Development*, 79, 1721-1735.
- Tach, L. M., & Farkas, G. (2006). Learning-related behaviors, cognitive skills, and ability grouping when schooling begins. *Social Science Research*, 35, 1048-1079.
- Valencia, R. R. (2002). The plight of Chicano students: An overview of schooling conditions and outcomes. In R. R. Valencia (Ed.), *Chicano school failure and success: Past, present, and future* (2nd ed.; pp. 3-51). New York, NY: Routledge.
- Valenzuela, A. (1999). *Subtractive schooling: US-Mexican youth and the politics of caring*. Albany, NY: State University of New York Press.
- Van Horn, M., Atkins-Burnett, S., Karlin, E., & Snyder, S. (2007). Parent ratings of children's social skills: Longitudinal psychometric analysis of the social skills rating system. *School Psychology Quarterly*, 22, 142-199.
- Vanneman, A., Hamilton, L., Baldwin Anderson, J., & Rahman, T. (2009). *Achievement gaps: How Black and White students in public schools perform in mathematics and reading on the National Assessment of Educational Progress* (NCES 2009-455). Washington, DC: U.S. Department of Education, National Center for Education Statistics, Institute of Educational Sciences.
- Vernon-Feagans, L. (1996). *Children's talk in communities and classrooms*. Cambridge, MA: Blackwell.
- Wainer, H., & Thissen, D. (2009). True score theory: The traditional method. In D. Thissen & H. Wainer (Eds.), *Test scoring* (pp. 23-72). New York, NY: Routledge.
- Walberg, H. J., & Tsai, S. (1983). 'Matthew' effects in education. *American Educational Research Journal*, 20, 359-373.

- Welsh, M., Parke, R. D., Widaman, K., & O'Neil, R. (2001). Linkages between children's social and academic competence: A longitudinal analysis. *Journal of School Psychology, 39*, 463-481.
- Wentzel, K. R. (1991). Relations between social competence and academic achievement in early adolescence. *Child Development, 62*, 1066-1078.
- Wigelsworth, M., Humphrey, N., Afroditi, K., & Lendrum, A. (2010). A review of key issues in the measurement of children's social and emotional skills. *Educational Psychology in Practice, 26*, 173-186.
- Wilson, F., Tienda, M., & Wu, L. Race and unemployment: Labor market experiences of Black and White men, 1968-1988. *Work and Occupations, 22*, 245-270.
- Wilson, H. K., Pianta, R. C., & Stuhlman, M. (2007). Typical classroom experiences in first grade: The role of classroom climate and functional risk in the development of social competencies. *The Elementary School Journal, 108*, 81-96.
- Winsler, A., & Wallace, G. L. (2002). Behavior problems and social skills in preschool children: Parent-teacher agreement and relations with classroom observations. *Early Education & Development, 13*, 41-58.
- Woodcock, R. W., McGrew, K. S., & Mather, N. (2001). *Woodcock-Johnson III Tests of Achievement*. Itasca, IL: Riverside.
- Yuan, K., & Bentler, P. M. (2000). Three likelihood-based methods for mean and covariance structure analysis with nonnormal missing data. *Sociological Methodology, 30*, 165-200.
- Zill, N., Moore, K. A., Smith, E. W., Stief, T., & Coiro, M. J. (1991). *Life circumstances and development of children in welfare families: A profile based on national survey data*. Washington, D. C.: Child Trends.