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EARLY SOCIAL-EMOTIONAL FUNCTIONING AND THE SCHOOL CONTEXT: CONTRIBUTIONS TO CHILDREN'S TRAJECTORIES OF BEHAVIOR AND ACHIEVEMENT

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Rachel M. Abenavoli

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The dissertation of Rachel M. Abenavoli was reviewed and approved* by the following:

Mark T. Greenberg

Edna Peterson Bennett Endowed Chair in Prevention Research

Professor of Human Development and Family Studies

Dissertation Advisor

Chair of Committee

Scott D. Gest

Professor of Human Development and Family Studies

Karen L. Bierman

Distinguished Professor of Psychology

D. Wayne Osgood

Professor of Criminology and Sociology

Eva Lefkowitz

Professor of Human Development and Family Studies

Professor-in-Charge of the Human Development and Family Studies Graduate Program

* Signatures are on file in the Graduate School

ABSTRACT

There is growing consensus among researchers and practitioners that children's ability to pay attention, regulate their emotions and behavior, and get along with others is crucial to their success in the classroom, particularly during the transition to school (Blair & Raver, 2015; Denham et al., 2010; Lin et al., 2003; Rimm-Kaufman et al., 2000). Although longitudinal associations between early social-emotional functioning and later behavioral and academic adjustment have been documented, how school-entry social-emotional functioning alters children's developmental trajectories across the early school years is not well understood. It may be that initially higher-functioning children continue to develop at a faster rate than their peers across the school years, in line with the skill-begets-skill or cumulative advantage hypothesis (Heckman, 2008). Alternatively, initially lower-functioning children may show greater growth over time, as would be predicted by the catch-up hypothesis (Barnett, 2011). Moreover, these patterns of development may differ depending on the child's context, with initially higher-functioning children showing greater growth under certain conditions and/or initially lower-functioning children showing greater growth under other conditions.

This dissertation examined the contributions of children's early social-emotional functioning and the school context to their trajectories of behavior and achievement during elementary school. Using a rich longitudinal dataset from the Family Life Project, which followed children and families in rural and small town U.S. communities, this dissertation examined: (1) how school-entry inattention, prosocial behavior, and conduct problems predicted behavior and achievement in Grade 3 and rates of change from kindergarten to Grade 3; (2) how distal factors and proximal processes in the elementary school context predicted behavior and achievement during this time period, both concurrently and cumulatively; and (3) how aspects of the school context might moderate the effect of school-entry social-emotional functioning on children's developmental trajectories.

Results of multilevel growth models indicated that school-entry social-emotional functioning had lasting effects on behavior and achievement through Grade 3, but initially lower-functioning children narrowed the gap with their higher-functioning peers over time on some outcomes (i.e., trajectories of children with high and low initial social-emotional functioning converged over time). Experiences within the school context also contributed to children's outcomes: High-quality teacher-student interactions and teachers' own social-emotional competence predicted higher concurrent behavior and achievement, and there was some evidence that cumulative exposure to high-quality experiences uniquely contributed to outcomes. Finally, features of the school context generally did not moderate the effects of school-entry social-emotional functioning, suggesting that variation in the school context had a surprisingly minimal impact on rates of convergence or divergence in developmental trajectories of children who differed in school-entry social-emotional functioning.

This dissertation adds to a growing body of work out of the Family Life Project investigating families, schools, and child development in high-poverty rural regions (e.g., Blair et al., 2016; Broekhuizen et al., 2016; Garrett-Peters et al., 2016; Sandilos et al., 2014; Vernon-Feagans et al., 2016). Fostering early social-emotional functioning and improving classroom experiences for children are two promising policy levers through which children may be supported as they progress through school.

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Writing a dissertation about developmental contexts and trajectories has a way of making you reflect on the contexts that were instrumental to your own personal and professional development. I am incredibly fortunate to have so many people pushing me forward, helping me up, and cheering me on, and this dissertation would not have been possible without them.

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CHAPTER 1

INTRODUCTION

There is growing consensus among researchers and practitioners that children's social-emotional functioning makes important contributions to their successful transition to and progress through school, independent of their academic readiness skills. However, many children begin school ill-prepared for the social and behavioral demands they will encounter in the classroom (Rimm-Kaufman, Pianta, & Cox, 2000). Understanding and supporting social-emotional functioning is an important goal because (1) it is a central component of healthy development in its own right; (2) it supports learning and academic progress over time (Zins, Weissberg, Wang, & Walberg, 2004); and (3) it predicts outcomes in adulthood such as educational attainment, reduced substance use, and reduced crime involvement (Jones, Greenberg, & Crowley, 2015; Moffitt et al., 2011). Furthermore, the immediate and sustained impacts of several early childhood interventions are at least partly explained by improvements in children's behavior, which suggests that "non-cognitive" skills are amenable to environmental influence and are conduits of lasting change (Heckman, Rodrigo, & Savelyev, 2013; Nix, Bierman, Domitrovich, & Gill, 2013).

Social-emotional functioning may be a powerful protective factor among children facing socioeconomic disadvantage and adversity, but the role of social-emotional functioning among children in low-income rural settings specifically has been understudied. In addition, although longitudinal associations between early social-emotional functioning and later outcomes have been documented, the extent to which social-emotional functioning predicts *rates of change* in learning and development over time is not yet well-understood. It may be that initially higher-functioning children continue to develop at a faster rate than their peers across the school years, in line with the skill-begets-skill hypothesis (Heckman, 2008). Alternatively, initially lower-functioning children may show greater growth over time, as would be predicted by the catch-up hypothesis (Barnett, 2011). Moreover, these patterns of development may differ depending on

the child's context. School and classroom experiences may moderate the extent to which school-entry status predicts growth over time, such that initially higher-functioning children show greater growth under certain conditions and/or initially lower-functioning children show greater growth under other conditions.

With these open questions in mind, the overarching goal of this dissertation was to examine the contributions of children's early social-emotional functioning and the school/classroom context to their trajectories of behavior and achievement during elementary school. Specifically, this dissertation examined: (1) how school-entry inattention, prosocial behavior, and conduct problems predict rates of change in behavior and achievement from kindergarten (K) to grade 3 (G3); (2) how distal factors and proximal processes in the elementary school context predict behavior and achievement during this time period; and (3) how aspects of the school context might moderate the effect of school-entry social-emotional functioning on children's developmental trajectories. The study utilized data from the Family Life Project (FLP), an in-depth longitudinal study of children and families in high-poverty rural and small town settings.

In this introduction, I first review literature on school-entry social-emotional functioning as a component of school readiness and contributor to social and academic success. I then consider two hypotheses regarding how children who vary in behavior when they begin school might differ in their rates of growth and learning across elementary school. Next, I review the literature on distal factors and proximal processes within the school context that predict children's behavioral and academic outcomes. Following this, I discuss studies on cumulative school experiences and differential effects of school experiences, which could either magnify initial differences between higher- and lower-functioning children or reduce behavioral or achievement gaps by facilitating catch-up among initially lower-functioning children. Finally, I describe the specific research aims of this dissertation.

Social-Emotional Functioning and School Readiness

The last few decades have seen a shift away from narrow definitions of school readiness toward broader models that place greater emphasis on multiple developmental domains. Whereas previous efforts to prepare children for the transition to school focused almost exclusively on their cognitive readiness, it is now widely-believed that in order to ensure their early success at school, families, preschools, and communities must equip children with a range of cognitive and "non-cognitive" skills, including social-emotional skills and behaviors. This view is supported by accumulating empirical evidence, including several recent trials documenting positive impacts of interventions with a specific emphasis on promoting children's early social-emotional learning (SEL; Bierman & Motamedi, 2015; Domitrovich, Moore, Thompson, & the CASEL Preschool to Elementary School SEL Assessment Workgroup, 2012).

While this research base is promising, there remain open questions with potentially important implications for practice. A prominent issue in the field is the extent to which social-emotional functioning predicts school adjustment after accounting for other school-entry skills, such as early math and reading skills or other aspects of behavior. For example, some work indicates that school-entry academic skills and knowledge are important predictors of later achievement, whereas school-entry behavior generally makes much weaker contributions (Claessens, Duncan, & Engel, 2009; Duncan et al., 2007). Other work suggests that social-emotional functioning has small but important effects on later achievement, but certain behavioral domains may play a larger role than others (Grimm et al., 2010). Moreover, social-emotional functioning may be more predictive of other indicators of success in adolescence and adulthood, such as educational attainment, mental health, and crime (Jones et al., 2015). Understanding which specific social-emotional skills or behaviors are critical to success—and for which outcomes—is an important task because it can sharpen the focus of current SEL interventions or clarify what impacts we might expect to see. For example, SEL interventions that place more or less emphasis on building relationships with teachers and peers, managing problem behavior, and/or facilitating attention and self-regulation may map on to differences in

specific social-emotional improvements and, therefore, differences in short- and long-term impact.

A prominent framework of SEL includes five competency domains: self-awareness, self-management, social awareness, relationship skills, and responsible decision making (CASEL, 2012; Payton et al., 2000). SEL competencies are hypothesized to facilitate effective social interactions, and during the early childhood period specifically, they are considered crucial to mastering the key developmental tasks of regulating emotional reactions and sustaining positive engagement with peers (Denham, Brown, & Domitrovich, 2010; Rose-Krasnor & Denham, 2009). Specific SEL skills that develop during early childhood and are particularly relevant as children transition to school include emotion knowledge and expression, self-regulatory abilities, prosocial skills, empathy, and basic social problem-solving (Denham & Weissberg, 2004; Domitrovich et al., 2012; Ladd, Herald, & Kochel, 2006). Children's SEL skills become more complex and developmentally intertwined during early childhood and are modestly stable across elementary school (Denham & Weissberg, 2004; La Paro & Pianta, 2000).

Component SEL skills contribute to children's behavior and are therefore expected to help children meet the cognitive and social demands unique to school (McKown et al., 2016; Raver, 2002; Thompson & Raikes, 2007). Foundational SEL skills like emotion knowledge and emotion regulation predict aspects of behavior, including attention (Rhoades et al., 2011), social competence (Blair et al., 2015; Denham et al., 2003; Trentacosta & Fine, 2010), externalizing problems (Blandon, Calkins, Grimm, Keane, & O'Brien, 2010; Jones, Bub, & Raver, 2013), and learning engagement (Nix et al., 2013). These behaviors, in turn, relate to higher achievement (Bierman, Torres, Domitrovich, Welsh, & Gest, 2009; Rhoades et al., 2011; Trentacosta & Izard, 2007) and better relationships with teachers and peers (Blair et al., 2015; Blandon et al., 2010; Gower et al., 2014). Prior work points to several key aspects of social-emotional functioning that may be important contributors to children's development (e.g., Denham, 2006; Farrington et al., 2012; Fantuzzo, Perry, & McDermott, 2004), and the current study focuses on three: (a)

inattention, (b) prosocial behavior, and (c) conduct problems.

Inattention. Children's capacity to focus attention, stay on task, switch between activities when appropriate, and follow directions enhances their exposure to and engagement in instructional and social situations in the classroom (Pagani et al., 2012; Stipek, Newton, & Chudgar, 2010). Attention problems, on the other hand, can cause children to become distracted and disengaged, which interferes with learning (Breslau et al., 2009; Schmiedeler & Schneider, 2014), effective peer interactions (Huang-Pollock et al., 2009), and relationships with teachers (Portilla et al., 2014). These effects can be long-lasting: School-entry inattention predicts achievement later in the school years (Duncan et al., 2007; Rabiner et al., 2000), and it has been linked to lower educational attainment, mental health, employment, and earnings in adulthood (Biederman et al., 2010; Knapp et al., 2011; Fletcher, 2013). Attentive behavior is stable across the transition to school (Schmiedeler & Schneider, 2014; Spira & Fischel, 2005), though subsets of children follow declining or rising trajectories across the early school years (Sasser, Beekman, & Bierman, 2015).

There appears to be large conceptual and empirical overlap between children's attentive behavior and their learning-related skills, approaches to learning, or classroom engagement (e.g., McClelland et al., 2006; McDermott, Rikoon, & Fantuzzo, 2014; Williford et al., 2013).[1] These constructs have different emphases and are assessed with different measures, but—especially when inattention is rated by classroom teachers—they share a focus on children's demonstration of self-regulated, engaged, organized, and attentive classroom behavior. Studies indicate that higher early learning-related skills are associated with higher level and faster rates of growth in reading and math achievement during elementary school (Bodovski & Farkas, 2007; DiPerna, Lei, & Reid, 2007; Galindo & Fuller, 2010; Li-Grining, Votruba-Drzal, et al., 2010; McClelland et al., 2006; Sasser, Bierman, & Heinrichs, 2015). This is particularly true for

[1] In FLP, learning behaviors were not assessed until grade 1 and could not be examined as school-entry predictors; however, in later waves inattention and learning behaviors were highly correlated, *r*s > .85.

children who begin school with low academic skills (Bodovski & Farkas, 2007; Li-Grining, Votruba-Drzal, et al., 2010).

Prosocial behavior. Children's prosocial behavior is another critical aspect of social-emotional functioning at the transition to school. As children spend increasing amounts of time outside the home, the opportunity for more varied and frequent social interaction also rises. In the classroom, children are exposed to a range of social situations, including one-on-one interactions with peers and adults, small group cooperative activities, structured large group lessons, and unstructured time with reduced adult supervision. How children navigate these diverse settings has implications for the relationships they form at school: Children's socially competent behavior is related to peer acceptance and the degree of conflict or closeness in student-teacher relationships (Ladd et al., 1999; Ladd et al., 2012; Roorda et al., 2014). In turn, the quality of these relationships can have lasting effects on school adjustment (Hamre & Pianta, 2001). Furthermore, because learning occurs largely via social interactions, children's effectiveness in specific interactions might directly facilitate or impede their knowledge acquisition or mastery of a task at hand. Teacher-rated prosocial behavior has shown impressive links to adult outcomes, including educational attainment, reduced substance use, and reduced crime involvement (Jones et al., 2015). It also has been linked to achievement and social adjustment across the school years in large national datasets (Grimm et al., 2010; Romano et al., 2010), though other work indicates that prosocial behavior does not contribute to higher achievement after accounting for other school-entry behavior, such as inattention (Claessen et al., 2009; Duncan et al., 2007).

Conduct problems. Children who exhibit high aggression, non-compliance, and oppositional behavior during kindergarten are at risk for poor social and academic outcomes. On average, externalizing problems decline in early and middle childhood as children adjust to school (Petersen et al., 2015). However, studies have identified subgroups of children who exhibit high, stable aggression over time, and among these children, the risk for persistent

learning and social difficulties is high (Campbell, Spieker, Burchinal, Poe, & the NICHD ECCRN, 2006; Campbell et al., 2010; NICHD ECCRN, 2004a). Early conduct problems are part of a developmental cascade linking family experiences in early childhood to poor outcomes in adolescence: In an empirical test of this chain, externalizing problems in kindergarten led to school failure in elementary school (e.g., peer rejection, grade retention, poor grades), low parental monitoring and association with deviant peers in adolescence, and ultimately violent behavior in high school (Dodge et al., 2008). Early aggression also has been linked to crime at age 25 (Pingault et al., 2013).

The link between early conduct problems and achievement is complex and appears to be bidirectional (Dodge et al., 2008; Stipek & Miles, 2008; Trzesniewski et al., 2006). Children who exhibit aggression and non-compliance as they transition to school have poorer concurrent EF and pre-academic skills (Bierman et al., 2009; Doctoroff et al., 2006). They also have trouble forming positive relationships with teachers, which can lead to disengagement and further behavior problems (Birch and Ladd, 1998; Gallagher et al., 2013; Gower et al., 2014; Skalická et al., 2015; Stipek & Miles, 2008). This may contribute to underachievement over time, but the field lacks consensus regarding the extent to which early conduct problems have unique negative effects on later achievement, with some studies documenting unique effects (Brennan et al., 2012; Grimm et al., 2010) and other studies finding nonsignificant associations after controlling for other aspects of school-entry behavior (Claessens et al., 2009; Duncan et al., 2007).

Skill Divergence or Convergence over Time

Although longitudinal associations between early social-emotional functioning and later outcomes are well-documented, less research has examined how early social-emotional functioning may predict *rates of change* in behavior and achievement over time. Two schools of thought offer competing hypotheses regarding the developmental trajectories of children who begin school with different levels of functioning. The skill-begets-skill hypothesis posits that

initially higher-functioning children show greater skill gains during the school years, which results in the widening of skill differences over time (Heckman, 2008). In contrast, the catch-up hypothesis suggests that initially lower-functioning children show greater growth during the school years, which results in the diminishing of skill differences over time (Barnett, 2011). Conceptual and empirical work that has advanced these hypotheses generally has focused on school-entry academic skills, and less attention has focused on school-entry social-emotional functioning. Research is needed to understand both (a) the extent to which social-emotional trajectories of initially higher-functioning children and initially lower-functioning children diverge or converge across the school years, as well as (b) the extent to which school-entry social-emotional functioning contributes to the widening or diminishing gap in achievement.

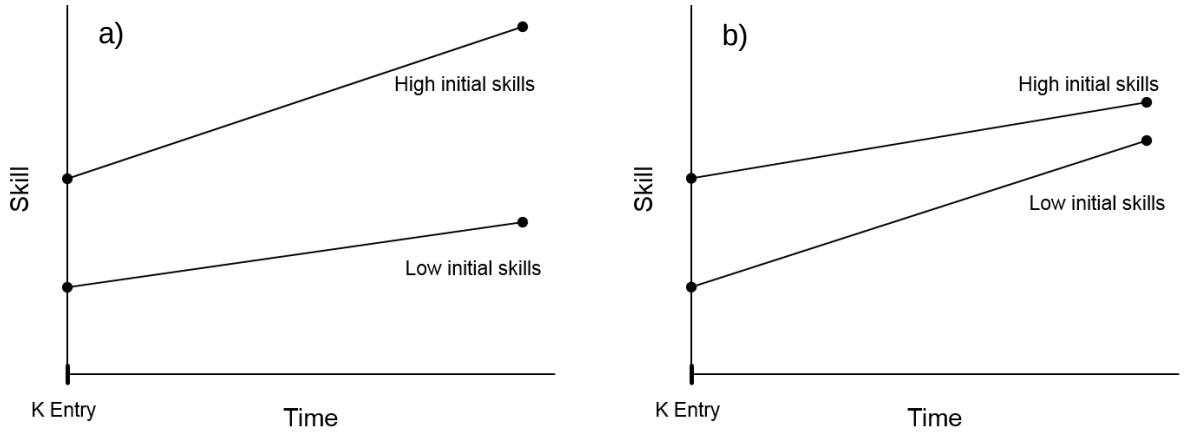

Figure 1. Hypothetical diverging or converging trajectories.

Skill divergence in the skill-begets-skill model. One prominent hypothesis holds that children with higher school-entry skills exhibit a faster pace of learning and skill development across the school years relative to children who begin school with lower skills. That is, initial skill is positively associated with growth over time. This pattern might be expected because learning and development are cumulative processes wherein later skills typically build directly upon earlier skills. Indirect pathways may also account for greater growth over time: Relative to initially lower-skilled children, higher-skilled children may develop closer relationships with teachers and classmates, experience higher expectations from parents and teachers, and find

the classroom more enjoyable and engaging, all of which may contribute to an upward cascade of increasing skill. Due to these direct and indirect mechanisms, higher-skilled children's initial advantage over their peers would be expected to grow over time, in line with the "skill begets skill" hypothesis and cumulative advantage/disadvantage models (Dannefer, 2003; DiPrete & Eirich, 2006; Heckman, 2008). As a result, children's skills diverge and initial differences between higher- and lower-skilled children widen over time (Figure 1a).

Several studies have examined the association between initial *academic* skill and rate of *academic* growth over time. For example, research suggests a "Matthew effect" for reading skill, wherein strong readers in kindergarten become even stronger relative to their peers over time, and initially poorer readers fall further behind their peers over time (Duff et al., 2015; Kempe et al., 2011; Stanovich, 1986). This pattern has been documented in other achievement domains, as well, such as math (Bodovski & Farkas, 2007; Salaschek et al., 2014). Less work has considered this developmental trend as a function of initial social-emotional functioning, however, and the limited research base that exists has tended to focus on learning-related skills and attention, rather than other aspects of social-emotional predictors like prosocial behavior and conduct problems. In a few studies, early learning-related skills have been shown to predict faster rates of achievement in elementary schools, contributing to diverging achievement trajectories (Li-Grining, Votruba-Drzal, et al., 2010; McClelland et al., 2006; Sasser, Bierman, & Heinrichs, 2006). The extent to which school-entry prosocial behavior and conduct problems predict the pace of development is less clear: Gaps in adjustment due to these factors are reduced, magnified, or constant over time in different samples (Grimm et al., 2010).

Skill convergence in the catch-up model. An alternative hypothesis regarding the association between initial status and growth over time holds that children with lower school-entry skills exhibit greater rates of change across the school years and thus partly catch up to their initially higher-skilled peers. That is, initial skill is negatively associated with growth over time. This pattern might be expected because, given their starting point, lower-skilled children

have more to gain upon school entry relative to higher-skilled children, whose relative development might slow or meet a ceiling after transitioning to kindergarten. In addition, teachers might target instruction or devote more attention to lower-skilled children, which could account for this subset's faster rate of change. According to this model, initial differences between higher- and lower-skilled children diminish over time, such that their skills converge as they progress through school (Figure 1b).

Like the research documenting widening skill differences, the literature on diminishing skill differences has primarily focused on academic skills. Some research on reading supports a compensatory model wherein poorer readers partially catch-up to their peers, rather than a cumulative advantage effect (Huang et al., 2014; Parrila et al., 2005; Pfost et al., 2014). In addition, Curby and colleagues (2009) found that children with poorer initial academic skills showed greater growth across in math (but not reading) in kindergarten and first grade relative to children with greater initial academic skills. Furthermore, although research indicates that children who attend high-quality preschools are more highly skilled on average than their peers at kindergarten entry, several studies indicate that children who do not attend preschool, and are thus lower-skilled at school entry on average, catch up to prior preschool attendees as they progress through elementary school (Barnett, 2011; Skibbe, Hindman, Connor, Housey, & Morrison, 2013).

Given competing hypotheses, inconsistent findings, and the limited research base on social-emotional functioning with respect to diverging or converging developmental trajectories over time, it would be informative to examine conditions under which school-entry social-emotional functioning may positively or negatively predict rates of change across the school years. Because processes in the school and classroom context play an important role in children's behavioral and academic development, as discussed next, these experiences may moderate the effect of school-entry status on growth trajectories.

Role of the School and Classroom Context

Next to the family, school is one of the most important developmental contexts for young people. Influences within the school context can be organized into distal factors and proximal processes (Bronfenbrenner & Morris, 2006; Mashburn & Pianta, 2010). Distal factors include characteristics of schools, classrooms, and teachers that are hypothesized to influence children's development indirectly through their effects on proximal processes to which children are exposed directly, or by moderating the effects of proximal processes (Mashburn & Pianta, 2010; Phillipsen, Burchinal, Howes, & Cryer, 1997). Proximal processes include children's sustained, daily interactions with teachers, peers, and learning materials that directly affect their behavioral and academic development (Mashburn & Pianta, 2010). Figure 2 illustrates diverse sources of influence within the school context, as well as examples of distal and proximal contributors to children's skill trajectories.

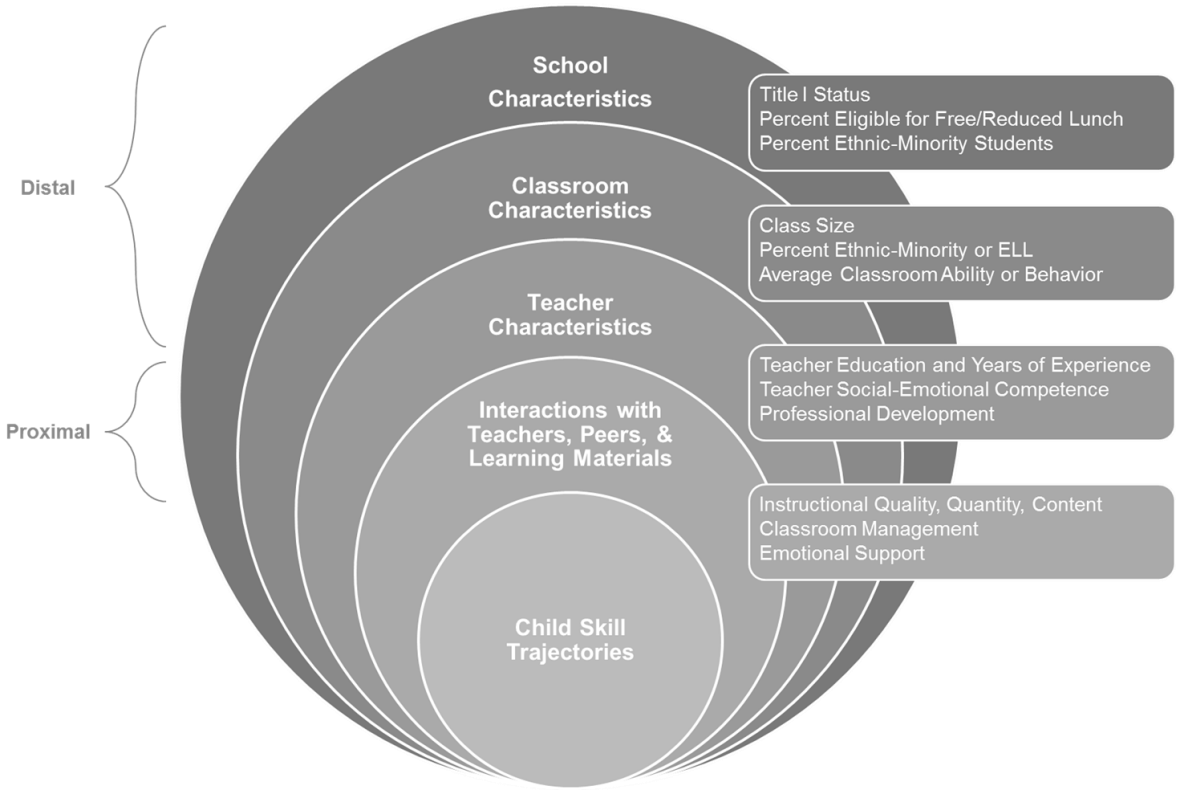

Figure 2. Sources of influence within the school and classroom context.

Distal factors.

School characteristics. Features of the school may influence children's behavior and achievement (a) because certain school characteristics shape children's interactions with teachers, peers, and learning materials, and thereby influence their growth and/or (b) because certain school characteristics are proxies for other factors children encounter. Relative to schools with greater financial resources, lower-income schools may have a harder time accessing high-quality instructional materials and attracting and retaining high-quality teachers, and these mechanisms might facilitate greater learning among students attending well-financed schools relative to those attending poorer schools (Darling-Hammond, 2004; Ingersoll et al., 2014; Johnson et al., 2004). Greater expenditures per student have been linked with greater achievement, though effects are modest (Greenwald, Hedges, & Laine, 1996; Yeh, 2010). In addition, school-level economic disadvantage as indexed by the percent of students living in poverty is related to children's achievement and behavior (Battistich et al., 1995; Perry & McConney, 2010; Silvernail et al., 2014; Sirin, 2005), which may reflect an effect of the school's financial resources, school climate, or the student composition itself. Because socioeconomic disadvantage is related to achievement and behavior problems at the individual level (Ryan et al., 2006; Zill & West, 2001), and because peers' aggregate achievement and behavior predict the pace of individual students' gains (Henry & Rickman, 2007; Justice, Petscher, Schatschneider, & Mashburn, 2011; O'Brennan, Bradshaw, & Furlong, 2014), high concentrations of low-income students can have negative impacts on children's developmental trajectories even after accounting for children's own family income.

Although more research typically has examined schools in low-income *urban* areas, schools in low-income *rural* areas face unique challenges, such as geographic isolation, and therefore might have unique effects on children's development (Irvin, Byun, Meece, Farmer, & Hutchins, 2012; Miller, Votruba-Drzal, & Setodji, 2013). High-poverty rural schools have difficulty recruiting and retaining teachers (Maranto & Shulls, 2012) and have high rates of student dropout (Provasnik et al., 2007).

Classroom characteristics. Various classroom characteristics have been examined as predictors of children's achievement and behavior. Classroom demographics, including the proportion of low-income or low-achieving students, relate to achievement outcomes of children in those classrooms (Henry & Rickman, 2007; Palardy & Rumberger, 2008; Reid & Ready, 2013; Weiland & Yoshikawa, 2014). One of the most widely studied classroom characteristics is class size or the teacher-student ratio, and the literature indicates that smaller class size is related to greater achievement (Ehrenberg et al., 2001; Krueger, 2002; NICHD ECCRN, 2004b; Shin & Raudenbush, 2011). In fact, a large-scale randomized trial of class size reduction found that small classrooms during the early elementary school years were causally linked to better outcomes years later, including greater high school completion and college attendance (Chetty et al., 2011; Finn, Gerber, & Boyd-Zaharias, 2004). There is also evidence that smaller class size is linked to better engagement, behavior, and peer relationships in the classroom (Blatchford, Basset, & Brown, 2011; Cappella & Neal, 2012; Finn et al., 2003; NICHD ECCRN, 2004b).

Teacher characteristics. Identifying characteristics of effective teachers is important because of the potential implications for minimum teacher qualifications and ongoing professional development. The evidence on teachers' level of education and years of experience is mixed: These background characteristics have been shown to predict children's achievement in some studies (Boyd et al., 2008; Croninger et al., 2007; Rice, 2010), but in other work these qualifications have no impact on child outcomes (Early et al., 2007; Hanushek, 1986; O'Brennan et al., 2014; Palardy & Rumberger, 2008), likely because the effects of education and experience are indirect and transmitted through actual teaching practice.

In addition to their background and experience, teachers' mindsets, stress, and burnout also can affect their efficacy in the classroom and therefore contribute to student behavioral and academic outcomes (Alam, 2012; Dottin, 2009; Jennings & Greenberg, 2009; Li-Grining, Raver, et al., 2010). An emerging literature highlights the importance of teachers' own social-emotional

competence (SEC) specifically, which includes emotion regulation, self-awareness, and interpersonal skills (Domitrovich et al., 2016; Jones, Bouffard, & Weissbourd, 2013). Theoretical frameworks suggest that teacher SEC may contribute to their students' social-emotional development and achievement via improvements in teacher-student relationships, classroom organization, SEL instruction, and classroom climate (Jennings & Greenberg, 2009; Roeser et al., 2012). While these conceptual models are compelling, there is a need for empirical tests of the link between teacher SEC and student outcomes.

Proximal processes.

Emotional support. The "Teaching through Interactions" framework highlights three domains of proximal teacher-student interaction that are expected to drive academic and behavioral development: Emotional support, classroom organization, and instructional quality (Hamre & Pianta, 2007; Hamre et al., 2013). Informed by both attachment theory and self-determination theory (Bowlby, 1969; Connell & Wellborn, 1991), this model holds that children will feel safe and motivated to learn in emotionally supportive classrooms, which are characterized by a positive emotional tone, teacher responsivity to students' needs and skill level, an emphasis on students' interests and perspectives, and low levels of negativity and rigidity. Classroom emotional support is hypothesized to have its most direct effects on children's social-emotional behavior, as well as cross-domain effects on specific self-regulatory skills and academic skills (Downer et al., 2010). Studies using the Classroom Observation Assessment Scoring System (CLASS) observational measure (Pianta, La Paro, & Hamre, 2008) have documented associations between emotional support and growth in children's social behavior, engagement in the classroom, and achievement (Mashburn et al., 2008; Merritt et al., 2012; NICHD ECCRN, 2005; Pianta, Belsky, Vandergrift, Houts, & Morrison, 2008; Reyes et al., 2012).

Classroom emotional support may lead to better child outcomes in part because it facilitates positive relationships between children and teachers and a sense of community

among peers (Hamre & Pianta, 2005; Madill, Gest, & Rodkin, 2014). Teacher-student closeness has been linked with children's attitudes toward school, achievement, and competency in peer relationships, whereas conflict and dependency are related to low engagement in the classroom, negative feelings about school, and declines in social-emotional functioning (Birch & Ladd, 1997, 1998; Mashburn & Pianta, 2006). The effects of teacher-student relationships may be long-lasting: Teacher-students relationships marked by conflict and dependency in kindergarten have been shown to predict children's outcomes through eighth grade (Hamre & Pianta, 2001). Positive peer relationships are also critical to children's learning and development. Friendships may be a source of emotional and instrumental support (e.g., academic assistance) for children, whereas peer conflict or rejection can lead to psychological distress, disengagement, and fewer opportunities to participate in learning or social activities (Ladd, Kochenderfer-Ladd, Visconti, & Ettekal, 2012). Many studies have documented the effects of children's peer relationships on their social-emotional and academic adjustment across the school years (Rubin, Bukowski, & Parker, 2006; Wentzel, 2009).

Classroom organization. In a well-organized classroom, teachers use proactive strategies to prevent problem behavior; opportunities to learn are maximized through the use of clear, consistent routines and other strategies that make optimal use of time; learning activities and materials effectively engage students in learning; and classroom disruption is prevented or kept to a minimum (Hamre et al., 2013). Teachers' behavior management practices and effective classroom organization are linked conceptually to the development of children's self-regulatory abilities (Downer et al., 2010). These associations have been documented empirically: Classroom organization predicts children's EF, engagement, and on-task behavior (Dominguez et al., 2010; Hamre et al., 2014; Rimm-Kaufman et al., 2009). Instructional time is increased in well-organized classrooms, and children's higher cognitive and behavioral regulation allows them to participate more fully, maximizing learning. Thus, in these classrooms, children may show greater academic gains (Downer et al., 2010). Furthermore, interventions

that build teachers' behavior management skills also have been shown to improve children's social skills, increase learning engagement, and reduce externalizing problems (Morris, Millenky, Raver, & Jones, 2013; Raver et al., 2009; Webster-Stratton, Reid, & Stoolmiller, 2008).

Instructional quality. Instructional quality refers to teachers' effectiveness in promoting children's critical thinking, providing feedback that expands their learning, modeling and stimulating advanced language, and utilizing a variety of strategies to engage children and promote deeper learning (Hamre et al., 2013). Studies indicate that instructional quality predicts children's academic skill gains (Burchinal et al., 2008; Mashburn et al., 2008), though effects generally are small (Burchinal et al., 2011). The association between instructional quality and achievement is also supported by experimental work outside the CLASS literature: Interventions that improve teachers' instructional quality and increase their use of evidence-based teaching practices have been shown to improve children's academic skills (Clements et al., 2011; Wasik & Hindman, 2011). Few studies have examined effects of instructional quality on social-emotional functioning, but conceptual models posit cross-domain effects on children's behavior and self-regulatory abilities (Downer et al., 2010).

Quantity of instruction. In addition to quality, the quantity of instruction is also critical to children's skill development. More time spent on reading or math instruction has been linked to children's higher achievement in those content domains (Clements et al., 2011; Hong & Hong, 2009), likely because of repeated exposure to content, more time to practice skills, and opportunities for exposure to advanced content. Interactive effects among instructional quality, quantity, and content are also possible, such that more advanced and frequent instruction may only be effective when instruction is also of greater quality (Connor et al., 2014).

Cumulative Experience within the School and Classroom Context

By and large, studies of distal factors and proximal processes within the school and classroom context have examined how the context *at a single point in time* relates to children's skill level or growth in the same school year or in subsequent years. Demonstrating that

schooling experiences in a given academic year predict children's outcomes has had important implications for developmental theory and intervention design. However, the magnitude of school and classroom context effects tends to be small (Burchinal et al., 2011), which leaves a large proportion of variance in children's skills unexplained by commonly-used indicators of the context. Examining the school and classroom context at a single point in time may be a limited approach because children's experiences within these contexts are quite variable from year to year (Pianta, Belsky, Houts, Morrison, & the NICHD ECCRN, 2007). Thus, it may be more meaningful to consider how children's cumulative experiences across multiple years contribute to their behavioral and academic skill development. A few recent studies, using different methods, have begun to illuminate the role of cumulative schooling experiences in contributing to children's learning and development.

Average or latent experience over time. One straightforward way to capture cumulative schooling experiences is to average a child's scores on a given measure of the school or classroom context across repeated measurements over time. Average experience in the context then could be used as a continuous indicator in analyses, or scores could be dichotomized based on data-driven or theory-driven cut points (e.g., Burchinal et al., 2014). Following this approach, Magnuson and colleagues (2007) created average scores for class size and quantity of literacy instruction using ECLS-K data in kindergarten, first grade, and third grade, and then dichotomized these variables at the median to identify children who tended to experience small or large classes and more or less literacy instruction. Large class size and less literacy instruction were associated with reduced achievement gains from kindergarten to third grade, particularly among children who had not attended preschool.

Rather than create a simple average score, Rudasill and colleagues (2013) modeled latent factors of teacher-student closeness and conflict using children's scores on the Student-Teacher Relationship Scale (STRS; Pianta, 2001) from kindergarten, first grade, and second grade as manifest indicators. This approach is conceptually similar to averaging scores across

time, with the exceptions that averaging ignores measurement error and also weights repeated measurements equally, whereas latent modeling allows repeated measurements to load differentially on the latent factor. In this study, latent teacher-student closeness from kindergarten to second grade predicted children's prosocial behavior in third grade, and teacher-student conflict predicted children's aggression, victimization, and reduced prosocial behavior in third grade.

Consistency or years of high-quality experiences. Other studies have defined cumulative school or classroom context as the number of years children experienced high or low quality. For example, Pianta and colleagues (2007) divided first, third, and fifth grade classrooms into terciles at each grade level based on teachers' instructional and emotional support CLASS scores. "High-quality" classrooms were those with scores in the top third at that grade level, and "low-quality" classrooms were those with scores in the bottom third at that grade level. The authors found that 14 to 17% of children in the NICHD ECCRN sample spent at least two years in high-quality classrooms and no years in low-quality classrooms; 19 to 20% of children spent at least two years in low-quality classrooms and no years in high-quality classrooms. This study did not report children's outcomes as a function of years in high- or low-quality classrooms.

A few intervention trials have followed a similar logic in testing the effects of multiple years of intervention. That is, if an intervention is hypothesized to improve children's outcomes via improvements in their classroom experiences, then multiple years of intervention exposure would be analogous to multiple years of higher classroom quality. Connor and colleagues (2013) tested the effects of zero, one, two, and three years' exposure to an individualized reading intervention and found that children randomly assigned to receive all three years of intervention had the best outcomes. Evidence from quasi-experimental studies also suggests that more years of high-quality classroom experiences during the preschool years (Domitrovich et al., 2013) and from preschool to third grade (Reynolds, 1994) are related to better behavioral

and academic outcomes.

Time-varying experiences. The predictive utility of a single summary indicator of the school or classroom context may be limited by the fact that children's experiences from year to year vary widely in quality (Pianta et al., 2007). Thus, it may be important to model within-child fluctuations in quality to account for additional variance in children's skills that is not explained by average or composite schooling experience variables. Time-varying predictors, such as children's classroom quality scores from multiple years, can be incorporated into multilevel models (e.g., level one of a two-level growth curve model). Depending on model specification, effects of time-varying quality may be interpreted as the overall concurrent association between quality and child skill or as the concurrent association between quality and skill at a particular time point. For example, using measures of quality from first, third, and fifth grades, Pianta, Belsky, and colleagues (2008) documented positive associations between aspects of quality and children's reading and math achievement in third and fifth grades, though they also documented counterintuitive negative associations between quality and reading achievement in first grade.

Models also can be specified to include both concurrent and cumulative experience over time. Maldonado-Carreño and Votruba-Drzal (2011) examined children's behavior and achievement as a function of time-varying teacher-student relationship quality at level one and average relationship quality across elementary school at level two in a two-level growth model. Average relationship quality from kindergarten to fifth grade positively predicted the level of children's language and math skills and negatively predicted level of children's internalizing and externalizing problems. Average relationship quality did not predict change (i.e., variance in slope of time) in these skills. In addition, within-child increases in relationship quality predicted increases in language and math skills as well as decreases in internalizing and externalizing.

Differential Effects of the School and Classroom Context

In general, research examining the effects of the school and classroom context has

focused on main effects. That is, most studies have examined how the context contributes to skill development for the "average" child. However, several theoretical frameworks would suggest that school quality may have differential effects across children within a given classroom or school. For example, according to the bioecological model of development (Bronfenbrenner & Crouter, 1983; Bronfenbrenner & Morris, 2006), the way in which proximal processes influence development is dependent on characteristics of an individual and/or the context. Goodness-of-fit theory (Thomas & Chess, 1977) suggests that optimal development is a function of the match between a child's characteristics and the demands of his or her environment. More recently, Connor and colleagues (Connor et al., 2009, 2011) have advanced a model of Child-by-Instruction or Aptitude-by-Treatment effects. These authors have used this framework specifically to study literacy skills and instruction, but applied more generally, this model highlights the possible interactive effects of children's skills and classroom experiences.

Several studies have tested whether high-quality schooling experiences interact with children's baseline risk status due to their sociodemographic or family background. In general, this work suggests that high-quality schooling experiences may be particularly beneficial for children at high sociodemographic risk (e.g., Burchinal et al., 2002; Hamre & Pianta, 2005). However, less research has examined whether the effects of the school and classroom context on developmental trajectories are moderated by children's school-entry level of functioning, particularly in the social-emotional domain. Documenting such moderation, or lack thereof, is important because it would further our understanding of the factors that influence the extent to which the trajectories of initially higher-functioning and initially lower-functioning children diverge or converge over time. Gaps between children would widen across the school years under conditions that differentially benefit higher-functioning children, and gaps would diminish under conditions that differentially benefit lower-functioning children.

As mentioned above, a well-developed line of research on the interactive effects of children's initial status and classroom instructional quality has examined the way in which

children's reading skill level moderates the effects of instruction that focuses on text comprehension ("meaning-focused") or on text decoding and phonics ("code-focused"), as well as instruction that involves more or less involvement of the teacher ("teacher-child managed" or "child managed," respectively) (Connor et al., 2004). This work indicates that lower-skilled children benefit differentially from code-focused and teacher-child managed instruction, whereas higher-skilled children differentially benefit from instruction that is consistently meaning-focused and child-managed (Connor et al., 2004; Juel & Minden-Cupp, 2000). Drawing from this work, the Individualizing Student Instruction reading intervention trains teachers to tailor their reading instruction to individuals' reading skills and needs, and evaluations highlight the promise of this differentiated instructional approach in elementary school (Connor et al., 2013).

Other research has documented differential effects of instruction for children with different initial math skills. For example, one study revealed that high-quality teacher-student interactions, as measured by a composite CLASS score, were related to greater math gains among children who began preschool with lower, but not higher, math skills (Cadmina, Leal, & Burchinal, 2010). In another study, children with initially low, average, and high math skills were found, on average, to exhibit parallel math skill trajectories in elementary school. However, greater inference-based instruction (versus basic skills instruction) and less conflictual relationships with teachers more strongly predicted math gains among children with initially low math skills, compared to children with average or high math skills (Crosnoe et al., 2010). A somewhat different pattern emerged from analyses using ECLS-K data: Kindergarten teachers' coverage of basic math content was linked to greater math gains across the school year among children with the lowest level of math skills at school entry; among all other children, coverage of basic math content predicted reduced math gains and coverage of advanced math content predicted greater math gains across the school year (Engel et al., 2013). However, another study conducted by this group did not reveal a similar moderated effect: Only coverage of advanced content was linked to achievement gains across the year, and this effect was not

moderated by initial academic skills, prior experience in preschool, or family income (Claessens et al., 2014).

There is some emerging evidence that the effects of classroom quality are moderated by children's behavior. A few studies have approached this question from a temperament perspective, given this field's emphasis on individual differences in response to the environment. For example, Vitiello and colleagues (2012) examined whether the quality of instructional and emotional support in Head Start classrooms had differential effects for temperamentally undercontrolled (i.e., aggressive, disruptive), overcontrolled (i.e., shy, reticent), and resilient (i.e., positive, socially competent) children. Results indicated that resilient children made greater achievement gains across the school year than overcontrolled and undercontrolled children in lower-quality classrooms. Relative to resilient children, undercontrolled children made greater gains in classrooms with higher instructional support and overcontrolled children made greater gains in classrooms with higher emotional support. Curby and colleagues (2011) similarly found that in first grade classrooms providing lower instructional support and emotional support, children with easy temperaments (rated in infancy) exhibited greater achievement and behavioral improvements in first grade compared to children with difficult temperaments. However, children with easy and difficult temperaments showed similar gains in classrooms providing higher instructional and emotional support. Outside the temperament literature, Williford and colleagues (2013) examined whether classroom quality, as measured by a CLASS composite score, had differential effects for preschoolers with different profiles of learning and social engagement. Results indicated that in lower-quality classrooms, more engaged children exhibited better literacy skills than children with average engagement, but in higher-quality classrooms, the differences between these two groups was reduced.

Taken together, these studies suggest that differences between children with better and poorer school-entry behavior might widen over time in lower-quality classrooms, whereas differences might be maintained or reduced in higher-quality classrooms. While these studies

point to possible differential effects of classroom quality as measured by the CLASS, however, it should be noted that several studies have found no such evidence of moderation by children's behavior. For example, one study found no evidence that difficult temperament moderated the influence of cumulative teacher-student relationship quality on children's behavioral outcomes in third grade (Rudasill et al., 2013). Other studies failed to detect any moderated effects of quality by children's adaptive classroom behavior (i.e., a composite of learning-related and SEL skills; Cadima et al., 2010) or by their attention and externalizing (Keys et al., 2013).

Present Study

This dissertation includes three related research aims which focus on the joint contributions of school-entry social-emotional functioning and the school/classroom context to children's developmental trajectories across early elementary school. More specifically, this dissertation examines: (1) the contributions of children's school-entry social-emotional functioning on level and growth in social-emotional functioning and achievement; (2) the effects of children's concurrent and cumulative experiences in the school/classroom context on their outcomes over time; and (3) possible interactive effects between school-entry social-emotional functioning and the school/classroom context.

Aim 1. The first aim of this dissertation is to examine how children's school-entry social-emotional functioning is related to children's behavior and achievement from kindergarten to grade 3. This extends prior research documenting longitudinal associations between early behavior and later outcomes by examining the extent to which school-entry status predicts *rates of change*. Two contrasting hypotheses will be tested: Under the skill-begets-skill hypothesis, children who start kindergarten with high prosocial behavior, low inattention, and/or low conduct problems are expected to exhibit greater growth over time relative to children with poorer social-emotional functioning. In contrast, under the catch-up hypothesis, children with inattention, conduct problems, and/or low prosocial behavior will exhibit greater growth once they enter kindergarten relative to children without these school-entry difficulties.

Aim 2. The second aim of this dissertation is to examine the effects of children's concurrent and cumulative experiences in the school/classroom context on children's behavior and achievement from kindergarten to third grade, which extends prior work examining the influence of schooling experiences at a single point in time. Analyses capitalize on rich longitudinal data collected in the FLP study on multiple facets of children's schooling experiences from kindergarten to grade 3: Distal factors to be examined include characteristics of children's schools (i.e., school-level economic disadvantage), classrooms (i.e., class size), and teachers (i.e., advanced education, teacher SEC). Proximal processes to be examined include observations of emotional support, classroom organization, and instructional quality, as well as teachers' report of the amount of math or reading instruction (for achievement outcomes only).

Aim 3. The third aim of this dissertation is to examine how the school and classroom context might moderate the effect of children's school-entry social-emotional functioning on their developmental trajectories across the early school years. The goal of these analyses is to further our understanding of the factors that play a role in the divergence or convergence of children's trajectories across time, suggested by the skill-begets-skill or catch-up hypotheses, respectively.

CHAPTER 2

METHOD

Participants

Data were drawn from the Family Life Project (FLP), a large-scale longitudinal study of children and families from high-poverty, rural counties in North Carolina and Pennsylvania. Three counties in North Carolina and three counties in Pennsylvania were identified to represent the Black South and Appalachia, respectively. Given the goals of the project, these target counties included no towns with a population greater than 50,000, were not adjacent to metropolitan areas, and had high rates (i.e., roughly 50%) of free and/or reduced price lunch eligibility among children in elementary school. Complex sampling procedures were used to recruit a representative sample of children born to mothers residing in the six target counties during a one-year period from 2003 to 2004. Low-income families were oversampled in both North Carolina and Pennsylvania, and African American families were also oversampled in North Carolina (but not in Pennsylvania because 95% of target communities were White).

Recruitment took place in-person at hospitals that delivered babies in target counties, as well as by phone to reach mothers who resided in target counties but delivered in hospitals outside the target counties, according to county birth records. This combination of in-person and phone recruitment covered about 90% of births in the six target counties. Through the hospital visits and searches of county birth records, 5471 births were identified during the one-year recruitment period. Of these, 1515 (28%) were not eligible for study participation (e.g., because English was not the primary language spoken in the home, mothers resided outside the target counties, or families intended to move within three years), and 3956 (72%) were eligible. Of those eligible, 2691 (68%) agreed to be considered for participation, and of those willing to participate, 1571 (58%) were selected for inclusion in the sample. Of this group, 1292 families (82%) formally enrolled in the project by completing the 2-month home visit. Additional details about initial recruitment are provided by Vernon-Feagans and colleagues (2013).

This dissertation utilized data collected during the spring prior to K entry and the first four years of elementary school (i.e., K through G3 for most children). Participants were included in the sample if (a) their behavior and achievement were assessed at least once from K to G3 (i.e., they did not drop out of the study before school entry), (b) they attended public school from K to G3 (i.e., they were not homeschooled and did not attend private school), and (c) they were enrolled in regular classrooms from K to G3 (i.e., they were not placed in a special education classroom). Of the 1292 participants originally enrolled in FLP, 972 (75%) met these inclusion criteria and were included in the analytic sample. Of these, approximately 60% had been recruited from North Carolina and 40% had been recruited from Pennsylvania. The analytic sample was split evenly by sex, and about 45% of children were African American, almost all (> 95%) from North Carolina. Only 16% of primary caregivers had a college degree. Nearly one-third of the sample lived below the federal poverty line, as measured by families' income-to-need ratio averaged across 6 waves of data collection from 6- to 58-months. Another 38% lived above this threshold but below 200% of the poverty line. The average age at K entry was 5.4 years. Nearly 90% of children began K in the 2009-2010 school year (n = 864); other children began K the year prior (2008-2009, n = 70) or following (2010-2011, n = 38).

Measures

This dissertation utilized data on children's social-emotional functioning, achievement, the school and classroom context, and sociodemographic background. Teachers rated children's social-emotional functioning in the spring prior to kindergarten and each subsequent spring through G3. Ratings from the spring prior to kindergarten were used as measures of children's school-entry social-emotional functioning, and ratings in K-G3 were used to model social-emotional trajectories in the outcome models. In addition, children's math and reading achievement were measured on standardized assessments each spring in K-G3. Aspects of the school and classroom context were measured each fall in K-G3 with teacher ratings, observations, and linked administrative data from the National Center for Education Statistics

(NCES). Information on children's sociodemographic background was collected via parent report when children were between 2- and 58-months of age.

Social-emotional functioning. Children's inattention was assessed with the ADHD subscale of the Disruptive Behavior Disorders Rating Scale, which is based on DSM diagnostic criteria (Pelham, Evans, Gnagy, & Greenslade, 1992). Teachers rated 9 items about attention problems on a 4-point scale from "never or rarely" to "very often" regarding the extent to which children had difficulties following instructions, sustaining attention in activities, and organizing tasks (e.g., fails to give close attention to details, has difficulty sustaining attention in tasks, does not follow through on instructions). Scale reliability was high at each wave (α = .93-.96), and correlations over time indicated moderate to high stability (*r*s = .39-.67). The distribution of this scale was positively skewed and handled by taking a log transformation.

Children's prosocial behavior was assessed with the Prosocial Behavior subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). Teachers rated 5 items on a 3-point scale from "not true" to "certainly true" regarding the extent to which children exhibited sharing and helping behaviors and were kind and considerate (e.g., shares readily with other children, considerate of other people's feelings, often offers to help). Scores on this subscale was internally consistent (α = .82-.86) and correlated over time (*r*s = .27-.44), though stability was somewhat lower than stability of inattention and conduct problems.

Children's conduct problems were assessed with the Conduct Problems subscale of the SDQ (Goodman, 1997). Teachers rated 5 items on a 3-point scale from "not true" to "certainly true" regarding the extent to which children acted out, fought with other children, and broke rules (e.g., generally well behaved [reversed], loses temper, fights with other children, lies or cheats). Reliability was adequate at each wave (α .79-.82), and children's conduct problems evidenced moderate stability over time (*r*s = .40-.61). As in the case of inattention, scores were transformed to handle positive skew in the original distribution.

Achievement. Children's math and reading achievement were directly assessed each

spring in K-G3 with widely used and well validated subtests from the Woodcock-Johnson III Tests of Achievement (Woodcock, McGrew, & Mather, 2001). Reading ability was assessed with the Letter-Word Identification subtest, in which children were asked to identify up to 76 letters and words of increasing difficulty. Math achievement was assessed with the Applied Problems subtest, in which children were asked to solve up to 63 counting, mathematical, and reasoning problems. For both subtests, responses were coded correct or incorrect, and interviewers discontinued the assessment after 6 consecutive incorrect responses. Rank order stability was very high for both math (*r*s = .69-.78) and reading (*r*s = .61-.90). The current analyses used Woodcock-Johnson *W*-scores, which are based on the Rasch model and item response theory (Jaffe, 2009), because these scores are particularly useful in measuring individuals' growth over time.

School and classroom characteristics. The proportion of students eligible for free and reduced-price lunch (FRPL) was available from the National Center for Education Statistics (NCES) and matched to schools in the FLP study. There was little year-to-year variability in this proportion at the school level, and children typically remained in the same school for multiple years. Therefore, rather than use this variable as a time-varying covariate, school-level FRPL eligibility was averaged from K-G3 and used as a time invariant indicator of school-level economic disadvantage.

Information about classrooms and teachers were collected via teacher surveys each fall in K-G3. These features of the context were treated as time-varying predictors in the main analyses. Class size was determined by teachers' report of the number of students enrolled in their class. Teachers also indicated the highest level of education they had attained to date. Since the majority of teachers had received a bachelor's degree, a dichotomous variable was created which indicated whether the teacher had received any additional schooling beyond this (1 = completed some coursework beyond college).

Each fall, teachers indicated whether they used established written curricula for math

and reading, and if so, how much time they spent per week using those curricula on a 4-point scale (1 = *1-4 hours*, 2 = *4-7 hours*, 3 = *7-10 hours*, 4 = *more than 10 hours*). Teachers reported on instructional time separately for math and reading on one item each. Responses were recoded so that teachers who reported that they did not use an established written curriculum for either math or reading received a "0" on the item measuring instructional time, shifting the range of possible scores on this item from 1-4 to 0-4.

Teacher social-emotional competence (SEC) was assessed by self-report each fall with the Mindfulness in Teaching Scale (Greenberg, Jennings, & Goodman, 2010). Teachers rated 20 items on a 5-point scale from "never true" to "always true" regarding their emotional non-reactivity and mindful awareness in daily teaching activities and interactions with students (e.g., I often react too quickly to what my students say or do [reverse scored]; when I am teaching I find myself doing things without paying attention [reverse scored]; I am aware of how my moods affect the way I treat my students). Items were averaged to form a total score (α = .84-.86 across waves). This measure has been used in the mindfulness literature (e.g., Frank, Jennings, & Greenberg, 2016), but it also has been used in recent work to measure teacher SEC more generally (Domitrovich et al., 2016).

In addition to teacher report of the classroom context, teacher-student interactions were assessed by observers with the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008) each fall in K-G3. Trained observers visited classrooms for two 30-minute cycles and rated 10 dimensions of teacher-student interactions on a 7-point scale. The 10 dimensions were averaged across cycles. Traditional CLASS scoring involves averaging items to form three domain scores: Emotional support (i.e., positive climate, negative climate (reversed), teacher sensitivity, regard for student perspectives; α = .79-.86), classroom organization (i.e., behavior management, productivity, instructional learning formats; α = .68-.79), and instructional support (i.e., concept development, quality of feedback, language modeling; α = .84-.86). Given high correlations among the three domains (*r*s = .45-.69), a

bifactor model was fit to the 10 CLASS items to create new, relatively orthogonal CLASS variables which could be entered together as predictors in the same model. The details of this approach are discussed at greater length in the Aim 2 results section.

Sociodemographic background. A number of sociodemographic characteristics of children and their families were measured by parent report when children were between 2 and 58 months. For characteristics that varied over time (e.g., income), parent reports were averaged across waves to create more reliable estimates of children's experience prior to kindergarten. Covariates used in the current analyses included state (1 = North Carolina), sex (1 = male), race (1 = African American), whether the parent completed college, whether the parent was employed, whether the parent was married, and family income-to-need. Child age at kindergarten entry was also included as a control variable.

Analytic Approach

Multilevel models were used to model growth trajectories of behavior and achievement and account for non-independence in the data. This general modeling approach was consistent across analyses, though different sets of predictors were included to address each aim (i.e., school-entry social-emotional functioning in Aim 1, school and classroom variables in Aim 2, and both sets of predictors in Aim 3). Technically, because children's classroom membership changed each year, data were not purely hierarchical. Cross-classified models can be used to fit this data structure (Raudenbush, 1995), but ultimately this dissertation used 3-level multilevel models, with occasions nested in children nested in schools, for a few reasons. First, over half of the classrooms in this sample included only one FLP participant. Second, cross-classified models are fit using MCMC estimation in the statistical program MLwiN, but there is not yet a way to use this method of estimation in conjunction with multiple imputation in MLwiN (Goldstein, 2014). Without imputation, any occasion with a missing predictor is dropped from the model, which would have resulted in an unacceptable amount of dropped level 1 cases, particularly in Aims 2 and 3 given the number of predictors and the different sources of data

used to model the time-varying concurrent and lagged effects described below. Third, preliminary cross-classified models fit to complete data indicated that the proportion of variance explained at the classroom level was small (7% on average) in comparison to the proportion of variance explained at the child level (55% on average), and much of classroom variance appeared to be captured by schools once the classroom level was dropped from the models.

Thus, 3-level models were estimated for all outcomes, with occasions (level 1, *N* = 3888) nested in children (level 2, *N* = 972) and children nested in schools (level 3, *N* = 175). Children who switched schools at some point during the study period were nested in the school they attended for the most amount of time or, in the case of equal time in two schools, the last school they attended. The unconditional growth model equation is below. Intercepts varied randomly across schools and children, and the linear effect of time varied across children. (Note that a fixed effect of quadratic time was also included in the achievement models but is not represented in the equation below.)

$$\text{Level 1:}\quad y_{tij} = \beta_{0ij} + \beta_{1ij}(\text{time}_{tij}) + e_{tij}$$

$$\text{Level 2:}\quad \beta_{0ij} = \delta_{00j} + u_{0ij}$$

$$\beta_{1ij} = \delta_{10j} + u_{1ij}$$

$$\text{Level 3:}\quad \delta_{00j} = \gamma_{000} + v_{00j}$$

$$\delta_{10j} = \gamma_{100}$$

Multiple imputation in SAS 9.3 was used to handle missing data. Twenty datasets were imputed using an “inclusive strategy” which included all analytic variables in the imputation model as well as auxiliary variables that were related to one or more variables of substantive interest (Collins, Schafer, & Kam, 2001; Graham, 2012). Additional details specific to each aim are provided below.

Aim 1. The first aim of the dissertation was to examine how children’s social-emotional functioning at school-entry was related to behavior and achievement at the end of third grade and to change over time from K-G3. This was accomplished by modeling children’s inattention,

prosocial behavior, conduct problems, math, and reading achievement from K-G3 as outcomes in separate models. The unconditional growth model outlined above was expanded to incorporate school-entry inattention, prosocial behavior, and conduct problems as predictors of the intercept and slope for linear time, first in separate models and then as predictors in a single model to examine unique effects. Time was centered at G3 so that effects at the intercept could be interpreted as effects at the end of third grade. For example:

$$\text{Level 1:}\quad y_{tij} = \beta_{0ij} + \beta_{1ij}(\text{time}_{tij}) + e_{tij}$$

$$\text{Level 2:}\quad \beta_{0ij} = \delta_{00j} + \delta_{01j}(\text{covariates}_{ij}) + \delta_{02j}(\text{PK soc-emo}_{ij}) + u_{0ij}$$

$$\beta_{1ij} = \delta_{10j} + \delta_{11j}(\text{covariates}_{ij}) + \delta_{12j}(\text{PK soc-emo}_{ij}) + u_{1ij}$$

$$\text{Level 3:}\quad \delta_{00j} = \gamma_{000} + v_{00j}$$

$$\delta_{01j} = \gamma_{010}$$

$$\delta_{02j} = \gamma_{020}$$

$$\delta_{10j} = \gamma_{100}$$

$$\delta_{11j} = \gamma_{110}$$

$$\delta_{12j} = \gamma_{120}$$

If school-entry social-emotional functioning significantly predicted slope for time, this would indicate that it was associated with change in the outcome from K-G3. A positive coefficient[2] would indicate that children with greater school-entry social-emotional functioning exhibit greater growth from K-G3 and thus increase their social-emotional and/or achievement advantage over children with lower initial social-emotional functioning. This would lend support to the skill-begets-skill hypothesis. Alternatively, a negative coefficient would indicate that children with lower school-entry social-emotional functioning exhibit greater growth over time. This would mean that the social-emotional and/or achievement gap between children with initially higher and lower social-emotional functioning would be reduced over time, which would

[2] Assuming higher scores reflect better social-emotional functioning, as in the case of prosocial behavior.

lend support to the catch-up hypothesis.

Aim 2. The second aim was to examine the effects of the school/classroom context on children's behavior and achievement. This was done by including time-varying indicators of children's current context plus their average experience in prior contexts. This indicator of cumulative experience was itself time-varying: It represented the lagged effect of K on G1 outcomes, the effect of average K-G1 experience on G2 outcomes, and the effect of average K-G2 experience on G3 outcomes.[3] Models also estimated the interaction between cumulative context and time to examine whether aspects of the context predicted differential rates of social-emotional or academic development. The equation below illustrates these analyses.

$$\text{Level 1: } y_{tij} = \beta_{0ij} + \beta_{1ij}(\text{time}_{tij}) + \beta_{2ij}(\text{current context}_{tij}) + \beta_{3ij}(\text{avg prior contexts}_{tij}) + \beta_{4ij}(\text{time}_{tij})*(\text{avg prior contexts}_{tij}) + e_{tij}$$

$$\text{Level 2: } \beta_{0ij} = \delta_{00j} + \delta_{01j}(\text{covariates}_{ij}) + u_{0ij}$$

$$\beta_{1ij} = \delta_{10j} + \delta_{11j}(\text{covariates}_{ij}) + u_{1ij}$$

$$\beta_{2ij} = \delta_{20j}$$

$$\beta_{3ij} = \delta_{30j}$$

$$\beta_{4ij} = \delta_{40j}$$

$$\text{Level 3: } \delta_{00j} = \gamma_{000} + v_{00j}$$

$$\delta_{01j} = \gamma_{010}$$

$$\delta_{10j} = \gamma_{100}$$

$$\delta_{11j} = \gamma_{110}$$

$$\delta_{20j} = \gamma_{200}$$

$$\delta_{30j} = \gamma_{300}$$

[3] Cumulative variables were set to a constant in K and interacted with a dichotomous variable that equaled 0 in K and equaled 1 in subsequent years (not shown above for simplicity); therefore, lagged effects did not "switch on" until G1, which was necessary because this dissertation did not examine contexts prior to K. Also, as noted in the measures section, school-level FRPL eligibility was entered as a single time-invariant predictor at level 2 (the average across K-G3 was taken at the child level).

$$\delta_{40j} = \gamma_{400}$$

Aim 3. The third aim of this dissertation was to examine potential interactive effects between children and their contexts on social-emotional and academic development across the early school years. This was accomplished by including indicators of school-entry social-emotional functioning, the school/classroom context, and their interaction in the growth models.

Level 1: $y_{tij} = \beta_{0ij} + \beta_{1ij}(\text{time}_{tij}) + \beta_{2ij}(\text{current context}_{tij}) + \beta_{3ij}(\text{avg prior contexts}_{tij}) + \beta_{4ij}(\text{time}_{tij})*(\text{avg prior contexts}_{tij}) + e_{tij}$

Level 2: $\beta_{0ij} = \delta_{00j} + \delta_{01j}(\text{covariates}_{ij}) + \delta_{02j}(\text{PK soc-emo}_{ij}) + u_{0ij}$

$\beta_{1ij} = \delta_{10j} + \delta_{11j}(\text{covariates}_{ij}) + \delta_{12j}(\text{PK soc-emo}_{ij}) + u_{1ij}$

$\beta_{2ij} = \delta_{20j} + \delta_{21j}(\text{PK soc-emo}_{ij})$

$\beta_{3ij} = \delta_{30j} + \delta_{31j}(\text{PK soc-emo}_{ij})$

$\beta_{4ij} = \delta_{40j} + \delta_{41j}(\text{PK soc-emo}_{ij})$

Level 3: $\delta_{00j} = \gamma_{000} + v_{00j}$

$\delta_{01j} = \gamma_{010}$

$\delta_{02j} = \gamma_{020}$

$\delta_{10j} = \gamma_{100}$

$\delta_{11j} = \gamma_{110}$

$\delta_{12j} = \gamma_{120}$

$\delta_{20j} = \gamma_{200}$

$\delta_{21j} = \gamma_{210}$

$\delta_{30j} = \gamma_{300}$

$\delta_{31j} = \gamma_{310}$

$\delta_{40j} = \gamma_{400}$

$\delta_{41j} = \gamma_{410}$

If certain effects of the school/classroom context varied systematically as a function of

children's school-entry social-emotional functioning, this could point to conditions under which developmental trajectories diverge or converge over time. For example, if cumulative experience in high-quality contexts had stronger positive effects for children who began school with initially lower levels of social-emotional functioning, this would indicate that higher quality contexts facilitate catch-up for children with poorer school-entry behavior. In contrast, if cumulative experience in high-quality contexts had stronger positive effects for children with higher school-entry social-emotional functioning, this would point to conditions under which trajectories increasingly diverge over time, supporting the skill-begets-skill hypothesis.

CHAPTER 3

RESULTS

Descriptive Analyses

Descriptive statistics are presented in Table 1, and correlations between the predictors and outcome variables are presented in Table 2. Correlations relevant to each aim are described in the sections that follow.

Random intercept only models were fit to the five outcomes to determine the proportion of variance explained at each level of nesting. On average across the imputed datasets, schools accounted 3-4% of the variance in social-emotional outcomes. Individuals accounted for 52% of the variance in inattention, 35% of the variance in prosocial behavior, and 50% of the variance in conduct problems. For the achievement outcomes, schools accounted for 5% of the variance in math and 2% of the variance in reading. In the null model, individuals accounted for 8% of the variance in math and 4% of the variance in reading. However, after linear and quadratic time variables were added to the achievement models (described next), the percent of remaining intercept variance at the individual level was 63% for math and 71% for reading.

After estimating the null model, unconditional growth models were fit to the outcomes to determine the appropriate function of time. For social-emotional outcomes, the fixed effect of linear time was significant. Before any covariates were added, the coefficient was in the positive direction for inattention and conduct problems and in the negative direction for prosocial behavior, indicating that teachers rated children's social-emotional functioning more poorly over time on average. The effect of linear time also varied randomly at the individual level. For achievement outcomes, fixed effects of linear and quadratic time were significant. For reading and math, the linear time effect was large and significant and the quadratic time effect was negative, which indicated that math and reading increased over time, but the rate of growth slowed from K to G3. The effect of linear time varied randomly at the individual level, but the random effect of quadratic time was not significant and was not included in subsequent models.

Aim 1: Social-Emotional Readiness Predictors

Preliminary analyses indicated significant moderate to strong correlations among the school-entry social-emotional predictors: Inattention and conduct problems were positively correlated (r = .60), and prosocial behavior was negatively correlated with inattention (r = -.49) and conduct problems (r = -.57). Results from models using school-entry inattention, prosocial behavior, and conduct problems as predictors of social-emotional and academic growth trajectories are presented in Tables 3-6. School-entry inattention, prosocial behavior, and conduct problems were first entered in separate models as predictors of the intercept (i.e., level) and the slope for linear time (i.e., change) (Tables 3-5), and then were entered in a single model to test the unique effects of each social-emotional readiness predictor (Table 6). Time was centered at G3 so that effects at the intercept represented effects on the outcome in G3.

School-entry inattention. As shown in the top half of Table 3, school-entry inattention was a consistent predictor of the level of social-emotional and academic outcomes in G3, after accounting for family and demographic covariates. Higher inattention predicted higher G3 inattention, b = 0.367. Higher inattention was also associated with higher G3 conduct problems, b = 0.643, as well as lower prosocial behavior, b = -0.601, lower math skills, b = -33.644, and lower reading skills, b = -46.734.

Results presented in the bottom half of Table 3 indicate that school-entry inattention significantly predicted change in social-emotional functioning. Specifically, school-entry inattention was negatively associated with growth in inattention, b = -0.045. That is, children with higher inattention at K entry showed greater decreases in inattention relative to children with low initial inattention, resulting in converging trajectories over time between those with high and low levels of school-entry inattention. Similar patterns of convergence were seen for the two other behavioral outcomes: School-entry inattention was negatively associated with growth in conduct problems, b = -0.071, and was positively associated with growth in prosocial behavior, b = 0.105. In other words, children with higher school-entry inattention showed reductions in

conduct problems and improvements in prosocial behavior from K to G3. However, school-entry inattention did not significantly predict change over time in either of the two achievement outcomes.

School-entry prosocial behavior. As shown in the top half of Table 4, school-entry prosocial behavior predicted all three social-emotional outcomes in G3 and both academic outcomes in G3. Higher school-entry prosocial behavior predicted higher G3 prosocial behavior, b = 0.196. School-entry prosocial behavior was also negatively associated with G3 inattention, b = -0.065, and conduct problems, b = -0.167, and was positively associated with G3 math, b = 3.093, and reading skills, b = 5.955.

School-entry prosocial behavior did not significantly predict the slope for linear time in any model, as shown in the bottom half of Table 4. In other words, school-entry prosocial behavior was associated with the G3 level of all five social-emotional and academic outcomes, but it did not predict change over time in any of these outcomes from K to G3.

School-entry conduct problems. As shown in the top half of Table 5, school-entry conduct problems predicted all three social-emotional outcomes in G3. Higher school-entry conduct problems predicted higher G3 conduct problems, b = 0.323. Higher school-entry conduct problems also predicted higher G3 inattention, b = 0.099, and lower prosocial behavior, b = -0.250. In addition, higher school-entry conduct problems predicted lower G3 math skills, b = -3.802, but did not significantly predict G3 reading skills.

Results presented in the bottom half of Table 5 indicate that school-entry conduct problems significantly predicted change in social-emotional functioning from K to G3. School-entry conduct problems were negatively associated with growth in conduct problems, b = -0.043, and inattention, b = -0.014, and positively associated with growth in prosocial behavior, b = 0.067. These results indicate that behavioral trajectories converged over time between children with high and low school-entry conduct problems.

Simultaneous model. Table 6 presents results from a model that included all three

social-emotional readiness variables as predictors of the five outcome trajectories. As in the separate models, school-entry inattention consistently predicted level of all social-emotional and academic outcomes in G3, after accounting for the covariates and school-entry prosocial behavior and conduct problems. In contrast, school-entry prosocial behavior significantly predicted G3 prosocial behavior in the simultaneous model, but it did not uniquely predict any other G3 outcomes. School-entry conduct problems uniquely predicted G3 conduct problems and prosocial behavior but did not uniquely predict G3 inattention after accounting for the other readiness predictors. Unexpectedly, after accounting for inattention and prosocial behavior, conduct problems were *positively* associated with G3 math and reading skills, whereas these coefficients were negative (and significant for math) in the previous models that did not include school-entry inattention and prosocial behavior as predictors. This reversal in the direction of the effect is likely due to collinearity among the predictor variables and points to a possible suppression effect.

As shown in the bottom half of Table 6, school-entry inattention negatively predicted growth in inattention over time in the simultaneous model, indicating a convergence effect. However, inattention did not uniquely predict change in prosocial behavior or conduct problems after accounting for the other social-emotional readiness predictors. Controlling for the other readiness predictors, children's conduct problems at school entry negatively predicted growth in conduct problems and positively predicted growth in prosocial behavior but did not predict change in inattention. In addition, school-entry conduct problems positively predicted growth in reading skills over time.[4] These results indicate that children with higher school-entry conduct problems showed improvements in conduct problems, prosocial behavior, and reading skills relative to children with low conduct problems, such that initial gaps between children decreased in magnitude from K to G3. School-entry prosocial behavior did not uniquely predict change

[4] This coefficient was in the same direction but only marginally significant, $p = .08$, in the model where conduct problems was entered individually.

over time in any outcome.

Covariate effects. Although they were not the primary focus of analyses, several covariates had significant effects on social-emotional and academic growth trajectories. In the simultaneous model (Table 6), state positively predicted G3 inattention (i.e., children in North Carolina were rated as more inattentive); males had higher G3 inattention, conduct problems, and math skills, and lower prosocial behavior; Black children had higher G3 conduct problems and lower math scores; children whose parents had college degrees had better G3 behavior and achievement across all five outcomes; children whose parents were more often employed had higher math skills; children whose parents were married had higher prosocial behavior and math skills and lower inattention and conduct problems; and family income-to-need was positively associated with reading skills.

Several covariates also predicted change over time, as shown in the bottom half of Table 6. The behavior of children from North Carolina got worse over time, but their math skills improved. Males also showed poorer behavior over time, whereas children whose parents were married showed less growth in inattention. Black children showed slower reading growth, and age at K entry was positively related to growth in inattention and negatively related to growth in math and reading (i.e., younger children showed greater improvements).

Aim 2: Classroom and School Predictors

Preliminary analyses. To address Aim 2, aspects of the school and classroom context were examined as predictors of behavioral and academic trajectories. Prior to running the main analytic models, preliminary analyses were conducted to examine correlations among the school and classroom predictors and address potential multicollinearity. Initial inspection of the data indicated that the traditional CLASS subscales (i.e., emotional support, classroom organization, instructional support) were moderately to strongly correlated (*r*s from .45 to .69). To avoid conceptual and statistical concerns that would arise if predictors with this much overlap were included in a model simultaneously, a bifactor modeling approach was used to create

orthogonal CLASS factor scores. This strategy involves modeling one general factor and one or more domain-specific factors, and it has been used effectively in several recent studies (Hamre, Hatfield, Pianta, & Jamil, 2014; Jones, Molano, Brown, & Aber, 2013; Madill, 2014). In the current study, several confirmatory factor analyses were estimated and compared based on theory, prior research, and model fit. Each model allowed the 10 CLASS items to load on a general factor that captured the shared variance across all the items. Additional factors were modeled to capture unique variance left unexplained by the common factor, and items were allowed to cross-load on one of these factors. Correlations between the latent variables were set to 0 so that the resulting factors would be orthogonal.

Table 7 presents the loadings and fit statistics from three different models. Model 1 included a general factor and three domain-specific factors that mapped on to each of the traditional CLASS domains. Model 2 included a general factor and two domain-specific factors. This model collapsed the “motivational supports” and “management and routines” domains from Model 1 based on that model’s modification indices and results of prior studies indicating better fit with this specification. Like Model 2, Model 3 included a general factor and two domain-specific factors, but loadings under .20 were set to 0, and a slightly different pattern of factor loadings was specified based on modification indices from Model 2 (i.e., instructional learning formats loaded on the cognitive facilitation factor instead of the positive management factor).

Model 3 was selected as the optimal model based on fit statistics and strong alignment with prior research (Hamre et al., 2014; Jones, Molano, et al., 2013; Madill, 2014). All 10 items loaded significantly on the general factor, labeled “responsive teaching” to align with prior studies; teacher sensitivity, positive climate, instructional learning formats, and regard for student perspectives had the strongest loadings (≥ .70). The first domain-specific factor was labeled “positive management”; behavior management had the strongest loading on this factor, and productivity, positive climate, and negative climate (reversed) also loaded significantly. The second specific factor was labeled “cognitive facilitation”; concept development and quality of

feedback loaded most strongly on this factor, followed by language modeling and instructional learning formats. When bifactor scores were saved and correlations with the original CLASS subscales were examined, responsive teaching factor scores were very strongly correlated with the traditional emotional support subscale scores, r = .97, and somewhat less strongly related to classroom organization, r = .75, and instructional support, r = .51. In addition, positive management was moderately correlated with classroom organization, r = .57, and weakly correlated with emotional support, r = .11. Cognitive facilitation was strongly correlated with instructional support, r = .89, and weakly correlated with classroom organization, r = .17. The bifactor strategy substantially reduced (but did not entirely eliminate) correlations among the new CLASS variables: Responsive teaching was weakly but significantly correlated with positive management and cognitive facilitation, both rs < .10, and positive management and cognitive facilitation were not significantly correlated.

After the CLASS bifactor scores were created, correlations among the school and classroom variables were examined. As shown in Table 8, most time-varying classroom predictors were only weakly correlated with each other. All but three correlation coefficients were below .10 in absolute value: The correlation between teacher education and cognitive facilitation and the correlation between observed responsive teaching and self-reported teacher social-emotional competence (SEC) were slightly larger than other correlations, both rs = .14, and time spent on reading and time spent on math were moderately correlated, r = .57. The generally weak correlations in Table 8 indicate that the predictors used in the current study captured different facets of children's classroom context, and that entering variables simultaneously was justifiable. (Time on math and time on reading were never entered in the same model, so this moderate correlation did not raise collinearity concerns.)

Furthermore, classroom predictors across years showed small to moderate correlations over time, as shown in Table 9, indicating some stability in children's classroom experiences from K to third grade. Children's experience of class size showed the strongest stability over

time, *r*s from .21 to .42, perhaps reflecting school or district policies and funding. Teacher SEC appeared to be the least consistent aspect of children's classroom context over time, *r*s ≤ .10. Other classroom variables fell between these extremes and showed small but significant correlations over time (*r*s ≤ .31).

In addition to concurrent associations between time-varying classroom experiences and children's outcomes, school and cumulative classroom experiences averaged over time were also considered in Aim 2. As shown in Table 10, children's cumulative experiences of distinct aspects of the school/classroom context were significantly correlated in many cases. These associations were generally small to moderate, but they were somewhat stronger than correlations among these same constructs when measured at each time point (i.e., the time-varying, non-cumulative variables in Table 9). The school-level proportion of students eligible for FRPL was negatively associated with cumulative teacher education, cognitive facilitation, responsive teaching, and time on math. In addition, cumulative teacher SEC was positively correlated with all three CLASS bifactor variables as well as time on math and reading. Cumulative time on math and time on reading were also positively correlated with each other and with teacher education and cognitive facilitation, and negatively correlated with positive management. Cumulative teacher education was positively correlated with cognitive facilitation but negatively correlated with positive management, and cumulative class size was negatively correlated with responsive teaching and time on math and positively correlated with positive management.

Overview of main analytic model. Following these preliminary analyses, school and classroom variables were included simultaneously as predictors of social-emotional and academic trajectories, and results are presented in Tables 11 and 12. In addition to simultaneous entry, predictors were entered individually in separate models given the small but significant overlap in several predictors, and results were generally similar to results of the simultaneous models; if a predictor was significant when entered individually but not when

entered simultaneously, this is noted in the tables and text. Each model examined (a) the concurrent effects of time-varying school/classroom experiences, (b) the effects of cumulative school/classroom experiences on outcomes in later years, and (c) the effects of cumulative school/classroom experiences on growth over time, or, put another way, the extent to which the effect of cumulative school/classroom experiences increased or decreased in magnitude over time. As with Aim 1, time was centered at G3.

Concurrent effects of time-varying classroom context. As shown in the top section of Table 11, two aspects of the classroom context had concurrent effects on social-emotional outcomes, after accounting for family and demographic covariates and other concurrent and cumulative effects of the classroom context. Time-varying teacher SEC negatively predicted concurrent inattention, b = -0.016, and conduct problems, b = -0.032, and positively predicted prosocial behavior, b = 0.113. In addition, positive management had negative effects on concurrent inattention, b = -0.035, and conduct problems, b = -0.055. A few variables were significant when entered individually as predictors of social-emotional outcomes but were not significant in the simultaneous model presented in Table 11: Class size negatively predicted prosocial behavior, and responsive teaching and cognitive facilitation both positively predicted prosocial behavior and negatively predicted conduct problems.

Concurrent effects of the classroom context on academic outcomes are shown at the top of Table 12. Controlling for family and demographic covariates and other concurrent and cumulative effects of the classroom context, cognitive facilitation, b = 3.490, and positive management, b = 2.597, had positive effects on concurrent reading skills, whereas class size had a negative effect, b = -0.219. No classroom predictors had significant concurrent effects on math skills when entered individually or simultaneously.

Lagged effects of cumulative school/classroom experiences. As shown in the middle of Table 11, only one cumulative predictor had a significant lagged effect on a social-

emotional outcome at G3.[5] Cumulative teacher SEC averaged across K to Grade 2 had a significant lagged effect on G3 prosocial behavior, *b* = 0.162, controlling for other cumulative and concurrent effects, including the significant concurrent positive effect of teacher SEC noted above. None of the school or cumulative classroom variables predicted G3 inattention or conduct problems.

As shown in the middle of Table 12, the school-level proportion of students eligible for FRPL negatively predicted G3 math scores, *b* = -11.447. In addition, cumulative responsive teaching averaged across K to Grade 2 had a positive lagged effect on children's G3 reading scores, *b* = 3.417 (see Figure 3). Two additional variables predicted reading when entered individually in separate models but not in the simultaneous model: Cumulative teacher SEC predicted greater G3 reading scores, and the school-level proportion of students eligible for free and reduced-priced lunch negatively predicted G3 reading scores.

Effect of cumulative school/classroom experiences on time slope. As shown in the bottom of Table 11, none of the school/classroom predictors significantly interacted with time in the inattention or conduct problems models, but two predictors interacted with time in the prosocial behavior model. Children in schools with a greater proportion of students eligible for FRPL showed greater growth in prosocial behavior over time, *b* = 0.094. The proportion of FRPL-eligible students had a trend-level negative association with prosocial behavior in K, *b* = -0.166, *p* = .08 (results from this model with time re-centered at K not shown), but as shown in Figure 4, prosocial trajectories converged over time among children in schools with higher and lower proportions of FRPL-eligible students (and was not significant in G3). Cumulative teacher SEC also significantly interacted with time, *b* = 0.084. Children who, on average, had teachers with high SEC showed greater growth in prosocial behavior over time relative to children who, on average, had teachers with low SEC (see Figure 5).

[5] Because the cumulative variables also interacted with time centered at G3, the "main effects" of the cumulative variables are interpreted as effects on the G3 intercept.

As shown in the bottom of Table 12, two variables significantly interacted with time in the Letter-Word model. Cumulative teacher SEC predicted greater growth in reading over time, after accounting for family and demographic controls, concurrent effects, and other lagged effects of cumulative school/classroom predictors, *b* = 3.042 (see Figure 6). Cumulative cognitive facilitation, in contrast, counterintuitively predicted *less* growth in reading over time after accounting for effects of the other predictors, including the positive effect of cognitive facilitation on concurrent reading (and the effects of the other predictors), *b* = -6.006. Further inspection of these results indicated that the lagged effect of cumulative cognitive facilitation was largest and in a positive direction in Grade 1, but it diminished in magnitude over Grades 2 and 3 and was in a negative direction in G3 (see Figure 7). However, the overall effect of cumulative cognitive facilitation on inattention was not significant in Grade 1, Grade 2, or G3 (results of models with time re-centered at Grade 1 and Grade 2 not shown).

Aim 3: Interactive Effects

To address Aim 3, interaction effects between social-emotional functioning at school entry and school/classroom variables were added to the models. These interaction effects tested whether the concurrent and cumulative school/classroom context had differential effects for children who began school with different levels of social-emotional functioning, which could contribute to convergence or divergence in behavioral and academic trajectories over time. For the social-emotional outcomes, interactions with the same-domain readiness variable were tested (e.g., for the inattention model, interactions between school/classroom variables and school-entry inattention were modeled). For the academic outcomes, interactions with each of the social-emotional readiness predictors were tested in three different models (e.g., for math, one model tested interactions between school/classroom variables and school-entry inattention, a second model tested interactions between school/classroom variables and school-entry prosocial behavior, and a third model tested interactions between school/classroom variables and school-entry conduct problems).

Results of the growth curve models are presented in Tables 13-15. Only one significant interaction emerged: Concurrent positive management moderated the effect of school-entry prosocial behavior on reading skills, wherein school-entry prosocial behavior had a smaller effect on reading in classrooms high in positive management. There was no other evidence that children's behavior interacted with current or cumulative school/classroom variables to predict social-emotional or academic outcomes. This indicates that school and classroom experiences generally had similar effects for children who started school with different levels of social-emotional functioning. Put another way, the effects of social-emotional functioning on behavioral and academic outcome level and change were not moderated by the concurrent or cumulative school/classroom context.

Alternate model specification. Given the complexity of the analytic model used to address Aim 3, an alternate model was specified and results were compared with the original model. Here, instead of estimating children's growth curves from K to G3, children's G3 outcomes were modeled controlling for their school-entry levels. Random effects for classrooms and schools were tested and included when significant: Final models included a random effect for school in the inattention model, random effects for classroom and school in the prosocial behavior model, and a random effect for classroom in the reading models. Predictors of children's G3 outcomes included in the models were: (a) school-entry social-emotional functioning, (b) cumulative school/classroom variables representing children's average experience from K to G3, and (c) the interaction between these sets of variables. All previous sociodemographic covariates were again controlled, and achievement outcome models also controlled for school-entry achievement. As in the original model specification, no significant interactions between school-entry social-emotional functioning and cumulative school/classroom experiences emerged. That is, the effects of school-entry social-emotional functioning on G3 behavior and achievement did not vary as a function of the cumulative school and classroom experiences children had over the course of K to G3.

CHAPTER 4

DISCUSSION

Schools are one of the major developmental contexts for children and adolescents; navigating this context effectively is a key task of childhood and has important implications beyond the school years. There is growing recognition among researchers and practitioners that—in addition to academic skills and knowledge—children's ability to pay attention, regulate their emotions and behavior, and get along with others is crucial to their success in the classroom, particularly during the transition to school (Blair & Raver, 2015; Denham et al., 2010; Lin et al., 2003; Rimm-Kaufman et al., 2000). These social-emotional skills foster the kinds of engaged learning, persistent effort, and positive relationships with peers and teachers that are marks of positive adjustment to school (Denham et al., 2014). Furthermore, there is evidence that these skills may promote more conventional benchmarks of school success like academic achievement, as well (Durlak et al. 2011). Based on accumulating work documenting the benefits of children's social-emotional skills, states across the U.S. are beginning to incorporate social-emotional learning goals into their learning standards and even accountability systems (Dusenbury et al., 2014).

Given the potential practice and policy implications, there is a need for research that moves beyond documenting associations between school-entry social-emotional readiness and concurrent or later outcomes. Randomized trials of pre-K social-emotional interventions represent one critically important research direction that addresses this need, and a growing number of these trials have furthered our understanding of the role of early social-emotional functioning (e.g., Bierman, Domitrovich, et al., 2008; Domitrovich et al., 2007; Morris et al., 2014). In addition, longitudinal research that carefully examines how, for whom, and under what conditions social-emotional readiness contributes to development over time also helps to build a deeper and more nuanced knowledge base about the impact of early social-emotional functioning. This dissertation falls in this second category of research: Using a rich longitudinal

dataset from the Family Life Project, I examined children's behavioral and academic trajectories from kindergarten to third grade in rural and small town U.S. communities as a function of school-entry social-emotional functioning and the school/classroom context. I also examined whether a range of school and classroom experiences magnified, reduced, or did not moderate the impact of school-entry social-emotional readiness. Key findings were that (a) school-entry social-emotional functioning predicted Grade 3 behavior and achievement; (b) initial gaps between children with different levels of social-emotional readiness tended to decrease over time for some outcomes (i.e., trajectories of children with high and low initial social-emotional functioning converged over time); (c) a few aspects of the school/classroom context had concurrent or lagged effects of behavioral and academic outcomes, though these effects were small; and (d) school and classroom experiences generally did not moderate the effects of social-emotional readiness on growth trajectories, suggesting that variation in the school context had a surprisingly minimal impact on rates of convergence or divergence in developmental trajectories of children who differed in school-entry functioning. These results are discussed in greater detail below.

Early Social-Emotional Functioning and Longitudinal Outcomes

Although research has documented benefits of social-emotional functioning across developmental periods, children's skills at school entry may be particularly crucial. For many children, the start of kindergarten marks a shift from largely informal and unstructured care—at home and/or small-group ECE settings—to more formal, structured school environments with greater academic, social, and emotional demands. Periods of transition, including the transition to school, may be particularly consequential because developmental systems and interactions among those systems have not yet stabilized (Granic, 2008; Thelen & Smith, 2006). In addition, early experiences, including early experiences in school, may be particularly influential in shaping later experiences by launching child-environment interactions and setting patterns of behavior into motion (Wachs & Gruen, 1982). In the case of school entry, as children begin

kindergarten, their beliefs about school are still malleable, they have not yet formed stable habits of learning or behaving in the classroom, and they have not yet established relationships or reputations with peers and teachers. Thus, how children navigate the transition to school—which is influenced by their school-entry social-emotional functioning—has implications for their immediate adjustment to the kindergarten classroom context, and may also have implications for their long-term school adjustment and success. Children who have difficulty regulating their attention and behavior when they start school may struggle with the transition to a structured classroom environment, fail to keep up with instruction, disengage from learning, and develop maladaptive patterns of behavior, putting them at a disadvantage relative to their more socially and emotionally-skilled peers. Studies documenting longitudinal effects of social-emotional readiness are consistent with these expected cascading effects: Early social-emotional functioning has been linked with outcomes during the kindergarten year (Owens et al., in press), across elementary school (Fitzpatrick & Pagani, 2013; Guhn et al., 2016; Li-Grining, Votruba-Drzal, et al., 2010), and into adolescence and adulthood (Jones et al., 2015; Moffitt et al., 2011).

Consistent with previous longitudinal research, the current results documented that aspects of early social-emotional readiness predicted behavior and achievement through the end of Grade 3, controlling for a range of sociodemographic control variables. Results from the social-emotional outcome models indicated that inattention, prosocial behavior, and conduct problems were moderately stable across different raters from school entry to Grade 3: School-entry inattention predicted Grade 3 inattention, school-entry prosocial behavior predicted Grade 3 prosocial behavior (though somewhat more weakly, compared to other domains of behavior), and school-entry conduct problems predicted Grade 3 conduct problems. This finding, considered along with other evidence that social-emotional skills during later childhood and adolescence predict positive academic and behavioral outcomes (e.g., McKown et al., 2016; Roeser et al., 2002), suggests that one way *school-entry* social-emotional functioning produces longitudinal impacts may be through *later* social-emotional functioning.

In addition to school-entry social-emotional functioning predicting same-domain outcomes in Grade 3, some unique cross-domain associations also emerged. Over and above sociodemographic covariates and school-entry prosocial behavior, school-entry inattention and conduct problems uniquely predicted lower Grade 3 prosocial behavior. In addition, after accounting for the covariates and school-entry conduct problems, school-entry inattention uniquely predicted higher Grade 3 conduct problems. These unique associations are striking given the strong correlations among the school-entry variables. Little research has examined the extent to which social-emotional functioning in one domain predicts later social-emotional functioning in other domains uniquely, but there is some evidence, for example, that early inattention contributes to later peer problems controlling for aggressive and prosocial behavior (Andrade & Tannock, 2014). Several explanations may account for the unique associations documented here, but additional research is needed to test specific mechanisms of these effects. It may be that children who are inattentive have difficulty sustaining positive interactions with peers, and this might lead to frustration during interactions with classmates, avoidance of social situations, and/or peer rejection, all of which could contribute to reduced opportunities for prosocial skill development and increased conduct problems over time. A similar pathway could follow from school-entry conduct problems: Children with early aggression or antisocial behavior are less likely to be accepted by their peers (Bierman et al., 2015), which may limit opportunities for these children to build their social skills and cultivate prosocial tendencies. The present results did not provide evidence for the reverse direction of effects, however, as school-entry prosocial behavior and conduct problems did not uniquely contribute to Grade 3 inattention. Thus, whereas earlier inattention predicts later problems in behavior, earlier prosocial behavior and conduct problems do not appear to give way to increased attention problems.

Aspects of school-entry social-emotional functioning also predicted Grade 3 math and reading achievement after controlling for the sociodemographic covariates. When entered individually, school-entry inattention predicted lower Grade 3 math and reading, prosocial

behavior predicted higher Grade 3 math and reading, and conduct problems predicted lower Grade 3 math. However, only these inattention effects remained significant in the simultaneous models that included all three school-entry social-emotional predictors.[6] Stronger and more consistent associations between inattention and achievement, compared to prosocial behavior or conduct problems and achievement, is consistent with a meta-analysis of six large datasets by Duncan and colleagues (2007), as well as more recent empirical studies (Gray et al., 2014; Grimm et al., 2010; Medford & McGeown, 2016). Whereas prosocial behavior and conduct problems are hypothesized to impact achievement indirectly (e.g., via effects on interactions with teachers and peers, attachment to school), inattention likely interferes more directly with the learning process. Attention problems make it difficult for children to focus on what a teacher says, sustain attention through an entire lesson, stay on task during instructional activities, and complete assignments. Another explanation for these stronger links is that underlying cognitive vulnerabilities might contribute to both attention problems and low achievement. In line with this possibility, studies have documented associations between IQ or executive functioning (EF) and achievement (Blair & Razza, 2007; Clark et al., 2010; Nisbett et al., 2012; Welsh et al., 2010) and between IQ or EF and inattention (Brocki et al., 2010; Kuntsi et al., 2004; Sasser, Beekman, & Bierman, 2015). The current dissertation did not test these potential mediator and third-variable explanations, and additional research would advance our understanding of why inattention plays a particularly important role in later achievement.

In comparison to school-entry inattention, results indicated that prosocial behavior and conduct problems had weaker and less consistent effects on Grade 3 social-emotional and academic outcomes. This was not due to poor reliability or lack of variability in these predictors (if anything, the distribution of prosocial behavior was more normal than that of inattention). These findings are not entirely consistent with prior work which has documented striking long-

[6] The conduct problems effects switched direction as a result of simultaneous entry of the correlated school-entry predictors.

term effects of early prosocial or problem behavior (Goodman et al., 2015; Jones et al., 2015; Heckman, Rodrigo, & Savelyev, 2013). For example, Jones and colleagues (2015) recently found that teacher-rated social competence in kindergarten had long-term effects on educational attainment, employment, and crime. It is not clear whether discrepancies resulted from differences in measures (e.g., use of the SDQ here versus the Teacher Social Competence measure [CPPRG, 1990] in Jones et al., 2015), differences in the timing of measurement of the predictor (end of pre-k versus beginning of kindergarten), differences in the measures and timing of the outcomes (end of Grade 3 versus age 18-25), or differences in samples (e.g., mostly urban versus mostly rural).

Another reason for discrepant findings is that the current study examined multiple aspects of social-emotional functioning simultaneously, in contrast to some prior work. Although long-term effects of early prosocial behavior and conduct problems are notable, few studies have examined the long-term effects of early behavior after controlling for attention, so unique longitudinal associations are less established in the literature (for exceptions, see Grimm et al., 2010; Pagani et al., 2010). Given the limited research base, additional research examining both the shared and unique effects of early social-emotional functioning is important, as this would refine our understanding of the roles of specific behavioral domains and would help identify which targets for intervention would be most likely to produce specific desired outcomes. For example, the current results suggest that social-emotional interventions for young children might be most likely to have cross-domain impacts on academic skills when those interventions intentionally target children's attention or self-regulatory skills, rather than focus solely on increasing social skills and decreasing problem behavior. Of course, randomized trials are needed to rigorously test this hypothesis, but it is clear that attention is a critical aspect of social-emotional functioning during early childhood and therefore a promising intervention target.

Early Social-Emotional Functioning and Growth Trajectories

Previous studies and the results described above suggest that there are gaps between

children in school-entry social-emotional functioning, and that gaps between children continue through Grade 3 as a direct function of school-entry social-emotional functioning. However, less is known about how the magnitude of initial gaps between children who differ in their school-entry social-emotional functioning may persist or change over time. In other words, it is not clear whether children with lower levels of social-emotional functioning show some catch-up to their higher-functioning classmates or fall further and further behind over time. The current results indicated that social-emotional growth trajectories from kindergarten to third grade generally follow a pattern of partial convergence between children who begin school with higher social-emotional readiness and children who begin school with lower social-emotional readiness. That is, social-emotional functioning improved somewhat over time among children who began school with lower levels, and social-emotional functioning declined somewhat over time among children who began school with higher levels. Thus, while variation in school-entry inattention, prosocial behavior, and conduct problems predicted variation in corresponding Grade 3 outcomes, significant interactions with linear time indicated that the gaps between children evident in Grade 3 were smaller in magnitude compared to gaps between children present in kindergarten. Looking across the models that included the social-emotional predictors individually, school-entry inattention and conduct problems, but not prosocial behavior, predicted convergence in social-emotional trajectories; when the predictors were entered simultaneously, school-entry inattention predicted convergence in inattention, and school-entry conduct problems predicted convergence in conduct problems and prosocial behavior. It should be noted that although children with high inattention and conduct problems at school entry improved over time, they remained at a social-emotional disadvantage in Grade 3 (given the significant intercept effects) relative to children who did not have attention problems or conduct problems when they began school.

The pattern of convergence documented in the current study runs counter to the “rich get richer” principle, the “Matthew effect,” or the “skill begets skill” hypothesis (Heckman, 2008).

Under these perspectives, trajectories would be expected to diverge. For instance, if earlier social-emotional skills enable faster acquisition of new behavioral and academic skills, initial gaps between children could conceivably increase across the school years, with initially more-skilled children showing faster rates of learning and development and initially lower-skilled children falling further and further behind. Most theoretical and empirical work exploring this pattern of development has focused on academic skill formation. In the reading literature, for example, scholars describe a "Matthew effect" wherein earlier reading skills facilitate greater and faster acquisition of more advanced reading skills, which causes initially poor readers to fall further and further behind more skilled readers at each stage in reading development (Pfost, Hattie, Dörfler, & Artelt, 2014). Results of the current study suggest that this pattern might not extend to growth in social-emotional functioning, at least according to global behavior ratings completed by teachers.

The mechanisms of social-emotional convergence deserve greater attention in future research. Convergence may be driven in part by maturation. Early childhood is a period of rapid development of regulatory capacities, driven in part by growth of the prefrontal cortex and EF skills (Center on the Developing Child, 2011; Weintraub et al., 2013). These developing regulatory abilities contribute to children's behavior: Higher EF is associated with better social-emotional functioning as children begin school (Bierman, Nix et al., 2008; Sasser, Bierman, & Heinrichs, 2015), and as EF develops, behavior improves, as well (Hughes & Ensor, 2011). The transition to school may occur at different points in the developmental progression of EF for different children. That is, because of different time frames for maturation, some children may be further along in their development of EF by the time they begin kindergarten, whereas other children may experience more rapid development of EF after they start school. Although these children may begin school with poorer social-emotional functioning, one might hypothesize that improvements in their EF over time may facilitate improvements in behavior and enable them to catch up, at least partially, to children who began school with relatively more mature EF skills.

Peer effects may also contribute to convergence of social-emotional trajectories over time. As children come together in classrooms and interact more with their classmates, their behavior may become more similar for various reasons. Peers may model certain kinds of behavior, which children learn and then exhibit themselves. They may also set social norms and expectations in classrooms, which could influence behavior in a positive or negative direction toward the norm (Ladd et al., 2012; Wentzel, 2015). In addition, peer interactions provide children opportunities to test and practice social skills; thus, the skill level of social partners can strengthen or put limits on the skills children develop. Several recent studies indicate that peers' behavior level does indeed influence the behavior of individual children during the early school years (Bulotsky-Shearer, Dominguez, & Bell, 2012; Hanish et al., 2005; Thomas, Bierman, & Powers, 2011), and there is evidence of peer contagion across multiple behavioral domains in later years (Dishion & Tipsord, 2011).

Social-emotional trajectories may also converge because, once they begin school, children share similar experiences that are common across schools and which have similar effects on behavior. Social-emotional functioning at school entry is influenced by a range of factors outside the school context, including sociodemographic risk, home environment, parenting, and prior exposure to high-quality ECE (Burchinal et al., 2008; Mistry et al., 2010; NICHD ECCRN, 2001; Raver, 2012; Ryan, Fauth, & Brooks-Gunn, 2006). These early experiences can vary greatly across children, but at school, differences in experience may be reduced to some degree. Certainly variations within the school context exist (and were the focus of Aim 2 in the current dissertation), but some experiences are universal. For most children, classrooms represent a relatively structured environment, and participating requires following a teacher's instructions, obeying rules, completing tasks, switching between activities, and interacting with peers in learning and social situations. These demands, which are common across most classrooms, may exercise children's social-emotional skills and improve behavior, particularly among children who did not encounter comparable demands prior to kindergarten.

Thus, shared experiences within the school context could contribute to behavioral convergence over time.

An important issue to consider is whether convergence occurs because children with poorer school-entry behavior improve, those with higher school-entry behavior get worse, or both. However, it is difficult to draw conclusions about this from the current study, as the method of measurement used likely played a role in the pattern of results obtained. Teacher ratings of behavior can be used effectively to monitor changes in rank order over time, but they are not "calibrated" in a way that permits strong conclusions about social-emotional growth over time in any absolute sense. To illustrate, the fixed effect of time was not significant in most of the Aim 1 social-emotional growth curve models, but this should not necessarily be interpreted to mean that, on average, children experienced no growth in social-emotional functioning from kindergarten to the end of third grade. Teachers at different grade levels likely use different frames of reference when completing global ratings of behavior: A kindergarten teacher evaluates a kindergartner's behavior with respect to other kindergartners, and not with respect to the third grader that child might become. Furthermore, Likert scale endpoints and ceiling/floor effects for particular children also pose challenges for the measurement of real growth across the school years. A child who receives the highest rating for prosocial behavior in kindergarten cannot demonstrate increases in prosocial behavior on that rating scale. At best, this child can show high and stable prosocial behavior over time. Recent efforts have been made to extend item response theory methods from the achievement literature to the assessment of social-emotional functioning and component skills. These and other novel methods appear to capture upward growth of social-emotional functioning (McDermott, Rikoon, & Fantuzzo, 2014; McKown et al., 2013), and may be a promising direction for further research on social-emotional convergence.

While convergence generally characterized patterns of social-emotional development from kindergarten to third grade, this was generally not true for achievement trajectories.

Although aspects of social-emotional functioning predicted Grade 3 level of achievement, in general they did not predict achievement growth over time after accounting for sociodemographic covariates. This suggests that school-entry social-emotional functioning, and inattention in particular, contributes to achievement gaps that are present in kindergarten and are maintained through Grade 3. In other words, the effect of school-entry social-emotional functioning on achievement is constant over time; the magnitude of the effect does not increase or decrease, at least across the early school years. The one exception was that school-entry conduct problems positively predicted reading growth over time, such that differences in reading achievement between children with high and low conduct problems which were present in kindergarten were no longer significant in Grade 3. In other words, children with early conduct problems had poorer reading skills when they started school, but they caught up to other children by the time they reached third grade, again supporting a pattern of converging trajectories. Considered together with the effects on social-emotional trajectories discussed above, these results suggest that children who began school with higher conduct problems showed behavioral and academic improvements over time. In contrast, children with high inattention at school entry became somewhat less inattentive over time, but this did not coincide with improvements in achievement.

The literature on behavioral predictors of math and reading growth trajectories during the early school years is somewhat mixed, with some evidence that school-entry behavior problems predict *greater* achievement growth (Grimm et al., 2010, NICHD SECCYD analysis) and other evidence that school-entry behavior problems predict *less* achievement growth (Grimm et al., 2010, ECLS-K and NLSY analyses; Sasser, Bierman, & Heinrichs, 2015). In the current study, the very high stability in achievement from K to G3 (*r*s = .69-.78 for math and 61-.90 for reading) and small (albeit significant) amount of random variance in linear time at the individual level might have limited the ability to detect effects on growth. The lack of consistency across studies points to the need for additional research in order to build consensus in the field. In addition, it

may be informative to examine effects on other indicators of academic achievement, such as grades, which may be more open to social-emotional influence and more predictive of adult outcomes, such as performance in college (Bowen et al., 2009; Duckworth et al., 2012; Geiser & Santelices, 2007).

The Role of the School and Classroom Context

Results pertaining to Aim 1 indicate that children's social-emotional functioning at school entry has persistent effects on behavior and achievement through Grade 3. Contextual factors outside the child also contribute to developmental trajectories, and Aim 2 focused on influences within the school context from kindergarten to Grade 3. Numerous studies across education, psychology, and sociology have examined the extent to which children's achievement and behavior are influenced by a range of school and classroom predictors, from more distal factors such as school funding to more proximal factors such as the quality of instruction. The large majority of these studies have assessed features of the school or classroom at a single point in time (e.g., the beginning of the school year) and tested whether these features relate to later outcomes or skill gains across a given school year. However, educational experiences are quite variable from year to year (Pianta et al., 2007), and a snapshot of a child's school or classroom at one point in one year may poorly characterize the diverse experiences that child has over the course of multiple school years. If we are interested in explaining developmental trajectories, and if we hypothesize that school and classroom factors have contemporaneous or perhaps even lasting effects on children's outcomes, understanding children's cumulative experiences across grade levels is critical. A few recent studies have examined cumulative experiences by assessing features of schools or classrooms across multiple grade levels, taking the average over time and assigning one score to each child, and then testing this as a predictor of outcomes (e.g., Magnuson et al., 2007). The current study extended this work by modeling both concurrent and cumulative school/classroom experiences simultaneously as predictors, with an emphasis on proximal features of the classroom which may have more direct links to student

outcomes. In addition, furthering prior work, predictors were examined not only individually, but also simultaneously in the same model to examine unique effects.

Several time-varying features of classrooms had concurrent effects on children's behavior and reading achievement. Teacher SEC predicted higher concurrent prosocial behavior and lower inattention and conduct problems. These effects are interpreted net of the growth parameters (i.e., intercept and slope); in other words, after accounting for differences in children's average level and change in social-emotional functioning over time, current teacher SEC explained residual variance in behavior. Teacher SEC is a relatively understudied aspect of the classroom context, but these findings are consistent with recent conceptual models that underscore its importance. The Prosocial Classroom Model (Jennings & Greenberg, 2009) holds that teacher SEC contributes to healthy teacher-student relationships, effective classroom management, and effective SEL implementation, which builds a healthy classroom climate and, ultimately, promotes better child outcomes. Roeser and colleagues (2012) put forth a similar model wherein teacher mindfulness, one component of teacher SEC, has effects on children's sense of belonging, motivation to learn, engagement, and behavior via teacher outcomes (i.e., occupational health, well-being, and engagement) and classroom outcomes (i.e., better classroom management, interpersonal climate, and student-teacher relationships). Notably, results showed that the concurrent effects of teacher SEC on children's behavior were independent of teacher education and observed teaching quality (responsive teaching, positive management, cognitive facilitation). Other potential pathways of effects, including the relationship between teachers and students, were not examined in these analyses and are worth exploring in future work. The link between teacher SEC and academic outcomes may be less direct, and the current study provided no evidence that teacher SEC had concurrent effects on achievement. These results add to a small but growing research base examining teacher SEC, a broad construct which encompasses teacher emotion regulation and mindfulness (Domitrovich et al., 2016; Jones, Bouffard, & Weissbourd, 2013; Roeser et al., 2012), and

extends this work by testing direct links to child outcomes.

The results also indicated that aspects of classroom quality as rated by observers with the CLASS predicted better concurrent behavior and reading achievement. Positive management, one of the two domain-specific factors from the CLASS bifactor model analysis, uniquely predicted lower inattention and conduct problems after accounting for a range of sociodemographic covariates and other concurrent and cumulative features of the school/classroom context. These findings are well-aligned with conceptual models of the CLASS, which suggest that children's self-regulatory abilities, including their capacity to regulate attention and behavior, improve when their teachers use proactive behavior management strategies, set clear behavioral expectations, establish classroom routines, and maximize learning time (Downer et al., 2010; Hamre et al., 2014). These practices are tapped by the "Classroom Organization" subscale in traditional CLASS scoring and the "Positive Management" factor in the bifactor model scoring, and they have been linked in prior work to children's EF, behavioral control, and classroom engagement (Hamre et al., 2014; Rimm-Kaufman et al., 2009). According to the CLASS conceptual model, "within-domain" links such as the link between teacher positive management and child self-regulation are hypothesized to be the strongest and most direct, but "cross-domain" links (e.g., positive management with social skills or achievement) are also possible (Downer et al., 2010). In line with this, positive management also predicted higher reading but not math achievement in the current study.

The second domain-specific factor of the CLASS, cognitive facilitation, also demonstrated expected "within-domain" effects in predicting concurrent reading outcomes. The cognitive facilitation factor and its related subscale in traditional CLASS scoring, instructional support, measure teachers' use of instruction, activities, discussion, and feedback that encourage students to reason, think critically, integrate information, connect material to their own lives, and express themselves. According to the CLASS conceptual model, these practices are expected to directly facilitate cognitive and academic skill development, and numerous

studies have supported this hypothesis (e.g., Burchinal et al., 2008; Hamre et al., 2014; Mashburn et al., 2008). It is not clear why cognitive facilitation predicted concurrent reading but not math achievement, but it is possible that the kinds of instructional practices captured by this variable may promote the general language and comprehension skills that are central to reading, but not the acquisition of specific content knowledge that is central in math. Results also indicated that cognitive facilitation predicted higher concurrent prosocial behavior and lower concurrent conduct problems, but these associations were not independent of other school/classroom effects because they only emerged when cognitive facilitation was entered individually.

Whereas the domain-specific CLASS factors (i.e., positive management and cognitive facilitation) had significant effects on concurrent outcomes and demonstrated some specificity in effects that aligned with CLASS conceptual models (Downer et al., 2010; Hamre et al., 2014), results pertaining to the domain-general CLASS factor, responsive teaching, were not as robust or consistent with prior work. In bifactor modeling, responsive teaching represents the variance shared across all 10 CLASS items and—here as well as prior work (Hamre et al., 2014; Madill, 2014)—it also represents an emphasis on teacher sensitivity and positive climate. As a broad indicator of quality, responsive teaching is hypothesized to have wide-ranging impacts across social, self-regulatory, and academic outcomes (Hamre et al., 2014). In line with this thinking, responsive teaching has been linked in previous work to EF, language, and literacy gains in preschool and improvements in student-teacher relationships across the school year in preschool and elementary school (Hamre et al., 2014; Madill, 2014). In the current study, however, responsive teaching was not associated with concurrent behavior or achievement in any of the simultaneous models controlling for other features of the school/classroom context, though it did predict higher concurrent prosocial behavior and lower concurrent conduct problems when entered individually. These effects likely dropped to non-significance in the full model because of shared variance among the classroom predictors: For example, given the

small correlation between teacher SEC and responsive teaching (r = .14), it is possible that responsive teaching did not account for additional variance in behavior after accounting for the contemporaneous effects of teacher SEC. Research using a bifactor modeling approach to CLASS data is still in an early phase, and the lack of independent and broad effects across developmental domains points to the need for additional studies.

Class size was conceptualized as a somewhat more distal feature of the classroom context that might impact child outcomes indirectly via other classroom processes, such as more opportunities for individualized instruction, more frequent peer-to-peer or small group interactions, and a more cohesive and supportive classroom environment. However, this structural variable is important to consider because, relative to other aspects of classroom quality, class size may be more easily monitored and regulated through legislation, and thus the policy and funding implications are more straightforward (Whitehurst & Chingos, 2011). Results here indicated that larger class size was associated with lower concurrent reading achievement, controlling for other aspects of the school/classroom context. This is consistent with prior studies, including randomized trials, which have demonstrated positive outcomes associated with reductions in class size (Chetty et al., 2011; Krueger, 1999; Vandell & Wolfe, 2000). In the current study, the effects of class size on behavior were more limited: Class size did not show any independent effects on inattention, prosocial behavior, or conduct problems, though it did predict lower prosocial behavior before other aspects of the classroom were controlled.

Teachers' advanced education (coursework beyond college) was not associated with concurrent behavior or achievement in any model. In addition, teachers' reports of the amount of time spent on reading or math were not associated with reading or math skills, respectively. These variables may be less important to children's outcomes than actual day-to-day instructional and interpersonal experiences. Mashburn and Pianta (2010) argue that children's interactions with teachers, peers, and learning materials are the key drivers of behavioral and academic development, and the current results are consistent with this, as teachers' level of

education was less important than their classroom management and instructional practices. In addition, evidence from the ECLS-K suggests that while the overall amount of time spent on math or reading instruction has small effects on academic gains in this nationally representative sample (Bodovski & Farkas, 2007; Guarino et al., 2006), it is important to consider not only the overall amount of time spent on math and reading instruction, but *how* that time is spent: Time spent teaching advanced skills is more consistently linked to academic growth, whereas time spent teaching basic skills is either not linked to growth or is linked to growth only for initially lower-skilled children (Claessens et al., 2014; Engel et al., 2013). Furthermore, it is possible that these factors are important, but only in interaction with other features of the classroom: For example, quantity of instruction might only be beneficial at high levels of instructional quality (Connor et al., 2014).

In comparison to the within-year effects of classroom predictors on concurrent behavior and achievement, there were few significant lagged effects of cumulative school/classroom experiences on level or change in outcomes over time. However, in addition to its effects on concurrent behavior, cumulative teacher SEC predicted greater growth in prosocial behavior and reading achievement over time after accounting for other aspects of the school/classroom context, both concurrent and cumulative. For prosocial behavior, this meant that children's prosocial behavior was a function both of their current teacher's SEC and the average of their prior teachers' SEC. Prior teacher SEC did not have a detectable effect in Grade 1, but it became increasingly influential over time and was a significant predictor of prosocial behavior by Grade 3. In the case of reading achievement, teacher SEC did not predict concurrent reading, but it appeared to have delayed effect, as cumulative prior teacher SEC predicted reading growth over time. Thus, even when controlling for the significant concurrent effects of class size, positive management, and cognitive facilitation on reading, prior teachers' SEC influenced children's reading achievement, and this effect grew in magnitude over time. The mechanisms of these lasting and compounding effects are not clear and warrant exploration in

future research. Teachers with high SEC may model effective, non-reactive emotion regulation strategies that children internalize and incorporate into their social-emotional skill repertoire, which may support and enhance prosocial behavior over time. In addition, teachers with high SEC might develop closer relationships with their students, which may also further the development of children's prosocial behavior over time. The effect of teacher SEC on reading is likely indirect, and may even be explained by increasing prosocial behavior. High teacher SEC might facilitate children's engagement in the classroom, participation in classroom discussion, or interest in reading. These pathways are of course only speculative and others may be possible.

The effect of responsive teaching—the general factor derived from the bifactor model—on reading was somewhat similar to, but independent of, the effect of teacher SEC. As in the case of teacher SEC, responsive teaching did not predict reading concurrently; however, cumulative responsive teaching did have a significant lagged effect on Grade 3 reading achievement. This effect was constant over time; in contrast to the effect of cumulative teacher SEC, the effect of prior responsive teaching was evident in Grade 1 and persisted through Grade 3 with similar magnitude. As discussed above, the CLASS conceptual model posits that the effects of responsive teaching span multiple developmental domains, including achievement (Hamre et al., 2014). This finding is consistent with this model, though the unique effects of responsive teacher were limited to reading achievement. As with teacher SEC, it is worth noting that cumulative—but not concurrent—responsive teaching predicted reading. This suggests that an indirect pathway that takes some time to unfold may be at play. Additional studies are needed to examine possible mediators of these delayed effects, which may include increased engagement or school bonding.

The school-level proportion of students eligible for free and reduced-price lunch (FRPL) averaged from kindergarten to Grade 3 also predicted some aspects of behavior and achievement, controlling for other classroom predictors and sociodemographic covariates, including children's family income-to-need. Specifically, school-level economic disadvantage

had a negative effect on kindergarten prosocial behavior but a positive effect on prosocial growth, indicating that children attending relatively more disadvantaged schools narrowed the gap with children attending less disadvantaged schools. Findings for achievement were less optimistic. For math, school-level FRPL eligibility predicted lower Grade 3 math achievement, and the nonsignificant interaction with linear time indicated that this effect was fairly consistent since kindergarten. This was also true of reading achievement when school-level FRPL eligibility was entered individually, but not in the full model that included other school/classroom predictors simultaneously. Thus, school-level economic disadvantage predicted achievement gaps as children entered school, even after accounting for individual-level income-to-need, and these achievement gaps did not shrink or widen over time. These effects emerged despite a potentially restricted range of school-level economic disadvantage, given that individuals in this sample were from relatively poor rural counties in North Carolina and Pennsylvania. Notably, school-level FRPL eligibility was the only significant school or classroom predictor of math achievement. School-level FRPL eligibility may proxy a number of factors that explain these effects. Children in disadvantaged schools may not have access to the same high-quality instructional resources as children in more advantaged schools, such as cutting-edge curricula, computers, or more qualified teachers. They may also experience instability in their schools and neighborhoods. The effects of school-level FRPL eligibility may also be driven by peer effects: Given the individual-level association between income and achievement, children attending schools with many other disadvantaged children might have poorer achievement because interactions with higher-skilled peers would be less frequent, instruction may be taught at a lower level to meet the needs of the average student, and teachers might have lower academic expectation for students.

While the lagged effects of teacher SEC and responsive teaching on later outcomes are impressive, it was somewhat surprising that the cumulative variables were not more predictive, relative to the effects of concurrent experiences. This was especially true for inattention and

conduct problems. One interpretation of this is that contemporaneous experiences, at least those assessed here, play a larger role in children's outcomes than prior experiences (NICHD ECCRN, 2001). These results suggest that children's current experience of positive classroom management is a critical contributor to their regulation of attention and behavior, but this influence evidently does not last beyond that particular classroom context. That is, it would seem that the ways in which one's previous teachers structured their classrooms, redirected misbehavior, and practiced routines matter little compared to the ways in which one's current teacher structures her classroom. This perspective is consistent with some work showing that teacher value-added effects on achievement decay sharply after one year (Raudenbush, 2014), but it is in stark contrast to the "primacy of early experience" hypothesis, which holds that earlier experiences not only matter, but have a disproportionate role in children's outcomes because they set developmental trajectories in motion (NICHD ECCRN, 2001).

A different possibility is that earlier experiences do matter, but the high degree of fluctuation within the school context that children experience from year to year renders the notion of "average" experience over time somewhat meaningless. In the current study, there was some stability in children's experiences over time, but the correlations between corresponding classroom predictors across grade levels (e.g., positive management in kindergarten, grade 1, grade 2, and grade 3) were small. In addition, plots of classroom experience over time (not presented here) indicated large variability over time for many children. This aligns with other longitudinal examinations of children's experience in classrooms over multiple years (Pianta et al., 2007). As a result of this year-to-year fluctuation, the same cumulative score could represent very different experiences across time for different children: A cumulative cognitive facilitation score at the sample mean could represent a consistent experience of moderate instructional quality each year for one child; for another child, the identical cumulative score could represent one year of high instructional quality, followed by a year of low instructional quality, followed by a year of moderate instructional quality.

Furthermore, later classroom experiences might moderate the effects of earlier classroom experiences: For example, the positive impact of an effective teacher one year might be more likely to persist over time for children who continue to have highly effective teachers in later years, but not for children who are subsequently placed with less effective teachers. The consistency and temporal ordering of children's experiences may have important implications for children's behavior and achievement, but these were not captured by the modeling approach taken here. Other methods of capturing children's classroom experiences longitudinally are worth examining and comparing in future research.

Examining Joint Contributions

Results pertaining to Aim 1 indicated that school-entry social-emotional functioning had some lasting effects on behavior and achievement, but the negative effects of inattention and conduct problems on behavior were mitigated over time, as were the negative effects of conduct problems on reading. Other effects of school-entry social-emotional functioning on achievement did not diminish over time. Aim 3 examined whether these child-level effects varied in different contexts, but results suggested that the average trends identified in Aim 1 generally were not moderated by features of the school and classroom. That is, the effects of school-entry social-emotional functioning were not magnified or further mitigated by these features, and thus there was no evidence that developmental trajectories were likely to converge or diverge under particular school or classroom conditions.

The lack of moderation, using the current models of analysis, is surprising given theoretical frameworks supporting the existence of interacting child and contextual influences. In addition to emphasizing the role of proximal processes in development, the bioecological model holds that characteristics of individuals can influence the "form, power, content, and direction" of those proximal processes (Bronfenbrenner & Morris, 2006). Goodness-of-fit (Thomas & Chess, 1977) and child-by-instruction models (Connor et al., 2009, 2011) also propose that developmental outcomes are a joint function of child characteristics and environmental

exposures. Empirical tests of interactions between school-entry behavior and subsequent school contexts provide somewhat mixed evidence, however. Some studies have found that high quality teaching and positive teacher-student relationships have stronger effects on children with poor initial behavior (Hamre & Pianta, 2001; Vitiello et al., 2012; Williford et al., 2013), whereas other studies have not found differential effects for children who vary in their early social-emotional functioning (Cadima et al., 2010; Keys et al., 2013; Rimm-Kaufman et al., 2009). Results here suggest that the effects of various school and classroom factors are similar in direction and magnitude across children with a range of social-emotional functioning. This implies that efforts to help lower-skilled children catch up to their peers or support already high-performing children achieve greater gains would need to be more intentional and intensive, and may require the manipulation of facets of the classroom not investigated here.

Implications

The results here indicate that children's school-entry social-emotional functioning has implications for school adjustment that last at least through third grade. The effects on Grade 3 behavior and achievement were stronger than the effects of many features of the school and classroom context, and there was little evidence that they were moderated by these subsequent experiences. These findings highlight the importance of fostering children's social-emotional functioning prior to the school transition, and suggest that doing so stands to have lasting impacts on children's learning and development. Children's inattentive behavior, and their attention and behavior regulation skills more generally, appear to be particularly important targets for intervention (Blair et al., 2012), given that school-entry inattention had independent and consistent effects across Grade 3 behavioral and academic outcomes.

In recent years, a few center-based SEL programs have been developed and tested with young children, and these show promise in improving children's social skills and behavior (Bierman & Motamedi, 2015; Domitrovich et al., 2012; Morris et al., 2014). Less clear are the impacts on achievement, and it may be that a greater emphasis on developing children's

attention skills is necessary in order to produce “cross-over” impacts. Furthermore, there are some early indications that these programs have lasting effects on children’s social-emotional functioning across elementary school (Nix et al., 2016). Ongoing long-term follow-up of children who participate in these programs is critical and will make substantial contributions to our understanding of children’s behavioral and academic trajectories following early social-emotional improvements. Results of this dissertation indicated that the effects of school-entry social-emotional functioning were strongest in kindergarten and weakened in some cases over time, though did not fade out completely. Thus, to the extent that preschool SEL programs lead to higher social-emotional functioning at school entry, program impacts may be expected to diminish in magnitude but persist over time. Certain contexts may be likely to sustain program impacts or, alternatively, encourage catch-up among children who do not participate in SEL programs prior to kindergarten (e.g., Bierman et al., 2014). However, given the lack of significant interactions between school-entry status and subsequent school experiences, this dissertation does not provide evidence to inform hypotheses regarding school or classroom moderators of long-term program impacts.

Results here also have implications for intervention after children transition to elementary school. Teacher SEC and teacher-student interactions around positive management and cognitive facilitation had impacts on children’s concurrent behavior and achievement, highlighting these features of the classroom as promising targets for school-based intervention. However, effects were generally small and largely contemporaneous; the added value of cumulative experience on later outcomes was more limited. Thus, in order to have sustained effects on children’s outcomes, the practices that produce those effects must themselves be sustained. Interventions that target teachers’ behavior management and instructional skills and are implemented in a single year may produce skill gains for children during the school year in which the intervention is implemented, but child-level impacts may disappear when children are placed in a new classroom with a new teacher the following year. This points to the importance

of ongoing, aligned, and coordinated instruction and SEL programming across the school years as a means of fostering healthy child development (Bogard & Takanishi, 2005; Greenberg et al., 2003). Continuous exposure to high-quality classroom experiences is important because it can produce positive impacts within each year of exposure, as suggested by the current results. It may also be that more *consistent* exposure increases the likelihood of producing enduring effects, though this dissertation did not address this possibility. Children's classroom experiences over time fluctuated widely in the current sample, and this lack of consistency may cause any positive effects of a particular classroom context to disappear once children move on to a new classroom context.

A notable exception to the trend of largely contemporaneous effects was seen for teacher SEC: Cumulative exposure to teachers with high SEC had a positive impact on prosocial behavior and reading growth. These findings need to be replicated in other samples, but they suggest that interventions that improve teacher SEC may have lasting impacts on children. Teacher mindfulness programs that focus on building teachers' emotion regulation skills, stress management, awareness, and compassion have positive impacts on teachers' mindfulness, stress, and well-being (Jennings et al., 2013; Jennings et al., 2011; Roeser et al., 2013), and have benefits for children both in that classroom and as they progress through school. In addition, SEL programs for children may also improve teachers' social-emotional competence (Domitrovich et al., 2016), and therefore reinforce and/or act as a mechanism of child-level impacts.

The fact that school and classroom variables had only modest effects on child outcomes also has implications for the ongoing debate about using measures of quality for high-stakes teacher evaluation and accountability. Observational measures like the CLASS may be useful tools for the purposes of teacher professional development, but they do not explain large enough proportions of variance in child outcomes to warrant use in deciding teacher pay, hiring, or layoffs. Conducting multiple observations during one school year and/or combining ratings

across multiple measures may increase the stability and predictive utility of quality ratings (Kane & Staiger, 2012; Whitehurst et al., 2015), but there is still much work to be done to determine whether and which measures of teaching should inform personnel decisions.

Limitations and Future Directions

A few limitations of this dissertation should be noted. Most importantly, this study was non-experimental, and although analyses controlled for several sociodemographic variables, strong causal inferences are not warranted. Omitted variables, such as parenting practices, the quality of the home learning environment, or child IQ, may account for some of the associations observed here. In addition, assignment to classrooms was not randomized, and the processes driving assignment are unknown and may influence results. Randomized controlled trials of preschool SEL interventions and sequenced interventions during the school years would enable stronger causal inferences about the joint contributions of school-entry social-emotional functioning and the school/classroom context.

One of the strengths of this study is that it included multiple sources of data, including teacher report, observations, and child direct assessments. However, because the social-emotional outcomes and several classroom predictors were both rated by teachers, shared method variance may account for some of the effects seen between teacher SEC and concurrent behavior. It should be noted, though, that cumulative teacher SEC predicted reading growth, which cannot be accounted for by shared method variance, and in the case of prosocial behavior, teacher SEC predicted later prosocial behavior as rated by different teachers. In addition, shared method variance also cannot account for the associations that emerged between observed classroom interactions on the CLASS and child outcomes as measured by teacher report or direct assessment.

Another limitation of the analyses reported here is that it is difficult to separate the developmental phenomenon of convergence in behavior from statistical regression to the mean, in which extreme scores on a first measurement occasion tend to be less extreme on a second

measurement occasion. However, because the current analyses modeled trajectories from the spring of kindergarten to the spring of third grade, regression to the mean that occurred between the first measurement of children's behavior (spring prior to kindergarten) and the second measurement (spring of kindergarten), should not contribute to results, and this is when regression to the mean would be most dramatic.

However, this spacing of measurements highlights a different issue. Because children's trajectories of behavior and achievement were modeled from the spring of kindergarten to the spring of third grade, any convergence or divergence between initially lower- and higher-functioning children that occurred *during the kindergarten year* (i.e., from the spring prior to kindergarten to the spring of kindergarten) was not captured in these analyses. This is an important consideration because the patterns of growth seen during this key transitional year might differ from the patterns during later school years identified in this dissertation, and they may be altered by the classroom context in unique ways. Future work should investigate more closely the patterns of convergence or divergence that may occur during the kindergarten year.

The effects of the school and classroom predictors reported here and elsewhere are small and an important issue to investigate in further research (Burchinal et al., 2011). Different measurement or analytic approaches to the study of classroom quality may explain more variance in children's outcomes. As noted earlier, it may be useful to quantify the consistency or duration of children's exposure to high-quality teaching, or create composites that index quality across multiple dimensions (Kane & Staiger, 2012). In addition, research on quality thresholds indicates that the effects of preschool classroom quality on child behavior are not linear, but are strongest at higher levels of quality and negligible below a cut-point (e.g., a 5 on the 1-7 scale for CLASS Emotional Support and Classroom Organization, and a 3 on Instructional Support; Burchinal et al., 2011, 2014). In the FLP sample, 30-45% of K-G3 classrooms fell below these cut-offs on the three traditional CLASS domains, so if threshold effects extend to elementary school, this may partly explain the modest magnitude of impacts observed here. A threshold

effect may also operate for class size: Consistent and lasting effects have been documented most often for initiatives that reduce class size substantially, such as the Tennessee STAR trial which compared children who were randomly assigned to intervention classrooms with about 15 students or to control classrooms with about 22 students (Whitehurst & Chingos, 2011; Krueger, 1999).

There may be other ways to conceptualize and model children's developmental trajectories of social-emotional functioning, as well. The current analyses used linear growth curves, but these are somewhat limited because the linear time function does not fully represent changes in children's behavior over time, and there was limited random variance in linear time to predict with child-level variables. Different subsets of children likely follow different trajectories of behavior: While many children may show stable levels of functioning over time, others may show distinct trajectories of improvement or decline. A few recent studies have used person-oriented approaches to study social-emotional development (Nix et al., 2016; Sasser, Beekman, & Bierman, 2015), and these methods can help elucidate the developmental course, predictors, and consequences of unique trajectories.

Conclusion

Fostering early social-emotional functioning and improving classroom experiences for children are two promising policy levers through which children may be supported as they progress through school, particularly among children facing socioeconomic disadvantage. This dissertation utilized a unique sample of children from high-poverty rural regions and adds to a growing body of work out of the Family Life Project investigating families, schools, and child development in these settings (e.g., Blair et al., 2016; Broekhuizen et al., 2016; Garrett-Peters et al., 2016; Sandilos et al., 2014; Vernon-Feagans et al., 2016). Children who begin kindergarten with low levels of social-emotional functioning may show some catch up to their better functioning peers during the early school years, but they still remain at a disadvantage in third grade, both behaviorally and academically. Teachers who are social-emotionally

competent and skilled in the classroom can have positive impacts on children's behavior and achievement, but more research is needed to determine which classroom experiences are particularly beneficial for initially lower-functioning children, and thus can reduce gaps between children with varied school-entry skills.

REFERENCES

Alam, S. (2012). Impact of teachers' stress on academic performance of public school students. Journal of the Indian Academy of Applied Psychology, 38, 156-161.

Andrade, B.F., & Tannock, R. (2014). Sustained impact of inattention and hyperactivity-impulsivity on peer problems: Mediating roles of prosocial skills and conduct problems in a community sample of children. *Child Psychiatry and Human Development*, *45*, 318-328.

Barnett, W.S. (2011). Effectiveness of early educational intervention. *Science*, *333*, 975-978.

Battistich, V., Solomon, D., Kim, D., Watson, M., & Schaps, E. (1995). Schools as communities, poverty levels of student populations, and students' attitudes, motives, and performance: A multilevel analysis. *American Educational Research Journal, 32*, 627-658.

Biederman, J., Petty, C.R., Monuteaux, M.C., Fried, R., Byrne, D., Mirto, T…. Faraone, S.V. (2010). Adult psychiatric outcomes of girls with attention deficit hyperactivity disorder: 11-year follow-up in a longitudinal case-control study. *American Journal of Psychiatry, 167*, 409-417.

Bierman, K.L., Domitrovich, C.E., Nix, R.L., Gest, S.D., Welsh, J.A., Greenberg, M.T., Blair, C., Nelson, K., & Gill, S. (2008). Promoting academic and social-emotional school readiness: The Head Start REDI program. *Child Development, 79,* 1802-1817.

Bierman, K.L., Kalvin, C.B., & Heinrichs, B.S. (2015). Early childhood precursors and adolescent sequelae of grade school peer rejection and victimization. *Journal of Clinical Child & Adolescent Psychology, 44*, 367-379.

Bierman, K.L., & Motamedi, M. (2015). Social-emotional learning programs for preschool children. In J. Durlak, C. Domitrovich, R. P. Weissberg, and T. Gullotta (Eds.), *The handbook of social and emotional learning: Research and practice* (pp. 135-150). New York: Guilford.

Bierman, K.L., Nix, R.L., Greenberg, M.T., Blair, C. & Domitrovich, C.E. (2008). Executive

functions and school readiness intervention: Impact, moderation, and mediation in the Head Start REDI Program. *Development and Psychopathology*, *20*, 821-843.

Bierman, K.L., Nix, R.L., Heinrichs, B.S., Domitrovich, C.E., Gest, S.D., Welsh, J.A., & Gill, S. (2014). Effects of Head Start REDI on children's outcomes one year later in different kindergarten contexts. *Child Development*, *85*, 140-159.

Bierman, K.L., Torres, M.M., Domitrovich, C., Welsh, J.A., & Gest, S.D. (2009). Behavioral and cognitive readiness for school: Cross-domain associations for children attending Head Start. *Social Development, 18,* 305-323.

Birch, S. H., & Ladd, G. W. (1997). The teacher-child relationship and children's early school adjustment. *Journal of School Psychology, 35*, 61-79.

Birch, S. H., & Ladd, G. W. (1998). Children's interpersonal behaviors and the teacher-child relationship. *Developmental Psychology, 34*, 934–946.

Blair, C., Berry, D., Friedman, A.H. (2012). The development of self-regulation in infancy and early childhood: An organizing framework for the design and evaluation of early care and education programs for children in poverty. In C. Blair, D. Berry, & A.H. Friedman (Eds.), *Infants, toddlers, and families in poverty: Research implications for early child care* (pp. 127-152). New York, NY: Guilford Press.

Blair, C., McKinnon, R. D., & The Family Life Project Key Investigators (2016). Moderating effects of executive functions and the teacher-child relationship on the development of mathematics ability in kindergarten. *Learning and Instruction, 41*, 85-93.

Blair, C., & Raver, C.C. (2015). School readiness and self-regulation: A developmental psychobiological approach. *Annual Review of Psychology*, *66*, 711-731.

Blair, C., & Razza, R.P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development, 78*, 647-663.

Blair, C., Ursache, A., Greenberg, M., Vernon-Feagans, L., & The Family Life Project

Investigators (2015). Multiple aspects of self-regulation uniquely predict mathematics but not letter-word knowledge in the early elementary grades. *Developmental Psychology, 51*, 459-472

Blandon, A.Y., Calkins, S.D., Grimm, K.J., Keane, S.P., & O'Brien, M. (2010). Testing a developmental cascade model of emotional and social competence and early peer acceptance. *Development and Psychopathology, 22*, 737-748.

Blatchford, P., Basset, P., & Brown, P. (2011). Examining the effect of class size on classroom engagement and teacher-pupil interaction: Differences in relation to pupil prior attainment and primary vs. secondary schools. *Learning and Instruction, 21*, 715-730.

Bodovski, K., & Farkas, G. (2007). Mathematics growth in early elementary school: The roles of beginning knowledge, student engagement, and instruction. *The Elementary School Journal, 108*, 115-130.

Bogard, K., & Takanishi, R. (2005). PK-3: An aligned and coordinated approach to education for children 3 to 8 years old. *Social Policy Report, 19*(3), 3-23.

Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). Test scores and high school grades as predictors. In W. G. Bowne, M. M. Chingos, & M. S. McPherson (Eds.), *Crossing the finish line: Completing college at America's public universities* (pp. 112–133). Princeton, NJ: Princeton University Press.

Bowlby, J. (1969). Attachment and loss: Volume I. Attachment. New York, NY: Basic Books.

Boyd, D., Lankford, H., Loeb, S., Rockoff, J., & Wycoff, J. (2008). The narrowing gap in New York City teacher qualifications and its implications for student achievement in high-poverty. *Journal of Policy Analysis and Management, 27*, 793-818.

Brennan, L.M., Shaw, D.S., Dishion, T.J., & Wilson, M. (2012). Longitudinal predictors of school-age academic achievement: Unique contributions of toddler-age aggression, oppositionality, inattention, and hyperactivity. *Journal of Abnormal Child Psychology, 40*, 1289-1300.

Breslau, J., Miller, E., Breslau, N., Bohnert, K., Lucia, V., & Schweitzer, J. (2009). The impact of early behavior disturbances on academic achievement in high school. *Pediatrics*, *123*, 1472–1476.

Brocki, K.C., Eninger, L., Thorell, L.B.,& Bohlin, G. (2010). Interrelations between executive function and symptoms of hyperactivity/impulsivity and inattention in preschoolers: A two year longitudinal study. *Journal of Abnormal Child Psychology, 38*, 163-171.

Broekhuizen, M., Mokrova, I., Burchinal, M., Garrett-Peters, P.T., & the Family Life Project Key Investigators (2016). Classroom quality at pre-kindergarten and kindergarten and children's behavior problems and social skills. *Early Childhood Research Quarterly, 36*, 212-222.

Bronfenbrenner, U. & Crouter, A.C. (1983). The evolution of environmental models in development research. In W. Kessen (Series Ed.) & P.H. Mussen (Vol. Ed.), *Handbook of child psychology: Vol I. History, theory, and methods.* (4th ed., pp. 357-414). New York, NY: Wiley.

Bronfenbrenner, U., & Morris, P.A. (2006). The bioecological model of human development. In R.M. Lerner (Ed.), *Handbook of child psychology* (6th ed., Vol. 1, pp. 793-828). New York, NY: Wiley.

Bulotsky-Shearer, R.J., Dominguez, X., & Bell, E.R. (2012). Preschool classroom behavioral context and school readiness outcomes for low-income children: A multi-level examination of child- and classroom-level influences. *Journal of Educational Psychology*, *104*, 421-438.

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., Kainz, K., & Cai, Y. (2011). How well do our measures of quality predict child outcomes? A meta-analysis and coordinated analysis of data from large-scale studies of

early childhood settings. In M. Zaslow, I. Martinez-Beck, K. Tout, & T. Halle (Eds.), *Quality measurement in early childhood settings* (pp. 11-31). Baltimore, MD: Paul H. Brookes Publishing.

Burchinal, M.R., Peisner-Feinberg, E., Pianta, R., & Howes, C. (2002). Development of academic skills from preschool through second grade: Family and classroom predictors of developmental trajectories. Journal of School Psychology, 40, 415-436.

Burchinal, M., Vernon-Feagans, L., Vitiello, V., Greenberg, M., & the FLP Key Investigators. (2014). Thresholds in the association between child care quality and child outcomes in rural preschool children. *Early Childhood Research Quarterly, 29*, 41-51.

Cadmina, J., Leal, T., & Burchinal, M. (2010). The quality of teacher–student interactions: Associations with first graders' academic and behavioral outcomes. *Journal of School Psychology, 48*, 457-482.

Campbell, F.A., & Ramey, C.T. (2010). Carolina Abecedarian Project. In A.J. Reynolds, A.J. Rolnick, M.M. Englund, & J.A. Temple, J.A. (Eds.), *Childhood programs and practices in the first decade of life: A human capital integration* (pp. 76-98). New York, NY: Cambridge University Press.

Campbell, S.B., Spieker, S., Burchinal, M., Poe, M.D., & the NICHD ECCRN (2006). Trajectories of aggression from toddlerhood to age 9 predict academic and social functioning through age 12. *Journal of Child Psychology and Psychiatry, 47*, 791-800.

Cappella, E., & Neal, J.W. (2012). A classmate at your side: Teacher practices, peer victimization, and network connections in urban schools. *School Mental Health, 4*, 81-94.

Center on the Developing Child at Harvard University (2011). *Building the brain's "air traffic control" system: How early experiences shape the development of executive function. Working Paper No. 11.* Cambridge, MA: Center on the Developing Child, Harvard University.

Chetty, R., Friedman, J.N., Hilger, N., Saez, E., Schanzenbach, D.W., & Yagan D. (2011). How

does your kindergarten classroom affect your earnings? Evidence from Project STAR. *The Quarterly Journal of Economics, 126*, 1593-1660.

Claessens, A., Duncan, G., & Engel, M. (2009). Kindergarten skills and fifth-grade achievement: Evidence from the ECLS-K. *Economics of Education Review, 28*, 415-427.

Claessens, A., Engel, M., & Curran, F.C. (2014). Academic content, student learning, and the persistence of preschool effects. *American Educational Research Journal, 51*, 403-434.

Clark, C.A., Pritchard, V.E., & Woodward, L.J. (2010). Preschool executive functioning abilities predict early mathematics achievement. *Developmental Psychology*, *46*, 1176-1191.

Clements, D.H., Sarama, J., Spitler, M.E., Lange, A.A., & Wolfe, C.B. (2011). Mathematics learned by young children in an intervention based on learning trajectories: A large-scale cluster randomized trial. *Journal for Research in Mathematics Education, 42*, 127-166.

Collaborative for Academic, Social, and Emotional Learning [CASEL]. (2012). *Effective social and emotional learning programs: Preschool and elementary school edition*. Chicago, IL: Author.

Collins, L.M., Schafer, J.L., & Kam, C.M. (2001). A comparison of inclusive and restrictive strategies in modern missing data procedures. *Psychological Methods, 6*, 330-351.

Conduct Problems Prevention Research Group [CPPRG]. (1990). Teacher Social Competence Scale. Available from http://www.fasttrackproject.org.

Connell, J.P., & Wellborn, J.G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M.R. Gunnar & L.A. Sroufe (Eds.), *Self process and development: The Minnesota symposia on child development* (Vol. 23, pp. 43-77). Hillsdale, NJ: Erlbaum.

Connor, C.M., Morrison, F.J., Fishman, B., Crowe, E.C., Al Otaiba, S., & Schatschneider, C. (2013). A longitudinal cluster-randomized control study on the accumulating effects of individualized literacy instruction on students' reading from first through third grade. *Psychological Science, 24*, 1408-1419.

Connor, C.M., Morrison, F.J., Fishman, B., Giuliani, S., Luck, M., Underwood, P.S., . . . Schatschneider, C. (2011). Testing the impact of child characteristics by instruction interactions on third graders' reading comprehension by differentiating literacy instruction. Reading Research Quarterly, 46, 189-221.

Connor, C.M., Morrison, F.J., & Petrella, J.N. (2004). Effective reading comprehension instruction: Examining child by instruction interactions. *Journal of Educational Psychology, 96*, 682-698.

Connor, C.M., Piasta, S.B., Fishman, B., Glasney, S., Schatschneider, C., Crowe, E., . . . Morrison, F.J. (2009). Individualizing student instruction precisely: Effects of child x instruction interactions on first graders' literacy development. *Child Development, 80*, 77-100.

Connor, C.M., Spencer, M., Day, S.L., Giuliani, S., Ingebrand, S.W., McLean, L., & Morrison, F.J. (2014). Capturing the complexity: Content, type, and amount of instruction and quality of the classroom learning environment synergistically predict third graders' vocabulary and reading comprehension outcomes. Journal of Educational Psychology, 106, 762-778.

Croninger, R.G., Rice, J.K., Rathbun, A., & Nishio, M. (2007). Teacher qualifications and early learning: Effects of certification, degree, and experience on first-grade student achievement. *Economics of Education Review*, *26*, 312-324.

Crosnoe, R., Morrison, F., Burchinal, M., Pianta, R., Keating, D., Friedman, S.L., Clarke-Stewart, K.A., & the Eunice Kennedy Shriver NICHD ECCRN (2010). Instruction, teacher-student relations, and math achievement trajectories in elementary school. *Journal of Educational Psychology, 102*, 407-417.

Curby, T.W., Rimm-Kaufman, S.E., & Ponitz, C.C. (2009). Teacher-child interactions and children's achievement trajectories across kindergarten and first grade. *Journal of Educational Psychology, 101*, 912-925.

Curby, T.W., Rudasill, K.M., Edwards, T., & Pérez-Edgar, K. (2011). The role of classroom quality in ameliorating the academic and social risks associated with difficult temperament. *School Psychology Quarterly, 26,* 175-188.

Dannefer, D. (2003). Cumulative advantage/disadvantage and the life course: cross-fertilizing age and social science theory. *Journal of Gerontology: Social Sciences, 58B*, S327-S337.

Darling-Hammond, L. (2004). Inequality and the right to learn: Access to qualified teachers in California's public schools. *Teachers College Record, 106*, 1936-1966.

Denham, S.A. (2006). Social-emotional competence as support for school readiness: What is it and how do we assess it? *Early Education and Development, 17*, 57-89.

Denham, S.A., Bassett, H.H., Zinsser, K., & Wyatt, T.M. (2014). How preschoolers' social–emotional learning predicts their early school success: Developing theory-promoting, competency-based assessments. *Infant and Child Development, 23*, 426-454.

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.

Denham, S.A., Brown, C., & Domitrovich, C. (2010). "Plays nice with others": Social-emotional learning and academic success. *Early Education & Development, 21*, 652-680.

Denham, S.A., & Weissberg, R.P. (2004). Social-emotional learning in early childhood: What we know and where to go from here. In E. Chesebrough, P. King, T.P. Gullotta, & M. Bloom (Eds.), *A blueprint for the promotion of prosocial behavior in early childhood* (pp. 13-50). New York: Kluwer Academic/Plenum Publishers.

Dionne, G. (2005). Language development and aggressive behavior. In R. E. Tremblay, W. M. Hartup, & J. Archer (Eds.), *Developmental origins of aggression*. New York: Guilford Publications.

DiPerna, J.C., Lei, P.W., & Reid, E.E. (2007). Kindergarten predictors of mathematical growth in

the primary grades: An investigation using the Early Childhood Longitudinal Study-Kindergarten Cohort. *Journal of Educational Psychology, 99*, 369-379.

DiPrete, T.A., & Eirich, G.M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical development. Annual Review of Sociology, 32, 271-297.

Dishion, T.J., & Tipsord, J.M. (2011). Peer Contagion in Child and Adolescent Social and Emotional Development. *Annual Review of Psychology, 62*, 189-214.

Doctoroff, G.L., Greer, J.A., & Arnold, D.H. (2006). The relationship between social behavior and emergent literacy among preschool boys and girls. *Applied Developmental Psychology, 27*, 1-13.

Dodge, K.A., Malone, P.S., Greenberg, M.T., and the Conduct Problems Prevention Research Group. (2008). Testing an idealized dynamic cascade model of the development of serious violence in adolescence. *Child Development, 97*, 1907-1027.

Dominguez, X., Vitiello, V.E., Maier, M.F., & Greenfield, D.B. (2010). A longitudinal examination of young children's learning behavior: Child-level and classroom-level predictors of change throughout the preschool year. *School Psychology Review, 39*, 29-47.

Domitrovich, C.E., Bradshaw, C.P., Berg, J.K., Pas, E.T., Becker, K.D., Musci, R…. Ialongo, N. (2016). How do school-based prevention programs impact teachers? Findings from a randomized trial of an integrated classroom management and social-emotional program. *Prevention Science, 17*, 325-337.

Domitrovich, C. E., Cortes, R. C., & Greenberg, M. T. (2007). Improving young children's social and emotional competence: A randomized trial of the preschool "PATHS" curriculum. *Journal of Primary Prevention, 28*, 67–91.

Domitrovich, C.E., Moore, J.E., Thompson, R.A., & the CASEL Preschool to Elementary School Social and Emotional Learning Assessment Workgroup. (2012). Interventions that promote social-emotional learning in young children. In R.C. Pianta (Ed.), *Handbook of*

Early Childhood Education (pp. 393-415). New York, NY: Guilford Press.

Domitrovich, C.E., Morgan, N.R., Moore, J.E., Cooper, B.R., Shah, H.K., Jacobson, L., & Greenberg, M.T. (2013). One versus two years: Does length of exposure to an enhanced preschool program impact the academic functioning of disadvantaged children in kindergarten? *Early Childhood Research Quarterly, 28*, 704-713.

Dottin, E. S. (2009). Professional judgment and dispositions in teacher education. *Teaching and Teacher Education, 25,* 83–88

Downer, J.T., Sabol, T.J., & Hamre, B. (2010). Teacher-child interactions in the classroom: Toward a theory of within- and cross-domain links to children's developmental outcomes. *Early Education & Development, 21*, 699-723.

Duckworth, A.L., Quinn, P.D., & Tsukayama, E. (2012). What *No Child Left Behind* leaves behind: The roles of IQ and self-control in predicting standardized achievement test scores and report card grades. *Journal of Educational Psychology, 104*, 439-451.

Duff, D., Tomblin, J.B., & Catts, H. (2015). The influence of reading on vocabulary growth: A case for a Matthew Effect. *Journal of Speech, Language, and Hearing Research, 58*, 853-864.

Duncan, G., 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.

Durlak, J.A., Weissberg, R.P., Dymnicki, A.B., Taylor, R.D., & Schellinger, K.B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82*, 405-432.

Dusenbury, L., Weissberg, R.P., Goren, P., & Domitrovich, C. (2014). *State standards to advance social and emotional learning: Findings from CASEL's state scan of social and emotional learning standards, preschool through high school, 2014.* Chicago, IL: Collaborative for Academic, Social, and Emotional Learning.

Early, D.M., Maxwell, K.L., Burchinal, M., Alva, S., Bender, R.H., Bryant, D…. Zill, N. (2007). Teachers' education, classroom quality, and young children's academic skills: Results from seven studies of preschool programs. *Child Development, 78,* 558-580.

Ehrenberg, R.G., Brewer, D.J., Gamoran, A., & Willms, J.D. (2001). Class size and student achievement. *Psychological Science in the Public Interest, 2,* 1-30.

Engel, M., Claessens, A., & Finch, M.A. (2013). Teaching students what they already know? The (mis)alignment between mathematics instructional content and student knowledge in kindergarten. *Educational Evaluation & Policy Analysis, 35*, 157-178.

Fantuzzo, J.W., Perry, M.A., & McDermott, P. (2004). Preschool approaches to learning and this relationship to other relevant classroom competencies for low-income children. *School Psychology Quarterly, 19,* 212-230.

Farrington, C.A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T.S., Johnson, D.W., & Beechum, N.O. (2012). *Teaching adolescents to become learners. The role of noncognitive factors in shaping school performance: A critical literature review*. Chicago: University of Chicago Consortium on Chicago School Research.

Finn, J.D., Gerber, S.B., & Boyd-Zaharias, J. (2004). Small classes in the early grades, academic achievement, and graduating from high school. *Journal of Educational Psychology, 97*, 214-223.

Finn, J.D., Pannozzo, G.M., & Achilles, C.M. (2003). The "why's" of class size: Student behavior in small classes. *Review of Educational Research, 73*, 321-368.

Flanagan, K.S., Bierman, K.L., & Kam, C.M. (2003). Identifying at-risk children at school entry: The usefulness of multibehavioral problem profiles. *Journal of Clinical Child & Adolescent Psychology, 32*, 396-407.

Fitzpatrick, C., & Pagani, L.S. (2013). Task-oriented kindergarten behavior pays off in later childhood. *Journal of Developmental & Behavioral Pediatrics, 34*, 94-101.

Fletcher, J. (2013). The effects of childhood ADHD on adult labor market outcomes. *NBER*

Working Paper Series (no. 18689). Cambridge, MA: National Bureau of Economic Research.

Frank, J.L., Jennings, P.A., & Greenberg, M.T. (2016) Validation of the Mindfulness in Teaching Scale. *Mindfulness*, *7*, 155-163.

Galindo, C., & Fuller, B. (2010). The social competence of Latino kindergarteners and growth in mathematical understanding. *Developmental Psychology, 46,* 579-592.

Gallagher, K.C., Kainz, K., Vernon-Feagans, L. & White, K.M. (2013). Development of student–teacher relationships in rural early elementary classrooms. *Early Childhood Research Quarterly, 28*, 520-528.

Garrett-Peters, P. T., Mokrova, I., Vernon-Feagans, L., Willoughby, M., Yi, P., & The Family Life Project Key Investigators (2016). The role of household chaos in understanding relations between early poverty and children's academic achievement. *Early Childhood Research Quarterly, 37*, 16-25.

Geiser, S., & Santelices, M.V. (2007). Validity of high-school grades in predicting student success beyond the freshman year: High-school record vs. standardized tests as indicators of four-year college outcomes. *Center for Studies in Higher Education Research & Occasional Paper Series,* 9.07.

Goldstein, H. (2014). *REALCOM-IMPUTE: Multiple imputation using MLwin*. Bristol, UK: Centre for Multilevel Modelling, University of Bristol.

Goodman, A., Joshi, H., Nasim, B., & Tyler, C. (2015). *Social and emotional skills in childhood and their long-term effects on adult life*. London: University College London Institute of Education.

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, *38*, 581-586.

Gower, A.L., Lingras, K.A., Mathieson, L.C., Kawabata, Y., Crick, N.R. (2014). The role of preschool relational and physical aggression in the transition to kindergarten: Links with

social-psychological adjustment. *Early Education & Development*, *25*, 619-640.

Graham, J.W. (2012). *Missing data: Analysis and design.* New York, NY: Springer.

Granic, I. (2008). A dynamic systems approach to understanding family and peer relationships: Implications for effective interventions with aggressive youth. In A. Fogel, King, B.J. King, & S.G. Shanker (Eds.), *Human development in the twenty-first century: Visionary ideas from systems scientists* (pp. 216-224). Cambridge, UK: Cambridge University Press.

Gray, S.A.O., Carter, A.S., Briggs-Gowan, M.J., Jones, S.M., & Wagmiller, R.L. (2014). Growth trajectories of early aggression, overactivity, and inattention: Relations to second-grade reading. *Developmental Psychology, 50*, 2255-2263.

Greenberg, M.T., Jennings, P.A., & Goodman, B. (2010). *The Interpersonal Mindfulness in Teaching Scale*. University Park, PA: Pennsylvania State University.

Greenberg, M.T., Weissberg, R.P., Utne O'Brien, M., Zins, J.E., Fredericks, L., Resnik, H., & Elias, M.J. (2003). Enhancing school-based prevention and youth development through coordinated social, emotional, and academic learning. *American Psychologist*, *58*, 466-474.

Greenwald, R. Hedges, L.V., & Laine, R.D. (1996). The effect of school resources on student achievement. *Review of Educational Research, 66*, 361-396.

Grimm, K.J., Steele, J.S., Mashburn, A.,J., Burchinal, M., Pianta, R.C. (2010). Early behavioral associations of achievement trajectories. *Developmental Psychology, 46*, 976-983.

Guarino, C.M., Hamilton, L.S., Lockwood, J.R., and Rathbun, A.H. (2006*). Teacher qualifications, instructional practices, and reading and mathematics gains of kindergartners* (NCES 2006-031). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Guhn, M., Gadermann, A.M., Almas, A., Schonert-Reichl, K.A., & Hertzman, C. (2016). Associations of teacher-rated social, emotional, and cognitive development in

kindergarten to self-reported wellbeing, peer relations, and academic test scores in middle childhood. *Early Childhood Research Quarterly, 35*, 76-84.

Hamre, B., Hatfield, B., Pianta, R., & Jamil, F. (2014). Evidence for general and domain-specific elements of teacher-child interactions: Associations with preschool children's development. *Child Development, 85*, 1257-1274.

Hamre, B.K., & Pianta, R.C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72,* 625-638.

Hamre, B.K., & Pianta, R.C. (2005). Can instructional and emotional support in the first-grade classroom make a difference for children at risk of school failure? *Child Development, 76*, 949-967.

Hamre, B.K., & Pianta, R.C. (2007). Learning opportunities in preschool and early elementary school. In R.C. Pianta, M.J., Cox, & K.L. Snow (Eds.), *School readiness and the transition to kindergarten in the era of accountability* (pp. 49-84). Baltimore, MD: Paul H. Brooks Publishing.

Hamre, B.K., Pianta, R.C., Downer, J.T., DeCoster, J., Mashburn, A.J., Jones, S.M., . . . Hamagami, A., (2013). Teaching through interaction: Testing a developmental framework of teacher effectiveness in over 4,000 classrooms. *The Elementary School Journal, 113*, 461-487.

Hanish, L.D., Martin, C.L., Fabes, R.A., Leonard, S., & Herzog, M. (2005). Exposure to externalizing peers in early childhood: Homophily and peer contagion processes*. Journal of Abnormal Child Psychology, 33*, 267-281.

Hanushek, E.A. (1986). The economics of schooling: Production and efficiency in public schools. *Journal of Economic Literature, 24*, 1141-1177.

Heckman, J.J. (2008). Schools, skills, and synapses. *Economic Inquiry, 46*, 289-324.

Heckman, J.J., Rodrigo, P., & Savelyev, P. (2013). Understanding the mechanisms through which an influential early childhood program boosted adult outcomes. *The American*

Economic Review, 103, 2052-2086.

Henry, G.T., & Rickman, D.K. (2007). Do peers influence children's skill development in preschool? *Economics of Education Review, 26*, 100-112.

Hong, G., & Hong, Y. (2009). Reading instruction time and homogeneous grouping in kindergarten: An application of marginal mean weighting through stratification. *Educational Evaluation and Policy Analysis*, *31*, 54-81.

Huang, F.L., Moon, T.R., & Boren, R. (2014). Are the reading rich getting richer? Testing for the presence of the Matthew Effect. *Reading & Writing Quarterly, 30,* 95-115.

Huang-Pollock, C.L., Mikami, A.Y., Pfiffner, L., & McBurnett, K. (2009). Can executive functions explain the relationship between Attention Deficit Hyperactivity Disorder and social adjustment? *Journal of Abnormal Child Psychology, 37,* 679-691.

Hughes, C., & Ensor, R. (2011). Individual differences in growth in executive function across the transition to school predict externalizing and internalizing behaviors and self-perceived success at 6 years of age. *Journal of Experimental Child Psychology*, *108*, 663–676.

Ingersoll, R., Merrill, L., & Stuckey, D. (2014). *Seven trends: The transformation of the teaching force*. CPRE Report (#RR-80). Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.

Irvin, M.J., Byun, S., Meece, J.L., Farmer, T.W., & Hutchins, B.C. (2012). Education barriers of rural youth: Relation of individual and contextual difference variables. *Journal of Career Assessment, 20*, 71-87.

Jaffe, L.E. (2009). *Development, interpretation, and application of the W score and the Relative Proficiency Index*. Woodcock-Johnson III Assessment Service Bulletin, No. 11.

Jennings, P.A., Frank, J.L., Snowberg, K.E., Coccia, M.A., & Greenberg, M.T. (2013). Improving classroom learning environments by Cultivating Awareness and Resilience in Education (CARE): Results of a randomized controlled trial. *School Psychology Quarterly*, *28*, 374-390.

Jennings, P.A., & Greenberg, M.T. (2009). The prosocial classroom: Teacher social and emotional competence in relation to child and classroom outcomes. *Review of Educational Research, 79*, 491-525.

Jennings, P.A., Snowberg, K.E., Coccia, M.A., & Greenberg, M.T. (2011). Improving classroom learning environments by Cultivating Awareness and Resilience in Education (CARE): Results of two pilot studies. *Journal of Classroom Interaction*, *46*, 37-48.

Johnson, S.M., Kardos, S.M., Kaufman, D., Liu, E., & Donaldson, M L. (2004). The support gap: New teachers' early experiences in high-income and low-income schools. *Education Policy Analysis Archives, 12*(61), 1-23.

Jones, D.E., Greenberg, M., & Crowley, D.M. (2015). Early social-emotional functioning and public health: The relationship between kindergarten social competence and future wellness. *American Journal of Public Health, 105,* 2283-2290.

Jones, S.M., Bouffard, S.M., & Weissbourd, R. (2013). Educators' social and emotional skills vital to learning. *Phi Delta Kappan, 94*(8), 62–65

Jones, S.M., Bub, K.L., & Raver, C.C. (2013). Unpacking the black box of the Chicago School Readiness Project intervention: The mediating roles of teacher-child relationship quality and self-regulation. *Early Education & Development*, *24*, 1043-1064.

Jones, S.M., Molano, A., Brown, J.L., & Aber, J.L. (2013). Reconceptualizing the CLASS framework in elementary schools: Domain specific links to teacher and child outcomes. In B. Hatfield (Chair), *Domain-general and domain-specific associations of the Classroom Assessment Scoring System to children's development from preschool to fifth grade*. Paper presented at the Society for Research in Child Development, Seattle, WA.

Juel, C., & Minden-Cupp, C. (2000). Learning to read words: Linguistic units and instructional strategies. *Reading Research Quarterly, 35*, 458-492.

Justice, L.M., Petscher, Y., Schatschneider, C., & Mashburn, A. (2011). Peer effects in

preschool classrooms: Is children's language growth associated with their classmates' skills? *Child Development, 82*, 1768-1777.

Kane, T.J., & Staiger, D.O. (2012). *Gathering feedback for teaching: Combining high-quality observations with student surveys and achievement gains.* Seattle, WA: Bill and Melinda Gates Foundation, MET Project Research Paper.

Kempe, C., Eriksson-Gustavsson, A. L., & Samuelsson, S. (2011). Are there any Matthew effects in literacy and cognitive development? *Scandinavian Journal of Educational Research*, *55*(2), 181–196.

Keys, T.D., Farkas, G., Burchinal, M.R., Duncan, G.J., Vandell, D.L., Li, W., . . . Howes, C. (2013). Preschool center quality and school readiness: Quality effects and variation by demographic and child characteristics. *Child Development*, *84*, 1171-1190.

Knapp, M., King, D., Healey, A., & Thomas, C. (2011). Economic outcomes in adulthood and their associations with antisocial conduct, attention deficit and anxiety problems in childhood. *Journal of Mental Health Policy and Economics, 14*, 137-147.

Krueger, A.B. (1999). Experimental estimates of education production functions. *Quarterly Journal of Economics, 114*, 497-532.

Krueger, A.B. (2002). Economic considerations and class size. *NBER Working Paper Series* (no. 8875). Cambridge, MA: National Bureau of Economic Research.

Kuntsi, J., Eley, T.C., Taylor, A., Hughes, C., Asherson, P., Caspi, A., & Moffitt, T.E. (2004). Co-occurrence of ADHD and low IQ has genetic origins. *American Journal of Medical Genetics Part B (Neuropsychiatric Genetics), 124B*, 41-47.

La Paro, K.M., & Pianta, R.C. (2000). Predicting children's competence in the early school years: A meta-analytic review. *Review of Educational Research, 70*, 443-484.

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., Herald, S.L., & Kochel, K.P. (2006). School readiness: Are there social

prerequisites? *Early Education & Development, 17*, 115-150.

Ladd, G.W., Kochenderfer-Ladd, B., Visconti, K.J., & Ettekal, I. (2012). Classroom peer relations and children's social and scholastic development: Risk factors and resources. In A.M. Ryan & G.W. Ladd (Eds.), *Peer relationships and adjustment at school* (pp. 11-49) Charlotte, NC: Information Age Publishing.

Li Grining, C., Raver, C.C., Champion, K., Sardin, L., Metzger, M., & Jones, S.M. (2010). Understanding and improving classroom emotional climate and behavior management in the "real world": The role of Head Start teachers' psychosocial stressors. *Early Education & Development, 21*, 65-94.

Li Grining, C.P., Votruba-Drzal, E., Maldonado-Carreño, C., & Haas, K. (2010). Children's early approaches to learning and academic trajectories through fifth grade. *Developmental Psychology, 46*, 1062-1077.

Lin, H.-L., Lawrence, F.R., & Gorrell, J. (2003). Kindergarten teachers' views of children's readiness for school. *Early Childhood Research Quarterly, 18*, 225-237.

Madill, R. (2014). *How do elementary school teachers shape children's social development? A study of teachers' use of seating arrangements and responsive teaching*. Unpublished dissertation.

Madill, R.A., Gest, S.D., & Rodkin, P.C. (2014). Students' perceptions of relatedness in the classroom: The roles of emotionally supportive teacher–child interactions, children's aggressive–disruptive behaviors, and peer social preference. *School Psychology Review, 43*, 86-105.

Magnuson, K. A., Ruhm, C., & Waldfogel, J. (2007). The persistence of preschool effects: Do subsequent classroom experiences matter? *Early Childhood Research Quarterly, 22*, 18-38.

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.

Maranto, R., & Shulls, J.V. (2012). How do we get them on the farm? Efforts to improve rural teacher recruitment and retention in Arkansas. *The Rural Education, 34*, 32-40.

Mashburn, A.J., & Pianta, R.C. (2006). Social relationships and school readiness. *Early Education & Development, 17*, 151-176.

Mashburn, A.J., & Pianta, R.C. (2010). Opportunity in early education: Improving teacher-child interactions and child outcomes. In A.J. Reynolds, A.J. Rolnick, M.M. Englund, & J.A. Temple (Eds.), *Childhood programs and practices in the first decade of life: A human capital integration* (pp. 243-265). New York, NY: Cambridge University Press.

Mashburn, A.J., Pianta, R.C., Hamre, B.K., Downer, J.T., Barbarin, O.A., Bryant, D., … Early, D.M. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child Development, 79*, 732-749.

McClelland, M. M., Acock, A.C., & Morrison, F.J. (2006). The impact of kindergarten learning-related skills on academic trajectories at the end of elementary school. *Early Childhood Research Quarterly, 21*, 471-490.

McKown, C., Allen, A.M., Russo-Ponsaran, N.M., & Johnson, J.K. (2013). Direct assessment of children's social-emotional comprehension. *Psychological Assessment, 25*, 1154-1166.

McKown, C., Russo-Ponsaran, N.M., Allen, A., Johnson, J.K., & Warren-Khot, H.K. (2016). Social-emotional factors and academic outcomes among elementary-aged children. *Infant and Child Development, 25*, 119-136.

Medford, E., & McGeown, S.P. (2016). Social, emotional and behavioural influences on young children's pre-reading and word reading development. *Journal of Applied Developmental Psychology, 43*, 54-61.

Merritt, E.G., Wanless, S.B., Rimm-Kaufman, & Cameron, C. (2012). The contribution of teachers' emotional support to children's social behaviors and self-regulatory skills in first grade. *School Psychology Review, 41*, 141-159.

Miller, P., Votruba-Drzal, E., & Setodji, C.M. (2013). Family income and early achievement across the urban-rural continuum. *Developmental Psychology, 49*, 1452-1465.

Mistry, R., Benner, A.D., Biesanz, J.C., Clark, S.L., & Howes, C. (2010). Family and social risk, and parental investments during the early childhood years as predictors of low-income children's school readiness outcomes. *Early Childhood Research Quarterly, 25,* 432-449.

Moffitt, T.E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J, Harringotn, H., … Caspi, A. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Proceedings of the National Academy of Sciences, 108*, 2693-2698.

Morris, P., Mattera, S.K., Castells, N., Bangser, M., Bierman, K., & Raver, C.C. (2014). *Impact findings from the Head Start CARES demonstration: National evaluation of three approaches to improving preschoolers' social and emotional competence.* OPRE Report 2014-44. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

Morris, P., Millenky, M., Raver, C.C., & Jones, S.M. (2013). Does a preschool social and emotional learning intervention pay off for classroom instruction and children's behavior and academic skills? Evidence from the Foundations of Learning Project. *Early Education & Development, 24*, 1020-1042.

National Institute of Child Health and Human Development Early Child Care Research Network. (2001). Nonmaternal care and family factors in early development: An overview of the NICHD Study of Early Child Care. *Applied Developmental Psychology, 22*, 457-492.

National Institute of Child Health and Human Development Early Child Care Research Network. (2004a). Trajectories of physical aggression from toddlerhood to middle childhood. *Monographs of the Society for Research in Child Development, 69*, 1-119.

National Institute of Child Health and Human Development Early Child Care Research Network. (2004b). Does class size in first grade relate to children's academic and social

performance or observed classroom processes? *Developmental Psychology, 69*, 651-664.

National Institute of Child Health and Human Development Early Child Care Research Network. (2005). A day in third grade: A large-scale study of classroom quality and teacher and student behavior. *The Elementary School Journal, 105*, 305-323.

Nisbett, R.E., Aronson, J., Blair, C., Dickens, W., Flynn, J., Halpern, D.F., & Turkheimer, E. (2012). Intelligence: New findings and theoretical developments. *American Psychologist, 67,* 130-159.

Nix, R.L., Bierman, K.L., Domitrovich, C.E., & Gill, S. (2013). Promoting children's social-emotional skills in preschool can enhance academic and behavioral functioning in kindergarten: Findings from Head Start REDI. *Early Education & Development, 24,* 1000-1019.

Nix, R.L., Bierman, K.L., Heinrichs, B.S., Gest, S.D., Welsh, J.A., & Domitrovich, C.E. (2016). The randomized controlled trial of Head Start REDI: Sustained effects on developmental trajectories of social-emotional functioning. *Journal of Consulting & Clinical Psychology, 84*, 310-322.

O'Brennan, L.M., Bradshaw, C.P., & Furlong, M.J. (2014). Influence of classroom and school climate on teacher perceptions of student problem behavior. *School Mental Health, 6*, 125-136.

Owens, J.S., Holdaway, A.S., Serrano, V.J., Himawan, L.K., Watabe, Y., Storer, J…. Andrews, N. (in press). Screening for social, emotional, and behavioral problems at kindergarten entry: The utility of two teacher rating scales. *School Mental Health*.

Pagani, L.S., Fitzpatrick, C., & Parent, S. (2012). Relating kindergarten attention to subsequent developmental pathways of classroom engagement in elementary school. *Journal of Abnormal Child Psychology, 40*, 715-725.

Palardy, G.J., & Rumberger, R.W. (2008). Teacher effectiveness in first grade: The importance

of background qualifications, attitudes, and instructional practices for student learning. *Educational Evaluation and Policy Analysis, 30*, 111-140.

Parrila, R., Aunola, K., Leskinen, E., Nurmi, J.-E. & Kirby, J.R. (2005). Development of individual differences in reading: Results from longitudinal studies in English and Finnish. *Journal of Educational Psychology, 97*, 299-319.

Payton, J.W., Wardlaw, D.M., Graczyk, P.A., Bloodworth, M.R., Tompsett, C.J., & Weissberg, R.P. (2000). Social and emotional learning: A framework for promoting mental health and reducing risk behavior in children and youth. *Journal of School Health, 70*, 179-185.

Pelham, W.E., Gnagy, E.M., Greenslade, K.E., & Milich, R. (1992). Teacher ratings of DSM-III-R symptoms of the disruptive behavior disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 31*, 210-218.

Perry, L., & McConney, A. (2010). Does the SES of the school matter? An examination of socioeconomic status and student achievement using PISA 2003. *Teachers College Record, 112*, 1137-1162.

Petersen, I.T., Bates, J.E., Dodge, K.A., Lansford, J.E., & Pettit, G.S. (2015) Describing and predicting developmental profiles of externalizing problems from childhood to adulthood. *Development & Psychopathology, 27*, 791-818.

Pfost, M., Hattie, J., Dörfler, T., & Artelt, C. (2014). Individual differences in reading development: A review of 25 years of empirical research on Matthew effects in reading. *Review of Educational Research, 84,* 203-244.

Phillipsen, L.C., Burchinal, M.R., Howes, C., & Cryer, D. (1997). The prediction of process quality from structural features of child care. *Early Childhood Research Quarterly, 12*, 281-303.

Pianta, R. C. (2001). *Student-teacher relationship scale*. Odessa, FL: Psychological Assessment Resources, Inc.

Pianta, R.C., Belsky, J., Houts, R., Morrison, F., & the NICHD ECCRN. (2007). Opportunities to

learn in America's elementary classrooms. *Science, 315*, 1795-1796.

Pianta, R.C., Belsky, J., Vandergrift, N., Houts, R., & Morrison, F.J. (2008). Classroom effects on children's achievement trajectories in elementary school. *American Educational Research Journal, 45,* 365-397.

Pianta, R.C., La Paro, K.M., & Hamre, B.K. (2008). *The Classroom Assessment Scoring System manual, K-3*. Baltimore, MD: Brookes.

Pingault, J.-B., Côté S.M., Lacourse, E., Galéra, C., Vitaro, F., & Tremblay, R.E. (2013). Childhood Hyperactivity, Physical Aggression and Criminality: A 19-year prospective population-based study. *PLoS ONE, 8*(5), e62594.

Portilla, X.A., Ballard, P.J., Adler, N.E., Boyce, W.T., & Obradović, J. (2014). An integrative view of school functioning: transactions between self-regulation, school engagement, and teacher–child relationship quality. *Child Development, 85*, 1915-1931.

Provasnik, S., KewalRamani, A., Coleman, M.M., Gilbertson, L., Herring, W., & Xie, Q. (2007). *Status of education in rural America* (NCES 2007-040). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Rabiner, D., Coie, J.D., & the Conduct Problems Prevention Research Group. (2000). Early attention problems and children's reading achievement: A longitudinal investigation. *Journal of the American Academy of Child and Adolescent Psychiatry, 39,* 859-867.

Raudenbush, S.W. (1995). Hierarchical linear models to study the effects of social context on development. In J.M. Gottman (Ed.), *The analysis of change* (pp. 165-201). Mahwah, NJ: Lawrence Erlbaum Associates.

Raudenbush, S.W. (2014). *What do we know about the long-term impacts of teacher value-added?* Stanford, CA: Carnegie Foundation for the Advancement of Teaching.

Raver, C.C. (2002). Emotions matter: Making the case for the role of young children's emotional development for early school readiness. *Social Policy Report, 16(*3), 3-18.

Raver, C.C. (2012). Low-income children's self-regulation in the classroom: Scientific inquiry for social change. *American Psychologist*, *67*, 681-689.

Raver, C.C., Jones, S.M., Li Grining, C., Zhai, F., Metzger, M.W., & Solomon, B. (2009). Targeting children's behavior problems in preschool classrooms: A cluster-randomized controlled trial. *Journal of Consulting and Clinical Psychology, 77*, 302-316.

Reid, J.L., & Ready, D.D. (2013). High-quality preschool: The socioeconomic composition of preschool classrooms and children's learning. *Early Education & Development*, *24*, 1082-1111.

Reyes, M.R., Brackett, M.A., Rivers, S.E., White, M., & Salovey, P. (2012). Classroom emotional climate, student engagement, and academic achievement. *Journal of Educational Psychology, 104*, 700-712.

Reynolds, A.J. (1994). Effects of a preschool plus follow-on intervention for children at risk. *Developmental Psychology, 30*, 787-804.

Rhoades, B.L., Warren, H.K., Domitrovich, C.E., & Greenberg, M.T. (2011). Examining the link between preschool social-emotional competence and first grade academic achievement: The role of attention skills. *Early Childhood Research Quarterly, 26*, 182-191.

Rice, J.K. (2010). *The impact of teacher experience: Examining the evidence and policy implications.* Washington, DC: Urban Institute, National Center for Analysis of Longitudinal Data in Education Research.

Rimm-Kaufman, S.E., Curby, T.W., Grimm, K.J., Nathanson, L., & Brock, L.L. (2009). The contribution of children's self-regulation and classroom quality to children's adaptive behaviors in the kindergarten classroom. *Developmental Psychology, 45*, 958-972.

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.

Roeser, R.W., Schonert-Reichl, K.A., Jha, A., Cullen, M., Wallace, L., Wilensky, R., . . . Harrison, J. (2013). Mindfulness training and reductions in teacher stress and burnout:

Results from two randomized, waitlist-control field trials. *Journal of Educational Psychology*, *105*, 787-804.

Roeser, R.W., Skinner, E., Beers, J., & Jennings, P.A. (2012). Mindfulness training and teachers' professional development: An emerging area of research and practice. *Child Development Perspectives*, *6*, 167-173.

Roeser, R.W., Strobel, K.R., & Quihuis, G. (2002). Studying early adolescents' academic motivation, social-emotional functioning, and engagement in learning: Variable- and person-centered approaches. *Anxiety, Stress, & Coping, 15*, 345-368.

Romano, E., Babchishin, L., & Pagani, L.S. (2010). School readiness and later achievement: Replication and extension using a nationwide Canadian Survey. *Developmental Psychology, 46*, 995-1007.

Roorda, D.L., Verschueren, K., Vancraeyveldt, C., Van Craeyevelt, S., & Colpin, H.. (2014). Teacher-child relationships and behavioral adjustment: transactional links for preschool boys at risk. *Journal of School Psychology, 52*, 495-510.

Rose-Krasnor, L., & Denham, S. (2009). Social-emotional competence in early childhood. In K.H. Rubin, W.M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups* (pp. 162-179). New York, NY: Guilford Press.

Rubin, K. H., Bukowski, W. M., & Parker, J. (2006). Peer interactions, relationships, and groups. In N. Eisenberg, W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology, Vol. 3: Social, emotional, and personality development* (6th ed.) (pp. 571-645).

Rudasill, K.M., Niehaus, K., Buhs, E., & White, J.M. (2013). Temperament in early childhood and peer interactions in third grade: The role of teacher–child relationships in early elementary grades. *Journal of School Psychology, 51*, 701-716.

Ryan, R.M., Fauth, R.C., & Brooks-Gunn, J. (2006). Childhood poverty: Implications for school readiness and early childhood education. In B. Spodek & O.N. Saracho (Eds.), *Handbook of research on the education of children* (2nd ed., pp. 323–346). Mahwah, NJ:

Erlbaum.

Salaschek, M., Zeuch, N., & Souvignier, E. (2014). Mathematics growth trajectories in first grade: Cumulative vs. compensatory patterns and the role of number sense. *Learning and Individual Differences, 35,* 103-112.

Sandilos, L., DiPerna, J., & the Family Life Project Key Investigators (2014). Measuring quality in kindergarten classrooms: Structural analysis of the classroom assessment scoring system (CLASS K-3). *Early Education and Development, 25*, 894-914.

Sasser, T.R., Beekman, C.R., & Bierman, K.L. (2015). Preschool executive functions, single-parent status, and school quality predict diverging trajectories of classroom inattention in elementary school. *Development & Psychopathology, 27*, 681-693.

Sasser, T.R., Bierman, K.L., & Heinrichs, B. (2015). Executive functioning and school adjustment: The mediational role of pre-kindergarten learning-related behaviors. *Early Childhood Research Quarterly, 30*, 70-79.

Schmiedeler, S., & Schneider, W. (2014). Attention-deficit hyperactivity disorder (ADHD) in the early years: Diagnostic issues and educational relevance. *Clinical Child Psychology & Psychiatry, 19,* 460-475.

Shin, Y., & Raudenbush, S.W. (2011). The causal effect of class size on academic achievement: Multivariate instrumental variable estimators with data missing at random. *Journal of Educational and Behavioral Statistics, 36*, 154-185.

Silvernail, D.L., Sloan, J.E., Paul, C.R., Johnson, A.F., & Stump, E.K. (2014). *The relationships between school poverty and student achievement in Maine*. Gorham, ME: Maine Education Policy Research Institute, Center for Education Policy, Applied Research, and Evaluation (CEPARE), School of Education and Human Development, University of Southern Maine.

Sirin, S.R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research, 75*, 417-453.

Skalická, V., Stenseng, F., & Wichstrøm, L. (2015). Reciprocal relations between student–teacher conflict, children's social skills and externalizing behavior A three-wave longitudinal study from preschool to third grade. *International Journal of Behavioral Development, 39*, 413-425.

Skibbe, L.E., Hindman, A.H., Connor, C.M., Housey, M., & Morrison, F.J. (2013). Relative contributions of prekindergarten and kindergarten to children's literacy and mathematics skills. *Early Education and Development, 24*, 687-703.

Spira, E.G., & Fischel, J.E. (2005). The impact of preschool inattention, hyperactivity, and impulsivity on academic development: A review. *Journal of Child Psychology and Psychiatry,* 46, 755-773.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21*, 360–407.

Stipek, D., & Miles, S. (2008). Effects of aggression on achievement: Does conflict with the teacher make it worse? *Child Development, 79*, 1721-1735.

Stipek, D., Newton, S., & Chudgar, A. (2010). Learning-related behaviors and literacy achievement in elementary school-aged children. *Early Childhood Research Quarterly, 25*, 385-396.

Thelen, E., & Smith, L.B. (2006). Dynamic systems theories. In R.M. Lerner (Ed.), *Handbook of child psychology* (6th ed., Vol. 1, pp. 258-312). New York, NY: Wiley.

Thomas, A., & Chess, S. (1977). *Temperament and development*. New York, NY: Brunner/Mazel.

Thomas, D.E., Bierman, K.L., & Powers, C.J. (2011). The influence of classroom aggression and classroom climate on aggressive-disruptive behavior. *Child Development*, *82*, 751-757.

Thompson, R.A., & Raikes, H.A. (2007). The social and emotional foundations of school readiness. In D.F. Perry, R.F. Kaufmann, & J. Knitzer (Eds.), *Social and emotional*

health in early childhood: Building bridges between services and systems (pp. 13-35). Baltimore, MD: Paul H. Brookes Publishing.

Trentacosta, C.J., & Fine, S.E. (2010). Emotion knowledge, social competence, and behavior problems in childhood and adolescence: A meta-analytic review. *Social Development, 19*, 1-29.

Trentacosta, C.J., & Izard, C.E. (2007). Kindergarten children's emotion competence as a predictor of their academic competence in first grade. *Emotion, 7*, 77-88.

Trzesniewski, K.H., Moffitt, T.E., Caspi, A., Taylor, A., & Maughan, B. (2006). Revisiting the association between reading achievement and antisocial behavior: New evidence of an environmental explanation from a twin study. *Child Development, 77*, 72-88.

Vandell, D.L., & Wolfe, B. (2000). *Child care quality: Does it matter and does it need to be improved?* Institute for Research on Poverty Special Report (no. 78). Madison, Wisconsin: University of Wisconsin-Madison.

Vernon-Feagans, L., Cox, M., & Investigators, F. L. P. K. (2013). The Family Life Project: An epidemiological and developmental study of young children living in poor rural communities. *Monographs of the Society for Research in Child Development, 78*, 1-125.

Vernon-Feagans, L., Willoughby, M., Garrett-Peters, P., & the Family Life Project Key Investigators (2016). Predictors of behavioral regulation in kindergarten: Household chaos, parenting, and early executive functions. *Developmental Psychology, 52*, 430-441

Vitiello, V.E., Moas, O., Henderson, H.A., Greenfield, D.B., & Munis, P.M. (2012). Goodness of fit between children and classrooms: Effects of child temperament and preschool classroom quality on achievement trajectories. *Early Education and Development, 23*, 302-322.

Wachs, T.D., & Gruen, G.E. (1982). *Early experience and human development*. New York, NY: Plenum Press.

Wasik, B.A., & Hindman, A.H. (2011). Improving vocabulary and pre-literacy skills of at-risk preschoolers through teacher professional development. *Journal of Educational Psychology, 10*3, 455-469.

Webster-Stratton, C., Reid, J., & Stoolmiller, M. (2008). Preventing conduct problems and improving school readiness: Evaluation of the Incredible Years teacher and child training programs in high-risk schools. *Journal of Child Psychology and Psychiatry, 49*, 471-488.

Weiland, C., & Yoshikawa, H. (2014). Does higher peer socio-economic status predict children's language and executive function skills gains in prekindergarten? *Journal of Applied Developmental Psychology, 35*, 422-432.

Weintraub, S., Dikmen, S.S., Heaton, R.K., Tulsky, D.S., Zelazo, P.D., Bauer, P….Gershon, R.C. (2013). Cognitive assessment using the NIH Toolbox. *Neurology, 80*(11 Supplement 3), S54-S64.

Welsh, J.A., Nix, R.L., Blair, C., Bierman, K.L., & Nelson, K.E. (2010). The development of cognitive skills and gains in academic school readiness for children from low-income families. *Journal of Educational Psychology, 102*, 43-53.

Wentzel, K. R. (2009). Peers and academic functioning at school. In K. Rubin, W. M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups* (pp. 531-547). New York, NY: Guilford Press.

Wentzel, K. (2015). Socialization in school settings. In J.E. Grusec & P.D. Hastings (Eds.), *Handbook of socialization: Theory and research* (pp. 251-275). New York, NY: Guildford Press.

Whitehurst, G.J., & Chingos, M.M. (2011). Class size: What research says and what it means for state policy. Washington, DC: Brown Center on Education Policy, The Brookings Institution.

Whitehurst, G.J., Chingos, M.W., & Lindquist, K.M. (2015). Getting classroom observations right: Lessons on how from four pioneering districts. *Education Next, Winter 2015*, 63-

68.

Willford, A.P., Maier, M.F., Downer, J.T., Pianta, R.C., & Howes, C. (2013). Understanding how children's engagement and teachers' interactions combine to predict school readiness. *Journal of Applied Developmental Psychology, 34*, 299-309.

Woodcock, R.W., McGrew, K.S., & Mather, N. (2001). Woodcock-Johnson III Tests of Achievement. Itasca, IL: Riverside Publishing.

Yeh, S.S. (2010). The cost effectiveness of 22 approaches for raising student achievement. *Journal of Education Finance, 36*, 38-75.

Zill, N. & West, J. (2001). *Entering kindergarten: A portrait of American children when they begin school. Findings from the Condition of Education, 2000.* Washington, DC: National Center for Education Statistics.

Zins, J. E., Weissberg, R. P., Wang, M. C., & Walberg, H. J. (Eds.). (2004). *Building academic success on social and emotional learning: What does the research say?* New York: Teachers College Press.

APPENDIX

Table 1.

Descriptive statistics

	Source	PK		K		G1		G2		G3	
		M	SD	M	SD	M	SD	M	SD	M	SD
Social-Emotional Functioning											
Inattention	T	0.55	0.62	0.71	0.79	0.76	0.84	0.79	0.82	0.79	0.78
Prosocial Behavior	T	1.49	0.44	1.56	0.46	1.53	0.49	1.55	0.47	1.47	0.48
Conduct Problems	T	0.23	0.37	0.26	0.40	0.27	0.41	0.29	0.42	0.29	0.41
Achievement											
Applied Problems	C			431.98	17.00	455.37	17.71	473.02	17.82	487.77	19.75
Letter-Word	C			395.30	25.82	442.95	28.00	470.02	25.32	488.83	22.19
School/Classroom Factors											
School-Level FRPL Eligibility[a]	NCES			0.64	0.19						
Class Size	T			20.03	3.67	20.52	3.18	21.10	2.98	21.63	3.55
Teacher Education	T			0.50	0.50	0.50	0.50	0.52	0.50	0.55	0.50
Teacher SEC	T			4.00	0.40	4.00	0.40	4.00	0.40	3.96	0.41
Responsive Teaching	O			-0.01	0.73	-0.01	0.75	0.08	0.71	-0.07	0.68
Positive Management	O			-0.05	0.28	-0.04	0.24	0.04	0.26	0.04	0.25
Cognitive Facilitation	O			-0.02	0.23	0.02	0.25	0.00	0.25	0.00	0.23
Time on Math	T			1.85	0.95	1.99	0.95	2.06	0.99	1.87	1.24
Time on Reading	T			2.34	1.25	2.71	1.25	2.61	1.20	2.21	1.39

Note. Total N_{child} = 972. Total $N_{classroom}$ = 1896. For ease of interpretation, raw scores are presented above, but inattention and conduct problems were transformed to correct positive skew prior to analyses. Teacher education was scored "1" if teacher completed coursework beyond college.

[a] Variable was averaged across K-G3 and was not modeled as time-varying.

Table 2.

Correlations between outcome and predictor variables

	Inattention	Prosocial Behavior	Conduct Problems	Applied Problems	Letter-Word
School-Entry Predictors					
Inattention	0.44***	-0.31***	0.34***	-0.21***	-0.21***
Prosocial Behavior	-0.25***	0.28***	-0.26***	0.09***	0.09***
Conduct Problems	0.32***	-0.34***	0.42***	-0.10***	-0.11***
School/Context Predictors					
School-Level FRPL Eligibility	0.15***	-0.13***	0.18***	-0.21***	-0.13***
Class Size	-0.01	0.00	-0.01	0.13***	0.12***
Teacher Education	-0.05**	0.04*	-0.05**	0.06***	0.02
Teacher SEC	-0.06***	0.11***	-0.05**	0.01	0.02
Responsive Teaching	-0.07***	0.09***	-0.10***	0.06***	0.06***
Positive Management	-0.06***	0.04*	-0.04**	0.17***	0.21***
Cognitive Facilitation	-0.03*	0.06***	-0.08***	0.09***	0.09***
Time on Math	0.01	-0.01	0.02	0.03	0.06***
Time on Reading	0.01	0.01	0.00	-0.04*	0.02

Note. Correlations were pooled across 20 imputed datasets. Inattention and conduct problems were transformed prior to analyses to correct positive skew. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3.

Effects of school-entry inattention on social-emotional and academic trajectories

	Inattention		Prosocial Behavior		Conduct Problems		Applied Problems		Letter-Word	
	b	SE	b	SE	b	SE	b	SE	b	SE
Intercept	0.218***	0.017	1.571***	0.045	0.300***	0.038	499.890***	2.255	551.655***	3.099
Linear Time	0.009	0.007	0.035	0.019	-0.014	0.014	22.829***	0.733	54.483***	0.984
Quadratic Time							-1.986***	0.177	-7.303***	0.181
State	0.035*	0.015	-0.043	0.040	0.014	0.034	1.941	1.720	0.133	2.419
Sex	0.066***	0.011	-0.178***	0.029	0.089***	0.025	3.810**	1.242	-0.532	1.581
Race	-0.008	0.017	-0.064	0.044	0.110**	0.037	-7.649***	1.809	-2.191	2.387
Parent College	-0.070***	0.017	0.094*	0.047	-0.095*	0.040	10.085***	1.938	7.999**	2.691
Parent Employed	-0.021	0.018	-0.023	0.051	0.056	0.042	6.276**	1.970	2.542	2.939
Parent Married	-0.048***	0.014	0.112**	0.039	-0.115***	0.032	3.069*	1.523	0.116	2.178
Income-to-Need	-0.021	0.049	0.081	0.129	-0.156	0.115	3.409	5.554	23.788**	7.251
Age at K Entry	-0.015	0.019	0.048	0.053	-0.034	0.046	1.002	1.922	-0.195	2.650
PK Inattention	0.367***	0.040	-0.601***	0.105	0.643***	0.095	-33.644***	4.197	-46.734***	6.112
Effects on linear time										
Time*State	0.012*	0.006	-0.059***	0.017	0.029*	0.013	1.887***	0.531	-0.595	0.636
Time*Sex	0.012**	0.004	-0.047***	0.012	0.021*	0.010	0.590	0.395	-0.264	0.469
Time*Race	-0.006	0.007	0.013	0.019	0.007	0.015	-1.081	0.578	-1.884**	0.720
Time*Parent College	-0.003	0.007	-0.001	0.020	-0.010	0.015	0.995	0.617	-0.532	0.860
Time*Parent Employed	-0.006	0.007	-0.014	0.021	0.003	0.016	0.843	0.590	-0.294	0.918
Time*Parent Married	-0.012*	0.006	0.004	0.016	-0.007	0.012	0.535	0.467	-0.699	0.723
Time*Income-to-Need	0.001	0.019	0.025	0.053	-0.034	0.043	-0.828	1.785	-3.093	2.274
Time*Age at K Entry	0.018*	0.007	0.000	0.022	-0.001	0.018	-2.366***	0.590	-2.207**	0.800
Time*PK Inattention	-0.045**	0.015	0.105*	0.046	-0.071*	0.036	-1.169	1.300	0.318	1.841

Note. K = Kindergarten. PK = Pre-Kindergarten. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4.

Effects of school-entry prosocial behavior on social-emotional and academic trajectories

	Inattention		Prosocial Behavior		Conduct Problems		Applied Problems		Letter-Word	
	b	SE	b	SE	b	SE	b	SE	b	SE
Intercept	0.209***	0.018	1.588***	0.045	0.283***	0.038	500.628***	2.257	552.782***	3.131
Linear Time	0.010	0.007	0.032	0.019	-0.012	0.015	22.846***	0.731	54.484***	0.981
Quadratic Time							-1.986***	0.177	-7.303***	0.181
State	0.043**	0.015	-0.064	0.040	0.031	0.034	1.601	1.747	-0.601	2.446
Sex	0.079***	0.011	-0.180***	0.029	0.100***	0.025	2.015	1.230	-2.495	1.647
Race	-0.008	0.017	-0.063	0.044	0.108**	0.037	-7.739***	1.836	-2.417	2.427
Parent College	-0.081***	0.018	0.114*	0.047	-0.116**	0.040	11.079***	1.989	9.569***	2.745
Parent Employed	-0.021	0.019	-0.029	0.051	0.060	0.043	6.452***	2.015	2.741	2.980
Parent Married	-0.048***	0.015	0.107**	0.040	-0.112***	0.032	3.248*	1.575	0.153	2.264
Income-to-Need	-0.031	0.050	0.077	0.128	-0.163	0.114	5.326	5.612	25.286***	7.550
Age at K Entry	-0.032	0.019	0.059	0.053	-0.054	0.045	3.119	2.029	2.532	2.696
PK Prosocial	-0.065***	0.015	0.196***	0.038	-0.167***	0.032	3.093*	1.467	5.955*	2.373
Effects on linear time										
Time*State	0.012*	0.006	-0.056***	0.017	0.027*	0.013	1.926***	0.536	-0.617	0.645
Time*Sex	0.009*	0.004	-0.045***	0.012	0.019*	0.009	0.419	0.379	-0.176	0.475
Time*Race	-0.006	0.007	0.012	0.020	0.007	0.015	-1.094	0.572	-1.880**	0.720
Time*Parent College	-0.002	0.007	-0.004	0.020	-0.008	0.015	1.019	0.611	-0.531	0.849
Time*Parent Employed	-0.006	0.007	-0.013	0.021	0.003	0.016	0.883	0.585	-0.325	0.921
Time*Parent Married	-0.012*	0.006	0.004	0.016	-0.007	0.012	0.573	0.464	-0.724	0.716
Time*Income-to-Need	0.004	0.019	0.023	0.053	-0.031	0.044	-0.640	1.782	-3.185	2.270
Time*Age at K Entry	0.021**	0.007	-0.003	0.022	0.002	0.018	-2.196***	0.611	-2.293**	0.785
Time*PK Prosocial	0.005	0.005	-0.028	0.015	0.013	0.012	-0.384	0.450	0.294	0.714

Note. K = Kindergarten. PK = Pre-Kindergarten. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5.

Effects of school-entry conduct problems on social-emotional and academic trajectories

	Inattention		Prosocial Behavior		Conduct Problems		Applied Problems		Letter-Word	
	b	SE	b	SE	b	SE	b	SE	b	SE
Intercept	0.217***	0.018	1.567***	0.045	0.307***	0.038	500.320***	2.261	552.401***	3.127
Linear Time	0.009	0.007	0.037*	0.019	-0.016	0.014	22.848***	0.731	54.552***	0.987
Quadratic Time							-1.986***	0.177	-7.303***	0.181
State	0.037*	0.015	-0.045	0.040	0.015	0.033	1.913	1.711	-0.045	2.421
Sex	0.080***	0.011	-0.188***	0.028	0.093***	0.024	1.863	1.283	-3.338*	1.603
Race	-0.013	0.017	-0.050	0.044	0.092*	0.036	-7.568***	1.830	-2.221	2.452
Parent College	-0.077***	0.018	0.101*	0.047	-0.102*	0.039	10.892***	2.001	9.293***	2.766
Parent Employed	-0.028	0.019	-0.010	0.051	0.040	0.042	6.765***	2.020	3.302	2.983
Parent Married	-0.046**	0.015	0.103**	0.039	-0.102**	0.032	3.194*	1.568	0.336	2.280
Income-to-Need	-0.031	0.050	0.086	0.128	-0.153	0.111	5.440	5.608	26.138***	7.509
Age at K Entry	-0.035	0.019	0.072	0.052	-0.055	0.043	3.348	1.974	3.357	2.700
PK Conduct Prob	0.099***	0.017	-0.250***	0.043	0.323***	0.036	-3.802*	1.808	-3.547	2.473
Effects on linear time										
Time*State	0.012*	0.006	-0.059***	0.017	0.028*	0.013	1.886***	0.531	-0.591	0.639
Time*Sex	0.010*	0.004	-0.048***	0.012	0.022*	0.009	0.514	0.393	-0.415	0.466
Time*Race	-0.005	0.007	0.009	0.019	0.009	0.015	-1.080	0.576	-1.952**	0.728
Time*Parent College	-0.002	0.007	-0.002	0.020	-0.009	0.015	1.025	0.617	-0.498	0.857
Time*Parent Employed	-0.005	0.007	-0.017	0.021	0.005	0.016	0.858	0.592	-0.326	0.921
Time*Parent Married	-0.012*	0.006	0.007	0.016	-0.009	0.012	0.544	0.471	-0.619	0.728
Time*Income-to-Need	0.003	0.019	0.027	0.053	-0.035	0.043	-0.743	1.761	-2.905	2.276
Time*Age at K Entry	0.020**	0.007	-0.002	0.022	0.000	0.018	-2.275***	0.589	-2.101**	0.787
Time*PK Conduct Prob	-0.014*	0.006	0.067***	0.018	-0.043**	0.014	-0.070	0.549	1.300	0.745

Note. K = Kindergarten. PK = Pre-Kindergarten. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6.

Unique effects of social-emotional readiness on social-emotional and academic trajectories

	Inattention		Prosocial Behavior		Conduct Problems		Applied Problems		Letter-Word	
	b	SE	b	SE	b	SE	b	SE	b	SE
Intercept	0.219***	0.017	1.571***	0.045	0.309***	0.037	500.049***	2.267	552.089***	3.100
Linear Time	0.008	0.007	0.037*	0.019	-0.016	0.015	22.793***	0.733	54.615***	0.987
Quadratic Time							-1.986***	0.177	-7.303***	0.181
State	0.036*	0.015	-0.054	0.040	0.016	0.033	2.031	1.769	-0.022	2.456
Sex	0.065***	0.011	-0.163***	0.029	0.080**	0.025	3.553**	1.217	-0.545	1.618
Race	-0.010	0.017	-0.055	0.044	0.095**	0.036	-7.959***	1.809	-2.765	2.371
Parent College	-0.070***	0.017	0.099*	0.047	-0.097*	0.039	10.039***	1.932	8.118**	2.671
Parent Employed	-0.022	0.019	-0.023	0.050	0.045	0.042	6.101**	1.950	1.952	2.929
Parent Married	-0.047***	0.014	0.102**	0.039	-0.102**	0.032	3.336*	1.519	0.515	2.190
Income-to-Need	-0.019	0.049	0.061	0.128	-0.143	0.112	3.761	5.551	24.136***	7.268
Age at K Entry	-0.015	0.019	0.042	0.053	-0.038	0.044	0.976	1.964	-0.580	2.642
PK Inattention	0.330***	0.047	-0.309*	0.128	0.263*	0.112	-42.153***	5.135	-59.839***	7.457
PK Prosocial	-0.005	0.018	0.092*	0.044	-0.006	0.039	-0.779	1.852	2.535	2.887
PK Conduct Prob	0.021	0.022	-0.121*	0.055	0.260***	0.048	5.218*	2.379	11.537***	3.192
Effects on linear time										
Time*State	0.013*	0.006	-0.060***	0.017	0.030*	0.013	1.959***	0.538	-0.691	0.648
Time*Sex	0.011**	0.004	-0.048***	0.013	0.021*	0.010	0.504	0.393	-0.186	0.477
Time*Race	-0.006	0.007	0.009	0.019	0.009	0.015	-1.088	0.570	-1.992**	0.721
Time*Parent College	-0.003	0.007	-0.001	0.020	-0.010	0.015	0.959	0.617	-0.480	0.848
Time*Parent Employed	-0.006	0.007	-0.017	0.021	0.005	0.016	0.883	0.586	-0.471	0.916
Time*Parent Married	-0.012*	0.006	0.007	0.016	-0.008	0.012	0.567	0.464	-0.643	0.722
Time*Income-to-Need	0.002	0.019	0.027	0.053	-0.034	0.043	-0.726	1.795	-3.108	2.290
Time*Age at K Entry	0.019*	0.007	-0.001	0.022	0.001	0.018	-2.302***	0.606	-2.354**	0.800
Time*PK Inattention	-0.040*	0.018	0.017	0.056	-0.020	0.045	-1.995	1.570	-1.563	2.418
Time*PK Prosocial	-0.004	0.007	0.006	0.018	-0.011	0.015	-0.719	0.561	1.200	0.839
Time*PK Conduct Prob	-0.007	0.008	0.066**	0.023	-0.046*	0.018	-0.076	0.717	2.426*	0.999

Note. K = Kindergarten. PK = Pre-Kindergarten. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7.

Standardized loadings and fit statistics from three bifactor models of the CLASS

	Model 1				Model 2			Model 3		
	Resp Teach	Motiv Supp	Manag & Rout	Cog Facil	Resp Teach	Pos Manag	Cog Facil	Resp Teach	Pos Manag	Cog Facil
Items										
Positive climate	0.64	0.54			0.74	0.29		0.75	0.27	
Negative climate (reversed)	0.48	0.36			0.54	0.24		0.55	0.23	
Teacher sensitivity	0.73	0.42			0.85	0.07		0.88		
Regard for student perspectives	0.60	0.37			0.76	-0.11		0.73		
Behavior management	0.64		0.77		0.49	0.84		0.50	0.84	
Productivity	0.60		0.38		0.45	0.54		0.45	0.54	
Instructional learning formats	0.92		-0.31		0.78	-0.03 [a]		0.75		0.25
Concept development	0.44			0.67	0.43		0.68	0.37		0.72
Quality of feedback	0.55			0.66	0.54		0.67	0.49		0.70
Language modeling	0.45			0.60	0.43		0.61	0.39		0.64
Fit										
CFI	0.93				0.95			0.96		
RMSEA	0.12				0.11			0.09		
SRMR	0.06				0.04			0.04		

Note. N = 1845 K through G3 classrooms with complete CLASS data. Resp Teach = Responsive Teaching. Motiv Supp = Motivational Supports. Manag & Rout = Management & Routines. Cog Facil = Cognitive Facilitation. Pos Manag = Positive Management. CFI = Comparative Fit Index. RMSEA = Root Mean Square Error of Approximation. SRMR = Standardized Root Mean Square Residual.

[a] Loading not significant at $p < .05$.

Table 8.

Correlations among time-varying classroom variables

	1.	2.	3.	4.	5.	6.	7.	8.
1. Class Size	--							
2. Teacher Education	0.06 ***	--						
3. Teacher SEC	-0.04 *	0.02	--					
4. Responsive Teaching	-0.09 ***	0.04 *	0.14 ***	--				
5. Positive Management	0.08 ***	-0.05 **	0.09 ***	0.06 ***	--			
6. Cognitive Facilitation	-0.06 ***	0.14 ***	0.09 ***	0.09 ***	-0.01	--		
7. Time on Math	0.01	0.05 **	0.06 ***	-0.04 **	-0.05 **	0.00	--	
8. Time on Reading	0.05 **	0.05 **	0.09 ***	-0.03	-0.07 ***	0.05 **	0.57 ***	--

Note. N = 3888 observations (972 individuals x 4 time points). * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 9.

Stability of children's classroom experiences from Kindergarten to Grade 3

		K	G1	G2	G3
Class Size	K	--			
	G1	0.39 ***	--		
	G2	0.26 ***	0.42 ***	--	
	G3	0.21 ***	0.23 ***	0.37 ***	--
Teacher Education	K	--			
	G1	0.11 ***	--		
	G2	0.21 ***	0.14 ***	--	
	G3	0.18 ***	0.19 ***	0.28 ***	--
Teacher SEC	K	--			
	G1	0.00	--		
	G2	0.04	0.07 ***	--	
	G3	-0.01	0.01	0.10 ***	--
Responsive Teaching	K	--			
	G1	0.25 ***	--		
	G2	0.14 ***	0.19 ***	--	
	G3	0.11 ***	0.17 ***	0.26 ***	--
Positive Management	K	--			
	G1	0.09 ***	--		
	G2	0.06 **	0.17 ***	--	
	G3	0.08 ***	0.14 ***	0.19 ***	--
Cognitive Facilitation	K	--			
	G1	0.31 ***	--		
	G2	0.15 ***	0.20 ***	--	
	G3	0.19 ***	0.15 ***	0.19 ***	--
Time on Math	K	--			
	G1	0.07 ***	--		
	G2	0.04	0.09 ***	--	
	G3	-0.03	0.10 ***	0.19 ***	--
Time on Reading	K	--			
	G1	0.12 ***	--		
	G2	0.10 ***	0.17 ***	--	
	G3	0.07 **	0.08 **	0.28 ***	--

Note. N = 972 children. K = Kindergarten. G1 = Grade 1. G2 = Grade 2. G3 = Grade 3. SEC = Social-Emotional Competence. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 10.

Correlations among school and cumulative classroom experiences

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. School % FRPL	--								
2. Cumulative Class Size	-0.03	--							
3. Cumulative Teacher Education	-0.37***	0.06	--						
4. Cumulative Teacher SEC	-0.05	-0.05	0.04	--					
5. Cumulative Responsive Teaching	-0.28***	-0.21***	0.05	0.16***	--				
6. Cumulative Positive Management	-0.01	0.14***	-0.16***	0.08*	-0.01	--			
7. Cumulative Cognitive Facilitation	-0.29***	-0.05	0.27***	0.16***	-0.02	-0.03	--		
8. Cumulative Time on Math	-0.10**	-0.09**	0.11***	0.11**	0.02	-0.10**	0.13***	--	
9. Cumulative Time on Reading	0.00	0.02	0.19***	0.12***	-0.02	-0.13***	0.10**	0.55***	--

Note. N = 972 children. FRPL = Free and Reduced-Price Lunch. In order to examine lagged effects of cumulative experiences in the main analytic models, cumulative variables were taken as the average of children's experiences over time, up to but not including the current year, since separate variables representing the current year were also included in the models. The correlations above were taken from the last data point, Grade 3, which means that the cumulative variables represent the average of children's experiences from kindergarten, Grade 1, and Grade 2 (i.e., up to but not including Grade 3). * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 11.

Effects of concurrent and cumulative school/classroom context on social-emotional trajectories

	Inattention		Prosocial Behavior		Conduct Problems	
	b	SE	b	SE	b	SE
Intercept	0.211***	0.021	1.582***	0.058	0.275***	0.047
Linear Time	0.012	0.008	0.044*	0.022	-0.016	0.017
Concurrent effects of time-varying classroom experiences						
Class Size	0.001	0.001	-0.005 [a]	0.003	0.001	0.002
Teacher Education	-0.005	0.006	0.022	0.016	-0.015	0.013
Teacher SEC	-0.016*	0.006	0.113***	0.018	-0.032*	0.015
Responsive Teaching	-0.001	0.004	0.017 [a]	0.011	-0.010 [a]	0.008
Positive Management	-0.035***	0.010	0.021	0.030	-0.055*	0.024
Cognitive Facilitation	0.005	0.011	0.057 [a]	0.033	-0.046 [a]	0.026
Lagged effects of cumulative school/classroom experiences						
School % FRPL	-0.016	0.042	0.111	0.109	-0.017	0.093
Cumu. Class Size	-0.003	0.002	0.003	0.006	0.002	0.005
Cumu. Teacher Education	0.008	0.019	-0.075	0.053	0.036	0.042
Cumu. Teacher SEC	-0.023	0.023	0.162*	0.066	-0.059	0.051
Cumu. Responsive Teaching	-0.011	0.011	0.025	0.032	-0.020	0.027
Cumu. Positive Management	-0.005	0.034	-0.153	0.098	-0.005	0.080
Cumu. Cognitive Facilitation	-0.024	0.035	-0.123	0.099	0.012	0.080
Effects on linear time						
Time*School % FRPL	0.003	0.015	0.094*	0.043	-0.023	0.034
Time*Cumu. Class Size	0.000	0.001	0.000	0.004	0.002	0.003
Time*Cumu. Teacher Education	0.006	0.010	-0.039	0.027	0.014	0.021
Time*Cumu. Teacher SEC	-0.023	0.012	0.084*	0.036	-0.031	0.027
Time*Cumu. Responsive Teaching	-0.002	0.006	0.002	0.020	-0.003	0.015
Time*Cumu. Positive Management	0.008	0.018	-0.095	0.052	-0.002	0.042
Time*Cumu. Cognitive Facilitation	-0.001	0.018	-0.101	0.054	-0.005	0.043

Note. SEC = Social-Emotional Competence. Cumu. = Cumulative. Family and demographic covariates were included as predictors of intercept and slope but are not shown above. Covariate effects were generally similar to those effects presented in Aim 1, with the following exceptions: Age at K entry negatively predicted inattention intercept, state and parent married did *not* significantly predict inattention slope, and sex did *not* significantly predict conduct problems slope. Intercept and time effects are slightly different from Aim 1 because these models also included the binary indicator that equaled 1 after K, which was interacted with the cumulative variables. * $p < .05$. ** $p < .01$. *** $p < .001$.

[a] Coefficient was significant when the predictor was entered individually in a separate model but was not significant in the simultaneous model shown above.

Table 12.

Effects of concurrent and cumulative school/classroom context on academic trajectories

	Applied Problems		Letter-Word	
	b	SE	b	SE
Intercept	486.492***	5.195	510.140***	6.012
Linear Time	18.557***	1.702	41.036***	1.953
Quadratic Time	-0.949*	0.419	-3.978***	0.431
Concurrent effects of time-varying classroom experiences				
Class Size	-0.137	0.077	-0.219*	0.100
Teacher Education	-0.375	0.466	-0.756	0.651
Teacher SEC	-0.145	0.551	0.776	0.670
Responsive Teaching	-0.015	0.332	0.709	0.434
Positive Management	1.750	0.919	2.597*	1.147
Cognitive Facilitation	0.642	1.050	3.490**	1.251
Time on Math/Reading	-0.302	0.238	0.327	0.237
Lagged effects of cumulative school/classroom experiences				
School % FRPL	-11.447**	4.385	-10.478 [a]	6.642
Cumu. Class Size	-0.246	0.253	0.191	0.271
Cumu. Teacher Education	-1.989	1.972	-0.087	2.501
Cumu. Teacher SEC	1.673	2.146	5.498 [a]	2.856
Cumu. Responsive Teaching	0.086	1.134	3.417*	1.352
Cumu. Positive Management	2.000	3.564	-3.655	4.613
Cumu. Cognitive Facilitation	2.904	3.947	-8.504	4.454
Cumu. Time on Math/Reading	1.306	0.904	0.795	0.870
Effects on linear time				
Time*School % FRPL	-0.633	1.260	1.632	1.786
Time*Cumu. Class Size	-0.021	0.129	-0.015	0.127
Time*Cumu. Teacher Education	-0.919	1.007	0.036	1.140
Time*Cumu. Teacher SEC	0.723	1.004	3.042*	1.359
Time*Cumu. Responsive Teaching	0.204	0.561	0.632	0.641
Time*Cumu. Positive Management	1.376	1.700	-1.259	2.161
Time*Cumu. Cognitive Facilitation	0.873	1.885	-6.006**	2.060
Time*Cumu. Time on Math/Reading	0.542	0.486	0.554	0.384

Note. SEC = Social-Emotional Competence. Cumu. = Cumulative. Current and cumulative math time were entered as predictors in the Applied Problems model, and current and cumulative reading time were entered as predictors in the Letter-Word model. Family and demographic covariates were included as predictors of intercept and slope but are not shown above. Effects were generally similar to effects presented in Aim 1, with the following exceptions: Sex and parent married did not significantly predict Applied Problems intercept, and sex did not predict Letter-Word intercept. Intercept and time effects are slightly different from Aim 1 because these models also included the binary indicator that equaled 1 after K, which was interacted with the cumulative variables. * $p < .05$. ** $p < .01$. *** $p < .001$.

[a] Coefficient was significant when the predictor was entered individually in a separate model but was not significant in the simultaneous model shown above.

Table 13.

Interaction effects on social-emotional functioning

	Inattention		Prosocial Behavior		Conduct Problems	
	b	SE	b	SE	b	SE
Intercept	0.217***	0.021	1.583***	0.058	0.290***	0.046
Linear Time	0.012	0.008	0.041	0.022	-0.020	0.017
PK Behavior	0.368***	0.041	0.210***	0.039	0.327***	0.037
Time*PK Behavior	-0.046**	0.016	-0.020	0.016	-0.041**	0.014
Concurrent effects of time-varying classroom experiences						
Class Size	0.000	0.001	-0.004	0.003	0.001	0.002
Teacher Education	-0.004	0.005	0.024	0.016	-0.012	0.013
Teacher SEC	-0.016*	0.006	0.111***	0.018	-0.030*	0.015
Responsive Teaching	-0.002	0.004	0.018	0.011	-0.013	0.008
Positive Management	-0.029**	0.010	0.020	0.030	-0.042	0.023
Cognitive Facilitation	0.007	0.011	0.062	0.033	-0.046	0.025
PK*Class Size	0.006	0.006	0.005	0.006	0.001	0.005
PK*Teacher Education	-0.007	0.038	0.003	0.036	0.023	0.033
PK*Teacher SEC	0.007	0.043	-0.019	0.041	0.012	0.039
PK*Responsive Teaching	0.042	0.025	0.019	0.026	0.016	0.022
PK*Positive Management	0.021	0.070	-0.055	0.066	-0.026	0.064
PK*Cognitive Facilitation	0.040	0.074	-0.026	0.078	-0.015	0.067
Lagged effects of cumulative school/classroom experiences						
School % FRPL	-0.041	0.040	0.160	0.108	-0.045	0.091
Cumu. Class Size	-0.003	0.002	0.005	0.006	0.002	0.005
Cumu. Teacher Education	0.013	0.018	-0.068	0.053	0.048	0.042
Cumu. Teacher SEC	-0.025	0.023	0.159*	0.065	-0.054	0.052
Cumu. Responsive Teaching	-0.011	0.011	0.025	0.031	-0.025	0.027
Cumu. Positive Management	0.012	0.033	-0.158	0.097	0.027	0.078
Cumu. Cognitive Facilitation	-0.020	0.034	-0.107	0.098	0.021	0.080
PK*School % FRPL	0.198	0.213	0.321	0.200	0.191	0.199
PK*Cumu. Class Size	-0.003	0.015	-0.003	0.014	0.021	0.013
PK*Cumu. Teacher Education	0.028	0.111	-0.077	0.099	-0.025	0.106
PK*Cumu. Teacher SEC	0.063	0.149	0.098	0.142	-0.020	0.137
PK*Cumu. Responsive Teaching	0.112	0.071	-0.003	0.074	0.038	0.071
PK*Cumu. Positive Management	0.098	0.224	-0.321	0.203	0.045	0.226
PK*Cumu. Cognitive Facilitation	-0.037	0.216	-0.154	0.211	-0.167	0.206
Effects on linear time						
Time*School % FRPL	0.007	0.015	0.091*	0.042	-0.016	0.034
Time*Cumu. Class Size	-0.001	0.001	0.001	0.004	0.002	0.003
Time*Cumu. Teacher Education	0.007	0.010	-0.035	0.027	0.016	0.021
Time*Cumu. Teacher SEC	-0.024	0.013	0.082*	0.036	-0.031	0.028
Time*Cumu. Responsive Teaching	-0.002	0.006	0.003	0.019	-0.004	0.015
Time*Cumu. Positive Management	0.011	0.018	-0.094	0.053	0.005	0.042

Time*Cumu. Cognitive Facilitation	0.001	0.018	-0.103	0.054	0.001	0.043
Time*PK*School % FRPL	-0.006	0.085	0.035	0.080	0.045	0.074
Time*PK*Cumu. Class Size	-0.001	0.008	-0.004	0.009	0.005	0.007
Time*PK*Cumu. Teacher Education	0.017	0.058	-0.023	0.056	-0.002	0.057
Time*PK*Cumu. Teacher SEC	0.044	0.084	0.018	0.085	-0.042	0.072
Time*PK*Cumu. Responsive Teaching	0.022	0.038	0.007	0.041	0.009	0.039
Time*PK*Cumu. Positive Management	0.042	0.124	-0.132	0.118	0.047	0.126
Time*PK*Cumu. Cognitive Facilitation	-0.015	0.124	-0.026	0.127	-0.088	0.114

Note. PK = Pre-kindergarten social-emotional functioning. Cumu. = Cumulative. School-entry predictors were entered in outcome models of the corresponding domain (e.g., for the inattention outcome, school-entry inattention was included as the “PK” predictor listed above). Intercept and time effects are slightly different from Aim 1 because these models also included the binary indicator that equaled 1 after K, which was interacted with the cumulative variables. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 14.

Interaction effects on math achievement

	Applied Problems					
	PK Inattention Model		PK Prosocial Behavior Model		PK Conduct Problems Model	
	b	SE	b	SE	b	SE
Intercept	486.094***	5.222	486.708***	5.197	486.255***	5.251
Linear Time	18.652***	1.711	18.596***	1.704	18.574***	1.722
Quadratic Time	-0.963*	0.422	-0.956*	0.420	-0.946*	0.426
PK Behavior	-32.765***	4.363	3.043*	1.462	-3.794*	1.817
Time*PK Behavior	-0.989	1.417	-0.271	0.489	-0.065	0.577
Concurrent effects of time-varying classroom experiences						
Class Size	-0.123	0.078	-0.138	0.078	-0.143	0.078
Teacher Education	-0.434	0.467	-0.356	0.462	-0.390	0.468
Teacher SEC	-0.135	0.560	-0.128	0.560	-0.208	0.562
Responsive Teaching	0.012	0.334	-0.045	0.334	-0.002	0.333
Positive Management	1.469	0.898	1.739	0.920	1.684	0.915
Cognitive Facilitation	0.607	1.031	0.679	1.039	0.442	1.034
Time on Math	-0.347	0.243	-0.323	0.240	-0.309	0.240
PK*Class Size	0.153	0.472	-0.068	0.162	-0.060	0.203
PK*Teacher Education	-3.891	2.904	1.755	1.041	-2.369	1.241
PK*Teacher SEC	0.478	3.382	0.352	1.158	-0.305	1.440
PK*Responsive Teaching	-2.340	2.091	0.987	0.784	-0.526	0.863
PK*Positive Management	1.245	5.458	-1.599	2.032	0.283	2.375
PK*Cognitive Facilitation	4.854	6.571	-2.859	2.316	2.832	2.821
PK*Time on Math	0.938	1.363	-0.069	0.481	-0.354	0.558
Lagged effects of cumulative school/classroom experiences						
School % FRPL	-9.122*	4.424	-10.689*	4.378	-10.891*	4.397
Cumu. Class Size	-0.187	0.256	-0.242	0.252	-0.210	0.255
Cumu. Teacher Education	-2.123	1.944	-2.121	1.961	-2.154	1.967
Cumu. Teacher SEC	1.708	2.162	1.759	2.129	1.541	2.120
Cumu. Responsive Teaching	0.074	1.140	0.058	1.138	0.183	1.146
Cumu. Positive Management	0.519	3.584	1.558	3.589	1.189	3.658
Cumu. Cognitive Facilitation	3.121	3.958	2.812	3.950	2.502	3.899
Cumu. Time on Math	1.074	0.915	1.331	0.909	1.283	0.911
PK*School % FRPL	3.822	22.093	-3.504	7.888	6.659	9.389
PK*Cumu. Class Size	0.703	1.336	-0.202	0.424	0.614	0.556
PK*Cumu. Teacher Education	-5.427	9.706	3.120	3.195	-1.035	4.127
PK*Cumu. Teacher SEC	-4.714	13.020	-1.395	4.511	-5.355	5.325
PK*Cumu. Responsive Teaching	2.097	6.641	1.783	2.345	0.844	2.565
PK*Cumu. Positive Management	-1.617	19.650	-3.432	7.047	1.489	8.927
PK*Cumu. Cognitive Facilitation	8.010	20.867	-4.630	6.881	7.934	8.578
PK*Cumu. Time on Math	5.800	5.329	-1.906	1.992	2.715	2.076

Effects on linear time						
Time*School % FRPL	-0.526	1.266	-0.685	1.252	-0.546	1.254
Time*Cumu. Class Size	0.001	0.131	-0.018	0.130	0.000	0.132
Time*Cumu. Teacher Education	-0.926	1.002	-0.998	1.006	-0.986	1.006
Time*Cumu. Teacher SEC	0.772	1.012	0.763	0.995	0.652	0.994
Time*Cumu. Responsive Teaching	0.222	0.564	0.228	0.561	0.289	0.566
Time*Cumu. Positive Management	0.869	1.734	1.203	1.720	1.076	1.736
Time*Cumu. Cognitive Facilitation	0.951	1.880	0.894	1.883	0.839	1.852
Time*Cumu. Time on Math	0.467	0.488	0.578	0.488	0.544	0.488
Time*PK*School % FRPL	-4.245	6.471	-0.744	2.180	0.098	2.469
Time*PK*Cumu. Class Size	0.657	0.691	-0.199	0.207	0.356	0.304
Time*PK*Cumu. Teacher Education	-2.437	4.944	1.083	1.574	-0.133	2.046
Time*PK*Cumu. Teacher SEC	-0.463	6.817	-1.016	2.282	-2.681	2.685
Time*PK*Cumu. Responsive Teaching	0.730	3.271	0.750	1.165	-0.473	1.310
Time*PK*Cumu. Positive Management	-2.555	9.700	0.097	3.517	0.001	4.449
Time*PK*Cumu. Cognitive Facilitation	4.811	10.694	-2.391	3.499	4.486	4.308
Time*PK*Cumu. Time on Math	1.810	2.537	-0.769	0.956	1.572	1.012

Note. PK = Pre-kindergarten social-emotional functioning. Cumu. = Cumulative. The first column of results shows estimates from model with inattention as the PK social-emotional predictor; the second column shows estimates from model with prosocial behavior as the PK predictor, and the third column shows estimates from model with conduct problems as the PK predictor. Intercept and time effects are slightly different from Aim 1 because these models also included the binary indicator that equaled 1 after K, which was interacted with the cumulative variables. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 15.

Interaction effects on reading achievement

	Letter-Word					
	PK Inattention Model		PK Prosocial Behavior Model		PK Conduct Problems Model	
	b	SE	b	SE	b	SE
Intercept	508.919***	6.029	509.923***	6.029	509.810***	6.035
Linear Time	40.795***	1.960	40.891***	1.956	40.936***	1.957
Quadratic Time	-3.909***	0.431	-3.948***	0.431	-3.952***	0.434
PK Behavior	-47.795***	6.228	6.291**	2.339	-3.897	2.506
Time*PK Behavior	-0.919	1.882	0.691	0.713	0.890	0.775
Concurrent effects of time-varying classroom experiences						
Class Size	-0.207*	0.101	-0.207*	0.104	-0.222*	0.101
Teacher Education	-0.793	0.650	-0.704	0.650	-0.759	0.645
Teacher SEC	0.730	0.666	0.729	0.664	0.669	0.675
Responsive Teaching	0.738	0.429	0.685	0.432	0.732	0.437
Positive Management	2.363*	1.135	2.705*	1.143	2.656*	1.151
Cognitive Facilitation	3.475**	1.255	3.604**	1.247	3.154*	1.288
Time on Reading	0.269	0.235	0.303	0.234	0.322	0.238
PK*Class Size	0.359	0.649	0.198	0.221	-0.353	0.272
PK*Teacher Education	-4.627	3.970	0.889	1.366	-2.740	1.585
PK*Teacher SEC	0.877	4.374	-1.677	1.538	0.774	1.744
PK*Responsive Teaching	-4.466	2.608	1.264	0.900	-1.036	1.072
PK*Positive Management	8.930	7.074	-6.830**	2.621	4.888	2.962
PK*Cognitive Facilitation	4.009	8.296	-3.715	2.874	3.050	3.294
PK*Time on Reading	-1.533	1.528	-0.083	0.555	-0.859	0.699
Lagged effects of cumulative school/classroom experiences						
School % FRPL	-6.646	6.758	-8.538	6.694	-9.758	6.695
Cumu. Class Size	0.253	0.273	0.173	0.274	0.216	0.272
Cumu. Teacher Education	-0.329	2.500	-0.085	2.508	-0.283	2.488
Cumu. Teacher SEC	5.529*	2.819	5.541	2.852	5.226	2.874
Cumu. Responsive Teaching	3.395*	1.356	3.302*	1.361	3.376**	1.370
Cumu. Positive Management	-5.256	4.587	-3.639	4.649	-3.788	4.631
Cumu. Cognitive Facilitation	-8.698	4.506	-8.580	4.484	-9.232*	4.494
Cumu. Time on Reading	0.653	0.862	0.656	0.867	0.765	0.868
PK*School % FRPL	-12.300	31.795	7.187	11.157	-6.658	13.211
PK*Cumu. Class Size	-0.305	1.972	0.371	0.618	-1.088	0.727
PK*Cumu. Teacher Education	-19.751	13.672	3.235	4.593	-3.133	5.786
PK*Cumu. Teacher SEC	-6.432	18.388	-4.390	6.176	0.473	7.451
PK*Cumu. Responsive Teaching	0.566	8.578	1.976	3.253	2.260	3.682
PK*Cumu. Positive Management	18.134	24.953	-11.561	9.360	7.089	10.811
PK*Cumu. Cognitive Facilitation	25.388	27.840	-3.999	9.417	7.005	10.688
PK*Cumu. Time on Reading	-2.160	5.360	-0.560	1.871	0.526	2.196

Effects on linear time						
Time*School % FRPL	1.744	1.777	1.893	1.786	1.568	1.789
Time*Cumu. Class Size	0.005	0.128	-0.026	0.127	0.002	0.127
Time*Cumu. Teacher Education	-0.015	1.137	0.048	1.143	-0.025	1.132
Time*Cumu. Teacher SEC	3.216*	1.348	3.093*	1.366	2.996*	1.369
Time*Cumu. Responsive Teaching	0.677	0.642	0.625	0.649	0.668	0.644
Time*Cumu. Positive Management	-1.795	2.150	-1.163	2.182	-1.306	2.176
Time*Cumu. Cognitive Facilitation	-6.179**	2.079	-6.050**	2.055	-6.158**	2.067
Time*Cumu. Time on Reading	0.498	0.381	0.484	0.385	0.539	0.386
Time*PK*School % FRPL	5.915	9.538	-1.559	3.560	-0.044	3.725
Time*PK*Cumu. Class Size	0.620	0.834	0.044	0.286	-0.223	0.337
Time*PK*Cumu. Teacher Education	-9.346	6.047	1.723	2.052	-1.475	2.461
Time*PK*Cumu. Teacher SEC	1.756	8.716	-0.913	3.016	0.611	3.496
Time*PK*Cumu. Responsive Teaching	-3.871	4.083	1.226	1.524	-0.243	1.752
Time*PK*Cumu. Positive Management	10.449	12.091	-1.649	4.286	1.964	4.954
Time*PK*Cumu. Cognitive Facilitation	8.001	14.018	-0.536	4.744	2.069	5.414
Time*PK*Cumu. Time on Reading	0.521	2.503	-0.669	0.836	0.783	1.007

Note. PK = Pre-kindergarten social-emotional functioning. Cumu. = Cumulative. The first column of results shows estimates from model with inattention as the PK social-emotional predictor; the second column shows estimates from model with prosocial behavior as the PK predictor, and the third column shows estimates from model with conduct problems as the PK predictor. Intercept and time effects are slightly different from Aim 1 because these models also included the binary indicator that equaled 1 after K, which was interacted with the cumulative variables. * $p < .05$. ** $p < .01$. *** $p < .001$.

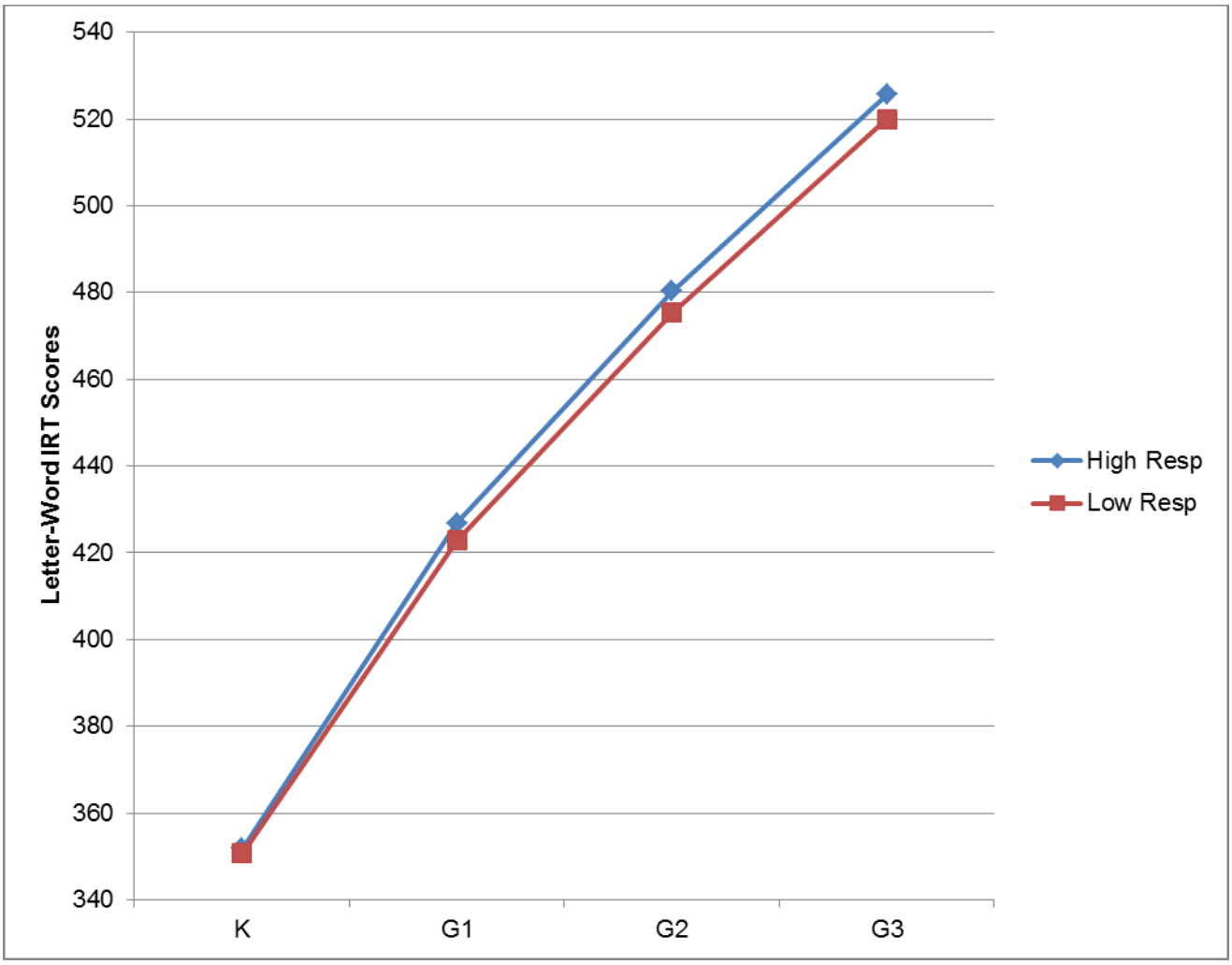

Figure 3. Cumulative responsive teaching predicts reading achievement. Children who, on average, experienced high levels of responsive teaching (1 SD above the mean at each grade level) showed higher reading achievement by third grade compared to children who experienced low levels of responsive teaching (1 SD below the mean at each grade level). This effect began in Grade 1 and did not significantly interact with time (i.e., the effect did not significantly grow in magnitude over time).

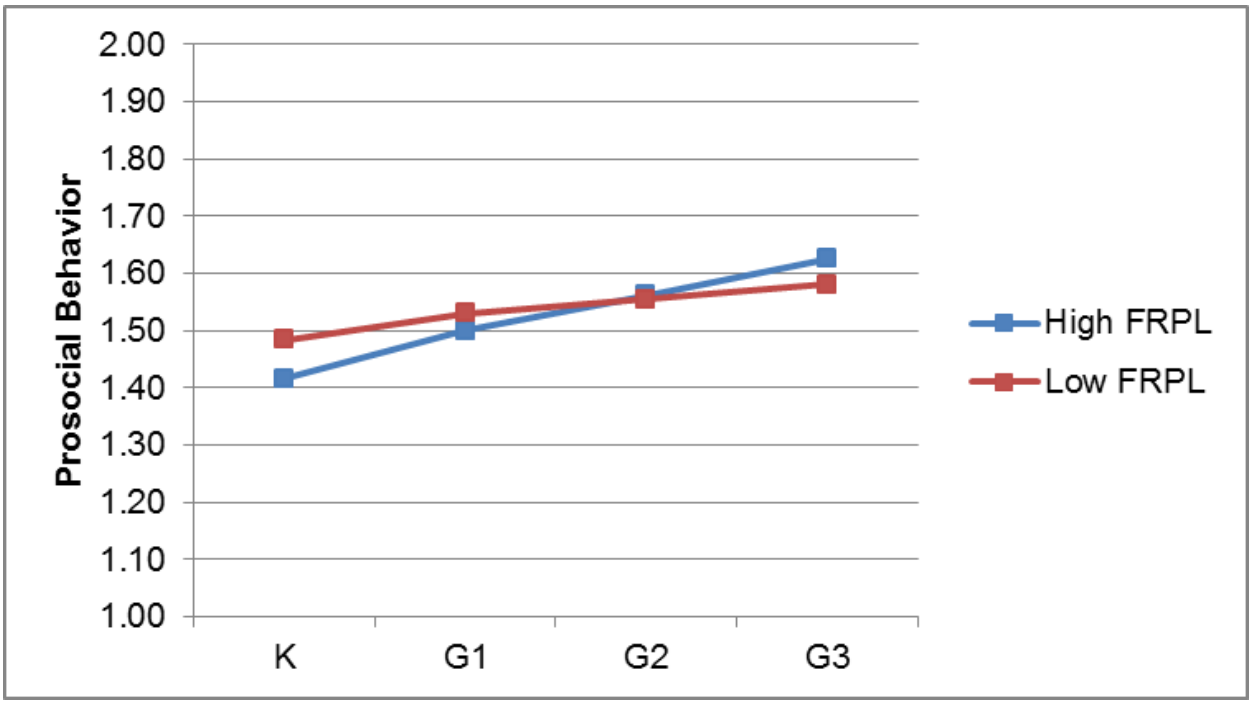

Figure 4. The school-level proportion of students eligible for free and reduced-price lunch (FRPL) predicts growth in prosocial behavior. Children in schools with higher (1 SD above the mean) proportions of students eligible for FRPL show greater growth in prosocial behavior compared to children in schools with lower (1 SD below the mean) proportions FRPL. The school-level proportion of FRPL-eligible students had a trend-level negative effect on K prosocial behavior; however, this effect was not significant in third grade.

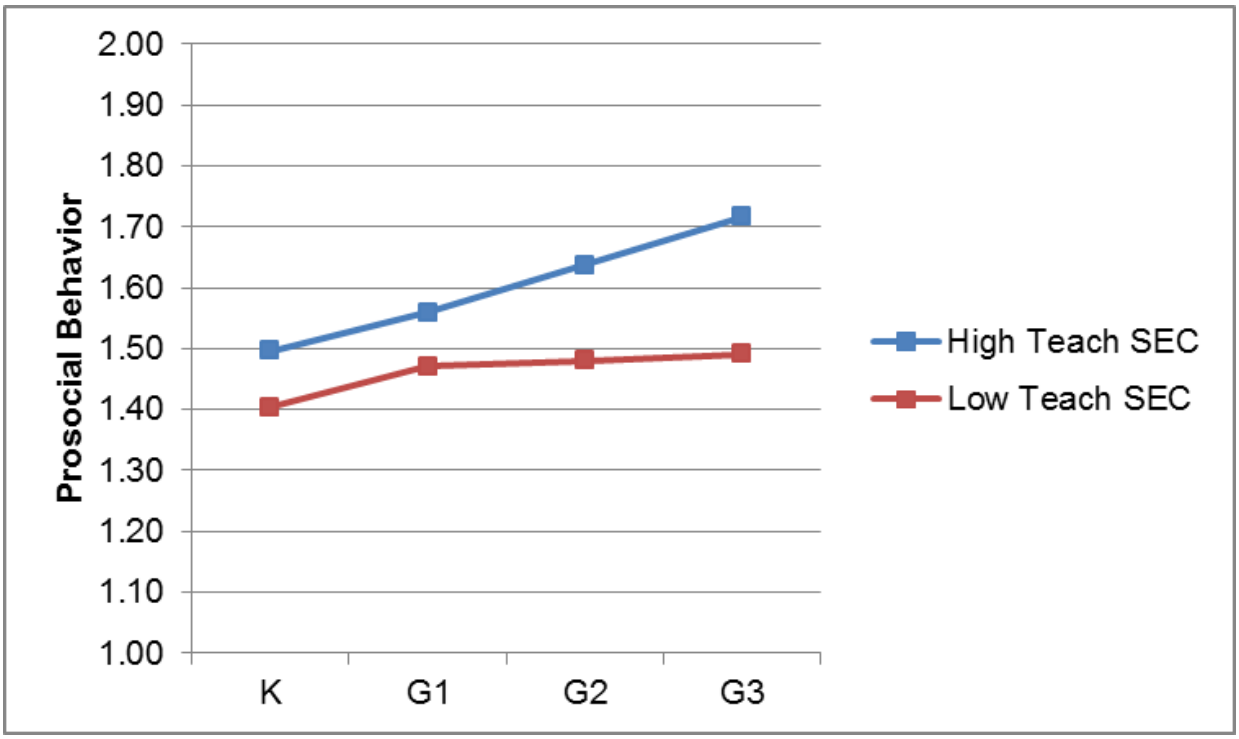

Figure 5. Cumulative teacher social-emotional competence (SEC) predicts growth in prosocial behavior. Children who, on average, had teachers with high SEC (1 SD above the mean at each grade level) showed greater growth in prosocial behavior over time relative to children who had teachers with low SEC (1 SD below the mean at each grade level). Note that the difference in prosocial behavior in kindergarten represents the significant concurrent effect of teacher SEC (but not a lagged effect of cumulative teacher SEC, as teacher SEC prior to kindergarten was not included in the model). Beginning in Grade 1, differences in prosocial behavior represent both concurrent effects and lagged effects of cumulative teacher SEC, which increased in magnitude over time.

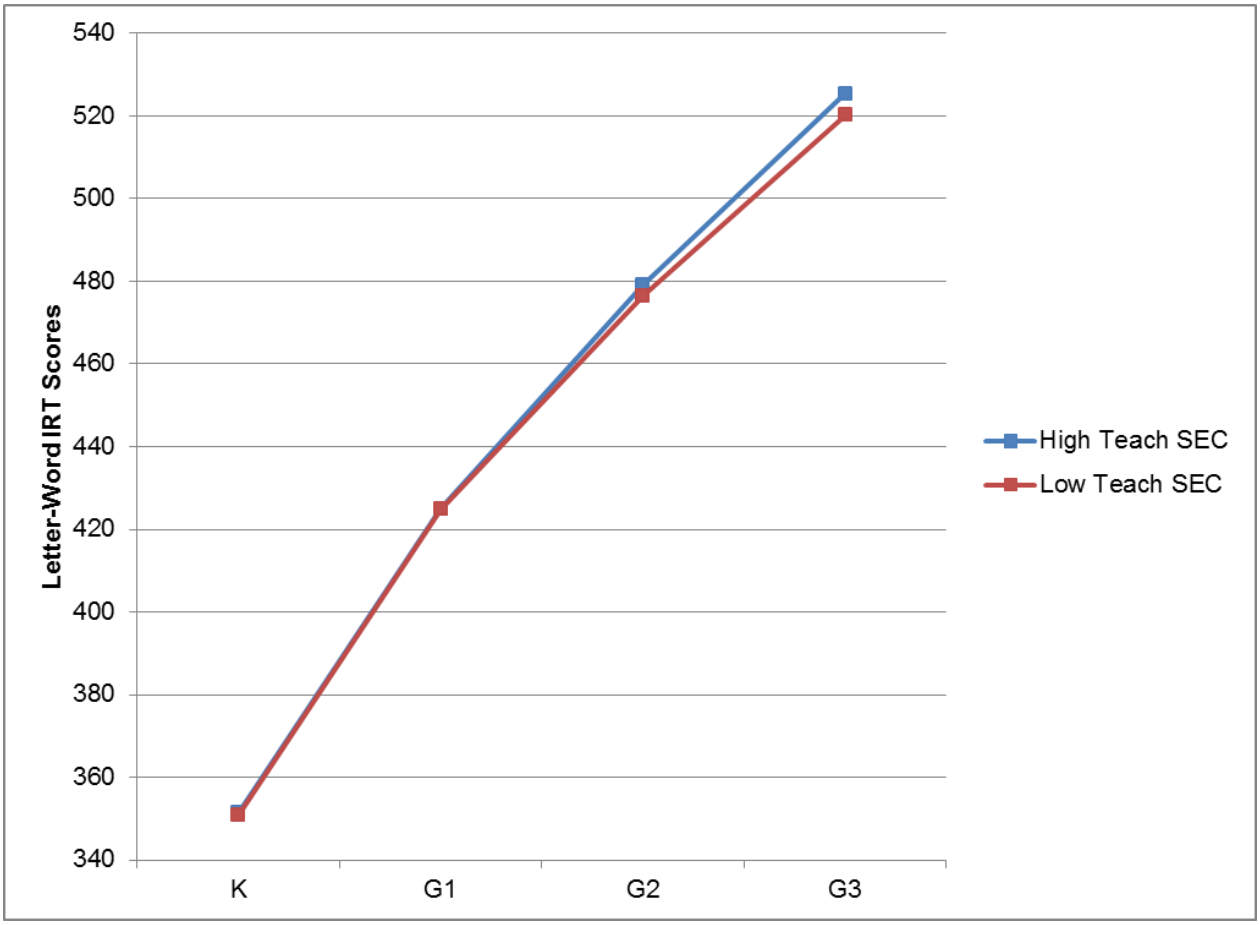

Figure 6. Cumulative teacher social-emotional competence (SEC) predicts growth in reading achievement. Children who, on average, had teachers with high SEC (1 SD above the mean at each grade level) showed greater growth in reading over time relative to children who had teachers with low SEC (1 SD below the mean at each grade level).

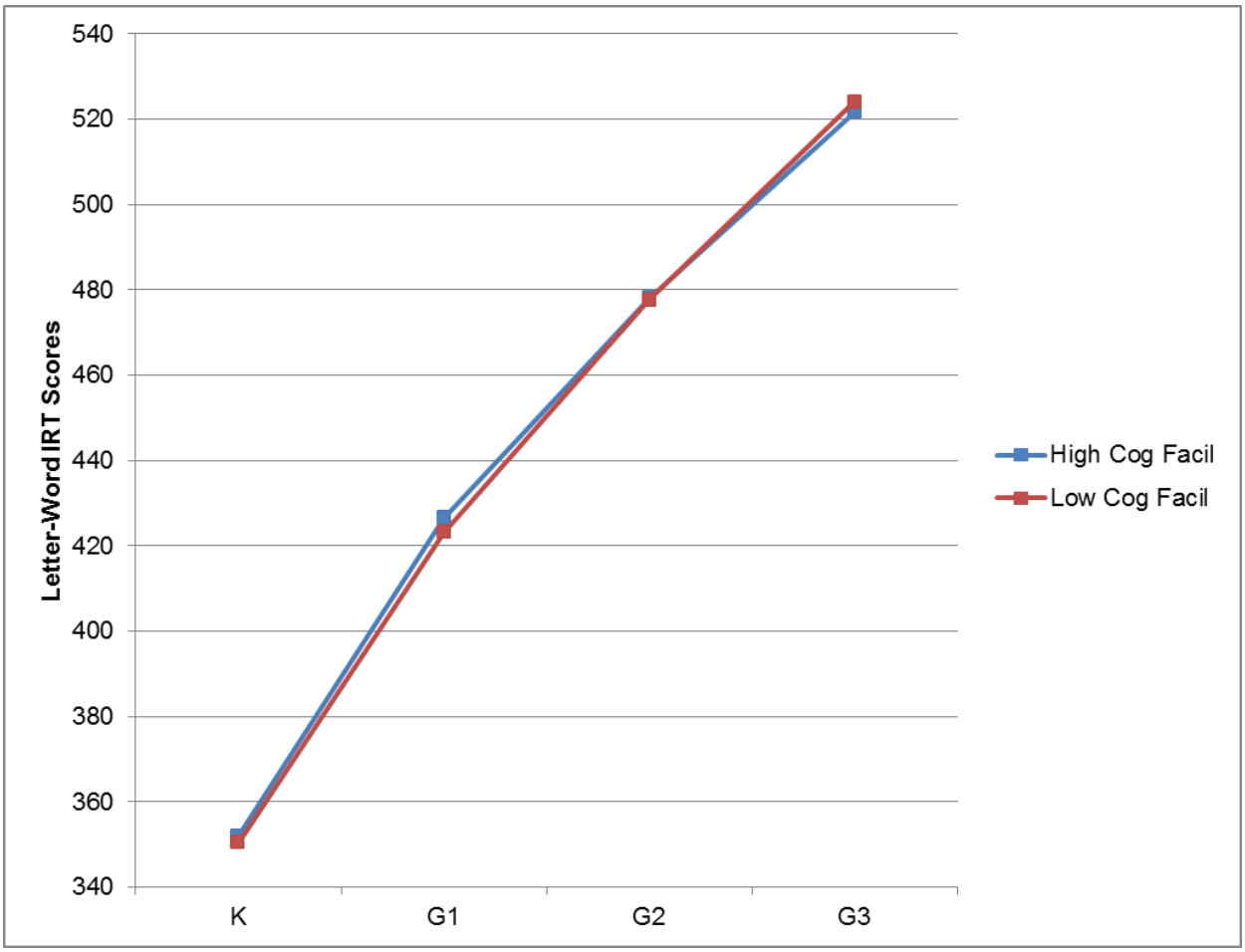

Figure 7. The lagged effect of cumulative cognitive facilitation on reading was largest in Grade 1 and then decreased in magnitude over time.

VITA
Rachel M. Abenavoli

EDUCATION

Pennsylvania State University — *University Park, PA*
Ph.D. Human Development and Family Studies — August 2016

Pennsylvania State University — *University Park, PA*
M.S. Human Development and Family Studies — May 2013

Fairfield University — *Fairfield, CT*
B.A. Psychology — May 2007

SELECTED PUBLICATIONS

Harris, A.R., Jennings, P.A., Katz, D.A., **Abenavoli, R.M.**, & Greenberg, M.T. (2016). Promoting stress management and well-being in educators: Feasibility and efficacy of a school-based yoga and mindfulness intervention. *Mindfulness*, *7*, 143-154.

Abenavoli, R.M., Greenberg, M.T., & Bierman, K.L. (2015). The role of parents' support for learning during the first few years of school: Benefits for high-risk, aggressive children. *Early Childhood Research Quarterly, 31,* 9-18.

Abenavoli, R.M., Jennings, P.A., Greenberg, M.T., Harris, A.R., & Katz, D.A. (2013). The protective effects of mindfulness against burnout among educators. *Psychology of Education Review, 37*, 57-69.

Gillham, J.E., **Abenavoli, R.M.**, Brunwasser, S.M., Linkins, M., Reivich, K.J., & Seligman, M.E.P. (2013). Resilience education. In S.A. David, I. Boniwell, & A.C. Ayers (Eds.), *Oxford handbook of happiness* (pp. 609-630). Oxford, UK: Oxford University Press.

SELECTED PRESENTATIONS

Abenavoli, R.M., Greenberg, M.T., & the FLP Key Investigators. (2016, March). Contributions of social-emotional readiness and teacher-student interactions to social-emotional trajectories across elementary school. *Paper presented at the Spring 2016 Conference of the Society for Research on Educational Effectiveness, Washington, D.C.*

Abenavoli, R.M., Katz, D.A., Zadzora, K., & Greenberg, M.T. (2015, May). Classmates' behavior influences children's skills in the early school years. *Poster presented at the 23rd Annual Conference of the Society for Prevention Research, Washington, D.C.*

Abenavoli, R.M., Greenberg, M.T., & Bierman, K.L (2015, March). Kindergarten school readiness profiles predict second grade competence among high-risk, low-income children. *Poster presented at the biennial meeting of the Society for Research on Child Development, Philadelphia, PA.*

SELECTED RESEARCH EXPERIENCE

Pennsylvania State University, Prevention Research Center — *University Park, PA*
Pre-Doctoral Fellow & Graduate Research Assistant — 2010-2016

University of Pennsylvania, Positive Psychology Center — *Philadelphia, PA*
Project Coordinator — 2007-2010

Fairfield University, Department of Psychology — *Fairfield, CT*
Research Assistant — 2006-2007