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Understanding the Needs of Children in Poverty to Improve Academic Achievement: A Literature Review

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UNDERSTANDING THE NEEDS OF CHILDREN IN POVERTY TO IMPROVE ACADEMIC ACHIEVEMENT: A LITERATURE REVIEW

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Abstract

Poverty affects one in five children in the U.S., where 50% of public schools identify as mid-high or high-poverty schools. Decades of research confirms a significant and constant economic academic achievement gap. This literature review sought to determine how poverty impacts children's development and ways educators can improve educational outcomes for students in poverty. Researchers illustrate how poverty impacts children environmentally and neurologically, leading to brain changes associated with language, memory, socioemotional, and executive functioning skills. Researchers offer a multitude of ways that educators can improve educational outcomes for students in poverty including: improving school climate and teacher-student relationships, implementing social skills and executive functioning curricula, increasing parental involvement, teacher instructional quality, and district instructional expenditures.

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CHAPTER I: INTRODUCTION

Poverty may be understood by some as living in a third world country or homeless people holding signs on street corners. Yet poverty is more insidious than that. It may be the single parent working two full-time jobs just to cover rent and provide food. It may be a senior citizen who keeps the heat low during the cold winter months because their monthly social security income is not adequate. It may be the family that becomes homeless when a parent loses their job or due to bills from an unexpected medical emergency. It may be the grandparents who are raising grandchildren because their daughter is battling with mental illness. Poverty can happen suddenly or accrue over multiple generations.

Poverty is a pressing issue in education. Teachers know this well. They see the effects of poverty in their classrooms every day where they face the challenge of teaching hungry, homeless, chronically stressed students or students exposed to endless trauma. While schools provide free breakfast and lunch to many students, meeting all of the needs of students in poverty is seemingly beyond the scope of public education. Families in poverty may need safe housing, stable jobs, reliable transportation, affordable health care, and adequate food. While poverty and inequity have been in the forefront for years, the 2020 Global Pandemic and distance learning acutely highlighted how the disparities impacted education. With schools temporarily shuttered by the Coronavirus, students in poverty faced enormous challenges simply to access online learning options. The place where students in poverty were provided with structure, stability, and nutritious food became unavailable. It quickly became clear that public schools provided students with much more than an education.

Poverty is defined as “the state of one who lacks a usual or socially acceptable amount of money or material possessions” (Merriam-Webster, n.a.). Without further qualification, this

definition is certainly subjective. The U.S. Census Bureau (Fox, 2020b; How the Census Bureau Measures Poverty, 2020) officially measures poverty using a family's pre-tax cash resources or income compared to pre-set poverty thresholds dependent upon the size of a family. A family may be relatives living in a household or unrelated housemates. If the family's income is less than the threshold identified for the family size, then every member in that household would qualify as living in poverty. For example, in 2020, a family of five with two adults and three children is considered to be in poverty if their total income is less than $30,887 (Poverty Thresholds, 2020). The U.S. Census Bureau also uses an alternate measure of poverty, the Supplemental Poverty Measure (SPM). The SPM includes government benefits as a part of a family's income, while deducting living expenses such as income taxes, child care, Social Security payments, and health care costs (Fox, 2020). While the Census Bureau measures poverty based on thresholds, another important measure of poverty includes poverty guidelines. The Department of Health and Human Services releases yearly federal poverty guidelines that are determined from the previous Census data. The purpose for federal poverty guidelines is to administratively determine financial eligibility for various federal programs (U.S. Department of Health and Human Services, January 26, 2021).

Prior to the pandemic, overall poverty in the U. S. was on the decline. According to the U.S. Census Bureau, the overall poverty rate using the official measure in 2019 was 10.9 percent, down from 14.8 percent in 2014; its lowest rate since 1959 (Semega et al, 2020). However, this still equates to 34 million Americans living in poverty. The poverty rate for children under the age of 18 was higher at 14.4 percent; however, this was down from 22 percent in 2010. Using the SPM, the overall poverty rate in 2019 was 11.7 percent and the rate for children under 18 years was 12.5 percent (Fox, 2020a). While official poverty rates have not been released since the

pandemic began, the Center on Poverty & Social Policy at Columbia University estimates that the poverty rate for children under 18 years increased steadily throughout the pandemic to 20.4% by September 2020 (Parolin, 2020). That means at least one in five children across the U.S. are living in poverty.

Minnesota is among a handful of states with lower than average rates of poverty. The 2019 poverty rate in Minnesota was nine percent overall and 11 percent for children under 18 years. This rate can be deceiving without disaggregating the data. The rates for Minnesota's Black, American Indian, Latino, Asian, and bi- or multi-racial children are much higher. According to the Children's Defense Fund, while only 6.2 percent of white children in Minnesota lived in poverty, the rates of children who did not identify as white ranged from 14.3 percent to 39.4 percent.

School districts measure poverty in an entirely different manner. Public schools have traditionally measured poverty status based on how many students qualify for free and reduced-price lunch under the federal programs, National School Lunch Program and School Breakfast Program (Learning Policy Institute, June 5, 2020). The U.S. Department of Agriculture uses federal poverty guidelines to determine who qualifies for FRPL (U.S. Department of Health and Human Services, January 26, 2021). Students' families fill out applications yearly in order to qualify.

The number of students qualifying for FRPL is particularly important to schools as the poverty measure traditionally determines federal funding allocations and designates the low-income student subgroup in state achievement testing results (New America, n.a.). Public schools are considered low-poverty, mid-low poverty, mid-high poverty, and high-poverty based on FRLP eligibility. A public school is considered a high-poverty school if more than 75% of

students qualify for FRPL. Mid-high poverty schools are those with between 50.1 percent and 75 percent of FRPL eligibility. Mid-low and low-poverty schools are those with FLRP eligibility of less than 50.1 percent and 25 percent, respectively (National Center for Educational Statistics, 2020). Public schools with higher concentrations of students in poverty typically receive more federal funds, such as Title I (Learning Policy Institute, June 5, 2020). However, FRPL may under-represent the actual number of students in poverty. It is estimated that for every 10 families qualifying for FRPL, there are an additional 6 families that qualify but don't complete applications. Many states are widening the poverty measure to include eligibility in a variety of public programs, alternate income forms, multipliers of FRLP status, and community income (Learning Policy Institute, June 5, 2020).

Determining poverty status is important for schools to provide nutritious meals to students in need but it also matters because of academic testing. The academic success of students in poverty is paramount to the success of any school. Every Student Succeeds Act (ESSA), the federal K-12 public school law, mandates that every state administer standardized tests. Schools are held accountable for the academic achievement of all students. High-poverty schools have chronically lower achievement scores than schools with smaller concentrations of students in poverty (U.S. Department of Education, 2020). The poverty achievement gap is significant. In 2019, reading and math achievement scores for high-poverty schools averaged 30 points lower than low-poverty schools. For example, on the 8th grade National Assessment of Educational Progress (NAEP) math assessment, the scale score for high-poverty schools was 265, followed by mid-high poverty schools (276), mid-low poverty schools (287), and low-poverty schools (301) (U.S. Department of Education, 2020, p. 86). Even more alarming is that a greater number of public school students attend high- or mid-high poverty schools than

mid-low or low-poverty schools in the U.S. (U.S. Department of Education, 2020). While this shows data from one year, Hanushek et al. (2019) found that the socioeconomic achievement gap has remained virtually unchanged for decades. Schools identified with consistently low performing achievement or with subgroups of students who perform at the lowest levels are identified as struggling or low-performing schools. Once identified, plans and funding are required to reverse this trend. Report cards for the status of each school are released to the public (Poiner, 2016).

While schools work hard to avoid being identified as struggling under ESSA, it is also important to recognize the well-being and outcomes for students. As a teacher, I can say that school achievement scores and status mean almost nothing to me. I care about my students deeply and want to help them avoid struggle and hardships. I want to see them succeed, and I feel confident in saying that I am not the only teacher to feel this. Students in poverty have lower high school graduation rates (Atwell et al., 2020) and higher suspension rates (Barrett et al., 2017), and may be more likely to be identified as a student who receives special education services (Schifter et al., 2019). Anecdotally, in my classroom, I see the effects of poverty that show up as mental health concerns, hunger, inability to concentrate, difficulty with memory and/or learning, instability in the home, peer conflicts, and defiant behavior.

Poverty has been shown to affect academic achievement and student behavior; therefore, poverty greatly affects the field of education. What interventions or instructional methods improve the outcomes for students living in poverty? While broad in scope, I would like to find the answers to this question as a result of this literature review. Also, underlying this question is determining ‘the why’. Why do students in poverty have such poor educational outcomes? What is the long-term outcome for students living in poverty? What specific learning needs do the

students present? Do students in poverty respond to specific teaching styles? How does living in poverty affect brain development? Do the brains of students living in poverty show neurological differences compared to students not living in poverty? What differences in school readiness are seen in students living in poverty compared to those not living in poverty? What have successful high-poverty schools done to improve the learning outcomes of their students? What role does parental involvement play in student academic achievement? This thesis will address poverty in education by reviewing literature focused on students who live in poverty and success in school.

CHAPTER II: LITERATURE REVIEW

Literature Search Procedures

To find the literature and information for this thesis, searches of Academic Search Premier, ProQuest Education Journals, ERIC, and PSYCHInfo were conducted for studies and publications from 2010-2020. The key search words used in these searches included “poverty,” “low-income,” “poverty or low-income and education,” “poverty or low-income and achievement,” “poverty or low-income and academics and performance,” “poverty or low-income and ability,” “ poverty or low-income and aptitude,” “poverty or low-income and education and interventions,” “poverty or low-income and strategies and achievement,” “poverty or low-income and teacher,” “poverty or low-income and relationships,” “poverty or low-income and teacher and instruction,” “poverty or low-income and language,” “poverty or low-income and brain,” “poverty or low-income and brain development,” “poverty or low-income and development,” “achievement gap and success,” “poverty or low-income and curriculum,” and “poverty or low-income and executive function.” This chapter will review the literature on the negative impact of poverty on children’s development as it relates to academic performance, and school-focused strategies and interventions that improve the academic outcome of children in poverty in the following order: The Impact of Poverty on Child Development and Academic Achievement; Strategies that Improve School Outcomes for Students in Poverty.

The Impact of Poverty on Child Development and Academic Achievement

Poverty and Language Development

Following previous research that has shown that both early language performance and SES predicted later academic achievement, Betancourt, Brodsky, and Hurt (2015) investigated ways SES impacted infant language at 7 months and whether maternal vocabulary skills played a

role in that language development relationship. For this longitudinal study, researchers recruited 54 mothers from either a lower or higher SES group and their female African-American infants who were healthy at the time of delivery. The Low SES mothers had incomes below the poverty line and no post-high school education, while the Higher SES mothers had incomes above the poverty line and at least a high school education. The Preschool Language Scale-5 (PLS-5) measured the infant's total language functioning, including auditory comprehension and expressive language skills. Subtests of the Wechsler Adult Intelligence Scale-IV (WAIS-IV) measured the mother's vocabulary and reasoning skills.

Results of the study indicated that both mothers and infants in the Low SES group scored lower on corresponding language and/or vocabulary assessments than participants in the Higher SES group. Concerning total language scores on the PLS-5, Low SES infants scored an average of 8 points lower than the Higher SES infants. Likewise, Low SES mothers had a mean score in the Low Average range on the WAIS-IV subtests, while Higher SES mothers had a mean score in the Average range. Using analysis to demonstrate significant relationships, Betancourt et al. (2015) determined a significant relationship between SES and infant language scores and SES and mother vocabulary scores; however, the relationship between infant language skills and mother vocabulary was not, indicating that a mother's vocabulary skills did not impact infant language development at this age.

Betancourt et al. (2015) concluded that a lower SES impacted infant language functioning by the age of 7 months, which was evidence of an earlier effect than determined by other studies reported thus far. Although neither group of infants had scores that indicated a language deficit, the authors deduced that the results suggested that having a lower SES placed infants at a disadvantage. They proposed that the PLS-5 measured observable foundational skills

in the areas of auditory comprehension and expressive language which underlies later language development. As the results suggested that SES affected these foundational language skills, the researchers felt it was critical to address the early language needs in lower SES children. Concerning the finding that the relationship between maternal vocabulary and infant language skills was insignificant, Betancourt el al. (2015) noted that other factors may have contributed to the differences between lower and higher SES infant language scores such as quality of interactions or exposure to number of spoken words. Additionally, they believed that data from the female and African-American cohort may have limited generalizability, the small differences between education and income in the two SES groups may underestimate how greatly SES affected language development.

Fernals, Marchman, Weisleder (2013) also examined the impact of socioeconomic status (SES) on early language development in infants. Researchers studied 48 monolingual English-learning infants from two different urban areas that varied significantly in parent education and family income. Infants from both the high SES group and the low SES group were followed from ages 18 to 24 months. Researchers investigated the differences and similarities in expressive vocabulary and language processing efficiency related to vocabulary learning over the six-month time span. Fernals et al. (2013) used real-time measures of spoken language processing that measured both reaction time and accuracy to track the variabilities in developmental changes in processing efficiency related to vocabulary and how the differences related to family SES.

Fernals et al. (2013) found that variability in family SES correlated with variability in both vocabulary development and spoken language processing. Concerning vocabulary development, infants in the high SES group had significantly more advanced vocabularies than

those in the low SES group at both the 18 and 24 month marks. Participants in the Lower-SES group produced about 150 fewer words by 24 months than infants in the high SES group. Additionally, the high SES group made greater gains in vocabulary over this period resulting in even greater between-group differences at 24 months compared to 18 months.

Concerning spoken language processing efficiency, both groups of infants were more accurate and had faster reaction times at 24 months versus 18 months; however, results indicated that SES was influenced by the variability of the two groups. Fernals et al. (2013), found that the high SES group was significantly more accurate than the low SES group at both ages. Results of reaction times were similar. The high SES group was significantly faster in word recognition than the low SES group. While both groups made similar gains in accuracy and reaction time over the six-month period, the low SES group demonstrated accuracy and reaction time scores at 24 months that were similar to the high SES group scores at 18 months, indicating a 6-month gap in language processing efficiency by 24 months of age. Furthermore, these accuracy rate and reaction time measures correlated with the expressive language scores at both 18 and 24 months.

Fernals et al. (2013), concluded that SES significantly impacted language development and noted crucial differences in vocabulary and language processing were evident by 18 months of age. Of further concern to the researchers, were the results that pointed to a 6-month disparity in vocabulary size and language processing efficiency between the high SES group and the low SES group. Similar to other findings, Fernals et al. (2013), also concluded that vocabulary development is aligned with language processing which may lead to a compounding effect on vocabulary growth for children with higher performance. Moreover, they deduced that there may be long-term consequences for children with lower SES given that lower language processing skills result in less vocabulary growth and missed opportunities for learning.

Previous studies examined the impact of socio-economic status on language development in infants. Nelson, Welsh, Vance Trup, and Greenberg (2010) investigated the prevalence and school-related impacts of language delays in low-income preschool children. Nelson et al. (2010) studied the prevalence and degree of language delay in 336 low-income 4-year-old children attending Head Start programs and the relationship of the language delay to academic and socioemotional skills. Using three standardized language assessments, the researchers measured the participants' language in the areas of syntax and vocabulary. Participants' composite language scores were converted to categorical language indicators: Strong Delay, Moderate Delay, Low-Average Language and High Language. After assessing participants' non-verbal intelligence (NVI) additional categories were created that combined language and NVI scores. Finally, to examine how language delays related to math, early literacy, and socioemotional skills, standardized academic and working memory assessments and an emotional recognition questionnaire were administered.

Nelson et al. (2010) found that the majority of the low-income preschool children were identified with a language delay. The results indicated that 32.7% met criteria for the Language Delay/No NVI Delay category. Similarly, another 32.7% met criteria for the Language Delay/NVI Delay category. The remaining participants demonstrated no language delays but 9% of this group met criteria for Low NVI. Results indicated that language status and NVI correlated moderately.

The results of the study further noted a significant relationship between academic abilities and the language delay status. The strongest language delay was associated with the lowest academic scores for math and early literacy. Academic scores increased systematically with each improved language indicator. Similar effects were found for working memory and emotional

recognition skills. No difference was found among the children who also participated in the Head Start program the year before as 3-year-olds. Additionally, Nelson et al. (2010) found that when comparing the non-language delayed children's academic scores to those scores of children in one of the three language delay indicators the effect sizes were large to very large.

The researchers concluded that two-thirds of children in the study demonstrated clinically significant levels of language delay and that as the degree of language delay increased, the degree of academic and socioemotional impairment increased systematically. Based on the results, Nelson et al. (2010) believed that there was a strong relationship between deficits in math, early literacy skills, and emotional knowledge and severity of language delay. No relationship was found between language delay and gender or ethnicity. Furthermore, the researchers concluded that the results, along with those of past studies, suggested that this relationship may remain firm throughout grade school and high school. Given that the children who attended Head Start as 3-year-olds demonstrated no less significant language delay, they further posited that children living in poverty needed preschool programs with increased language-focused activities.

Congruent with the study by Nelson et al. (2010), Neuman, Kaefer, and Pinkham (2018) sought to investigate how poverty specifically impacted preschool children's exposure to environmental supports that build language. Following previous research that identified types of early childhood language processes, interactions, and materials that supported proficiency in reading and writing skills, Neuman et al. (2018) examined how socio-economic status (SES) affected the quality and quantity of these supports in home and school environments during the transition to grade school. Participants included 70 children who either attended a Head Start program and lived in a low-income neighborhood of concentrated poverty or attended a

state-funded preschool and lived in bordering working-class neighborhoods. Children were followed during the transition to kindergarten and throughout the school year. The researchers assessed the mothers' reading comprehension skills and the children's expressive and receptive language and early reading skills to measure the types of language and literacy processes the children were exposed to in both the home and school environments. The children were assessed at both the beginning and end of kindergarten. Additionally, observations were conducted in the home and school environment to measure the quality and quality of child-directed language input.

The results indicated significant differences between the low-income group and the working class group in child-directed language in both the home and school environments. Concerning the parent-child directed language, Neuman et al. (2018) found that parents from the working class group had verbal interactions with their children that were longer in duration than those from the low-income group. Parents from the low-income group also used shorter sentences with limited word variety. Furthermore, the low-income parents also had significantly lower reading comprehension scores than the working class parents.

In the school environment, Neuman et al. (2018) found that SES also affected the quality of child-directed language in the kindergarten classroom. While no differences were found in the quantity of child-directed language used in classrooms for children in the low-income and working-class settings, the quality of child-directed language differed significantly. The teachers for children in the low-income group used less complex language and variety than the teachers of the working class group of children (Neuman et al., 2018).

When comparing the children's scores from the fall and spring of kindergarten, Neuman et al. (2018) found a significant difference related to SES. Both the children from the low-income

and working class neighborhoods showed gains over the school year; however, the children in the working class neighborhood achieved significantly higher scores at both beginning and end of the year with significant gains in receptive language that outpaced their peers.

After correlating parents and teachers' language measures with the children's language and literacy measures, the researchers found that the parent and teacher language variables related differently to each child measure. Parent language correlated with children's expressive and receptive language and early reading skills; whereas, teacher language only correlated with early reading skills. Moreover, children's SES independently correlated to expressive and receptive language and letter-sound correspondence skills apart from parent and teacher language (Neuman et al., 2018).

Neuman et al. (2018) concluded that the children who lived in neighborhoods of concentrated poverty had fewer supports for language and literacy development. Not only did the parents of this group have lower reading comprehension skills and use less complex and varied language when speaking to their children, once the children entered school, they were exposed to teachers who used simpler sentences with less varied vocabulary. The researchers argued that this "double dose of disadvantage" (p. 115) may have serious implications. The children from the low-income families showed growth but only limited growth when compared to their peers from working class homes. If compared to children from more affluent neighborhoods, Neuman et al. (2018) believed that the difference in opportunities and support would be significantly greater. Researchers also posited that structural inequalities were evident considering that home, school, and neighborhood effects were interconnected.

Poverty and Access to Resources

Neuman and Moland (2019) considered the ways neighborhood poverty levels affected access to early literacy resources. Neuman and Moland (2019) selected six neighborhoods from three different states to examine the number of preschool and children's books available. The neighborhoods examined included an area of concentrated poverty (greater than 40%) and a borderline community with a poverty rate of 18% to 40%. The researchers systematically observed each neighborhood during the summer and documented every store that carried print resources. They catalogued the types and number of print resources for children younger than 6 and under 18 years.

Neuman and Moland (2019) found that the neighborhoods of concentrated poverty consistently had fewer stores that carried print resources with fewer children's books available. While the number of bookstores in a neighborhood ranged from one to 11, and dollar stores were the most common type of store to carry children's print resources in all the neighborhoods examined, the high-poverty neighborhoods consistently had fewer locations to buy books compared to the bordering neighborhoods. There was large variability across the neighborhoods in the number of books available. The results showed a range of only five books in one high-poverty neighborhood to 7,256 books in a borderline neighborhood in another state. Researchers found that every neighborhood examined had fewer books for preschoolers than for children 18 years and under and often the books available were specialized for racial or religious groups. Finally, when quantifying the number of books for sale per child, researchers found that the bordering neighborhoods had 16 times as many books per child than the high-poverty neighborhoods.

Neuman and Moland (2019) concluded that there are great disparities in the availability of print resources for children living in neighborhoods of concentrated poverty compared to

bordering more affluent neighborhoods, potentially affecting children's early literacy and school readiness skills. Furthermore, they noted that none of the neighborhoods had an adequate amount or variety of books particularly for young children. Neuman and Moland argued that the limited availability of books meant that book reading could not become routine leading to serious consequences for a child's reading development. They used the term "book deserts" to describe the neighborhoods, noting that structural inequalities separate from family characteristics may lead to achievement gaps in education.

Poverty and School-Focused Goals

In contrast to the previous studies focused on external resources and supports, Oyserman, Johnson, and James (2011) investigated the impact of socio-economic status on children's internal supports that promoted school success. Oyserman et al. (2011) examined how family socioeconomic status (SES) and neighborhood economic disadvantage affected middle school children's school-focused possible identity, or future self, and linked behavioral strategies. Using a sample of approximately 300 8th grade children from low-income communities in the Fast Track program, researchers administered a possible identity and behavioral strategy measure. For each participant, they coded the school-focused possible identities into academic, school sports, and teacher-engagement categories and documented the percentage of school-focused possible identities from the identities generated (salience). The number of school-focused strategies to attain the possible identities were also examined. Additionally, researchers measured each child's family socioeconomic status and the relative economic disadvantage of the neighborhoods in which they lived.

Results of the study indicated that the children living in the neighborhoods of greater economic disadvantage were more likely to have school-focused possible selves but that

neighborhood and family SES correlated with the number of school-focused strategies generated. Oyserman et al. (2011) found that only neighborhood disadvantage predicted greater salience of school-focused possible identities; family SES was found to have no effect. When examining the number of school-focused behavioral strategies generated, children from higher SES families were more likely to generate school-focused strategies. The results also showed that boys were overall less likely to generate strategies overall, specifically those focused on academics or teacher engagement. Furthermore, the greater the neighborhood disadvantage, the fewer strategies boys generated. This effect was not seen with girls.

Oyserman et al. (2011) concluded that children were actually more likely to have school-focused possible identities when living in more economically disadvantaged neighborhoods than when living in less economically disadvantaged neighborhoods. Yet, neighborhood economic disadvantage along with a lower family SES predicted having fewer strategies to attain the school-focused possible identities. The researchers believed that socioeconomic disadvantage made it more difficult for children to visualize attaining their school-focused selves even when they cared about school success. Oyserman et al. (2011) posited that the results showed that both family SES and neighborhood disadvantage mattered as each impacted the probability of children needing behavioral interventions to attain their school-focused selves. Because family SES was measured not only by income but also parent education levels, children with higher family SES were more likely to have parents who modeled such strategies. On the other hand, neighborhood disadvantage played a role in how likely boys generated school-focused strategies. The researchers argued economically disadvantaged children did not need help to identify school goals and aspirations, they needed help in developing strategies to achieve the goals.

Poverty and Executive Functioning

While Oyserman et al. (2015) demonstrated that school-focused behaviors and strategies are affected by poverty status, Lipina, Segretin, Hermida, Prats, Fracchia, Camelo, and Colombo (2013) studied how executive functioning behaviors were impacted by poverty. Lipina et al. (2013) examined the effects of poverty on executive functioning in children and the influence of different environmental factors on executive control performance. Participants were 250 Argentine children with a mean age of 4.87 years. Researchers administered six cognitive assessments that measured working memory, attention, reaction time, fluid processing, and general cognition. Mothers of participants were administered a Child Behavior Questionnaire that measured their child's temperamental effortful control and an anxiety and depression scale to measure their own mental health. Additionally, researchers measured the parent's socioeconomic status (SES) based on parental education and occupation, housing condition, and children's access to schooling, placing them into either an unsatisfied (UBN) or satisfied basic needs (SBN) group. Other indicators of poverty such as literacy materials in the home, frequency of reading, health history, and computer and/or internet use were also documented. Researchers used these measures to create literacy activities and a computer resources composite.

Lipina et al. (2013) found considerable differences in several measures between the UBN and SBN groups based on SES. While the children in the UBN group averaged one more year of preschool than their SBN peers, they had fewer books in the home, less reading frequency, and less computer/internet usage. The mothers of the UBN children also reported higher rates of depression and anxiety. No differences were found between the two groups in health history or the participant's temperamental effortful control measure.

The results of the study further indicated executive functioning performance differences between participants in the UBN and SBN groups. Lipina et al. (2013) found that children in the UBN group had significantly lower efficacy scores in all six cognitive assessments than the children in the SBN group. They also demonstrated slower reaction times on one assessment. Concerning the literacy activities and computer resources composites, researchers found the literacy activities composite was significantly associated with working memory and fluid processing, and the computer resources composite was significantly associated with fluid processing.

Lipina et al. (2013) concluded that poverty impacts the development of executive control functioning in children. The results of the study demonstrated that children from UBN homes showed lower efficacy on cognitive tasks that measured executive function. Researchers also concluded that the UBN children had experienced greater deprivation in all poverty indicators except preschool attendance, yet only certain indicators appeared to mediate the effects of poverty. Exposure to literacy activities in the home influenced performance in working memory and fluid processing but not attentional control or planning. Exposure to computer resources influenced performance in fluid processing but not for working memory or planning. Lipina et al. (2013) posited that these results suggested that each environmental factor associated with poverty mediated different aspects of neurocognitive development. They argued the impact of poverty on different neural networks may not be uniform, suggesting that future research should analyse the specific effects of various poverty indicators.

Following the Lipina et al. (2013) study suggesting poverty effects executive functioning control, Lawson and Farah (2017) examined the degree to which executive function mediated the association between socioeconomic status (SES) and changes in academic performance over a

2-year time span. Using data from the National Institute of Health (NIH) MRI Study of Normal Brain Development, researchers analyzed behavioral and clinical measures of 336 children between the ages of 6 and 15 years. To measure the executive function of each participant, the scores from four behavioral tasks were combined to create a latent executive function measure. To examine how EF specifically mediated academic achievement, Lawson and Farah included a comparison mediator, verbal memory. The scores from four observed memory measures were combined to create a latent verbal memory measure. Participants' SES was determined based on a composite of family income and parental education. Additionally, participants were administered two measures of academic achievement two years apart: reading comprehension and math calculation.

Lawson and Farah (2017) found that executive function was a partial mediator of SES and change in academic achievement. The results of the study indicated that SES was significantly correlated with executive functioning and verbal memory, with higher SES associated with higher executive functioning and higher verbal memory scores. SES was also significantly correlated to changes in academic achievement in both reading comprehension and math calculation. Using structural equation modeling to analyze how executive functioning and verbal memory mediated the relationship between SES and academic achievement change, the results suggested that executive function significantly mediated the relationship in math calculation but not reading comprehension. Verbal memory was not a significant mediator in either area of academic achievement change.

Based on the results of the study, Lawson and Farah (2017) determined that executive functioning mediated the relationship between SES and changes in math achievement. They concluded that executive functioning could predict change in math achievement. While verbal

memory was significantly related to SES, it did not predict a change in academic achievement. Because the participants came from mostly middle-class families and were free of physical or mental illness, Lawson and Farah (2017) also noted that it was remarkable that SES disparities in executive functioning were even discovered in the population sample. Researchers argued that these results suggested that executive functioning is an especially important factor in the association between SES and academic achievement and may be a crucial area for targeted interventions to address the SES-related achievement gap.

Poverty and Brain Development

As the results of the previous studies have shown, poverty status along with its stressors appears to negatively affect child development in ways that impair school readiness and achievement. Research demonstrated that the hippocampus region in the brain is affected by stress. Hanson, Chandra, Wolfe, and Pollak (2011) hypothesized that the hippocampus may be affected by income level. Using data from the National Institute of Health MRI Study of Normal Brain Development, researchers examined the association between socioeconomic status and the hippocampus in children's brains Participants included 317 children between the ages of 4 to 18 considered to have normal brain development. Researchers collected parents' income and education levels. They used the participants' MRI images to measure anatomical differences in the hippocampus and the amygdala, specifically the concentration of gray matter, among children from various income levels.

Hanson et al. (2011) found that the hippocampus, but not the amygdala, was related to parental income levels. Controlling for gender, age, whole-brain volume, and parent education, the results indicated that participants with lower socioeconomic status (SES) had lower concentrations of total gray matter and left gray matter in the hippocampus compared to their

peers from more affluent backgrounds. Researchers found no association between the amygdala and income levels.

Researchers linked the volume of gray matter in the hippocampus to income level. Children living in higher SES homes had greater concentrations of gray matter in the hippocampus. Hanson et al. (2011) argued that the higher stress levels related to growing up in poverty were associated with the lower hippocampal volumes and produced negative effects such as poor health and lower academic achievement. They believed that changes in the hippocampus may explain previously identified differences in memory, learning, and socioemotional regulation, all which have been linked to the hippocampus functioning in children from lower SES homes compared to those living in a higher SES family. Hanson et al. (2011) also noted that because the NIH study excluded children with mental health issues or low cognition, typically linked to poverty, the results of the study may have under-represented the true degree of changes in the hippocampus associated with poverty.

Considering the Hanson et al. (2011) study that identified gray matter development in the brain as uniquely vulnerable to early childhood stressors, Hanson, Hair, Shen, Shi, Gilmore, Wolfe, and Pollak (2013) examined how SES influenced changes in the brain from birth through toddlerhood. Using data from the National Institute of Health MRI Study of Normal Brain Development, researchers examined the MRIs of 77 infants to measure the total gray, white, and cerebral volumes, and the gray matter volume in the frontal, parietal, temporal, and occipital lobes. Between birth to 4 years, the participants were followed longitudinally and scanned at various ages. Researchers divided the participants into three SES groups based on family income: low SES, moderate SES, and high SES. Additionally, data was collected regarding the participants' behavioral and emotional problems.

Hanson et al. (2013) found that SES affected brain growth in multiple ways. The results of the study indicated that the participants from low SES families had significantly lower total gray matter volumes compared to those from high SES families. Additionally, the participants from low SES families had lower gray matter volumes in the frontal and parietal lobes. This group of participants also showed a reduced growth trajectory over time in all three identified brain volumes. The results did not indicate significant differences in total cerebral or white matter volumes; nor were there differences in the regional gray matter volumes in the parietal or temporal lobes. When children from moderate and high SES families were compared, no significant differences in brain volume were found.

When examining the relationship between brain development and socioemotional problems, the results indicated that externalizing behaviors, but not internalizing behaviors, were associated with differences in brain volume in two measurements. Hanson et al. (2013) found that lower total gray matter and frontal lobe gray matter volumes were associated with increased externalizing behaviors. Furthermore, for low SES participants, results suggested that volume, not growth, of the total gray matter and the frontal lobe more strongly influenced externalizing behaviors.

Hanson et al. (2013) concluded that the rate of brain development in infants was impacted by low SES environments. By toddlerhood, children from low SES families had lower total gray matter volume than their middle and higher SES counterparts, even though all the infants began the study with similar brain volumes. Even more concerning was the difference in brain volume between the low and high SES participants that only widened with age. The regions of the brain significantly affected were the frontal and parietal lobes. Researchers noted that these brain regions were linked to executive functions, sensory integration, and visual

processing. According to Hanson et al. (2013), these results suggested long-term implications in children's functioning and were supported by previous findings that lower SES was associated with poor executive function. Researchers recognized that this study did not identify the specific brain alterations that led to the volume changes nor did it distinguish the various environmental aspects associated with lower SES. Because researchers only examined the data from typically developing children which excluded many of the disorders and atypicality disproportionately associated with poverty, they also posited that the results were most likely an under-representation of the effect of poverty on infant brain development.

The results of the Lipina et al. (2013) and Lawson and Farrah (2017) studies demonstrated the relationship among children's socioeconomic status (SES) and executive functioning, and academic achievement. Lawson, Duda, Avants, Wu, and Farah (2013) examined the relationship between SES and prefrontal cortical thickness, an area of the brain essential for executive functioning. Using data from the National Institute of Health MRI Study of Normal Brain Development, participants were 283 typically developing children between the ages of 4 and 18 years. Lawson et al. (2013) examined the previously collected structural MRI data for each participant to measure the mean cortical thickness in specific regions of interest (ROI). The regions were identified as those associated with executive functioning and those susceptible to stress. For each participant, researchers also documented family income and parental education levels.

The results of the study indicated that two of the ROI were significantly related to SES. Lawson et al. (2013) found that parental education and family income were significantly correlated. However, only parental education was significantly associated with cortical thickness in the right anterior cingulate gyrus and the left superior frontal gyrus. Specifically, higher levels

of parental education predicted increased cortical thickness in these areas. Unlike parental education, family income alone was not found to significantly correlate with cortical thickness.

Lawson et al. (2013) concluded that SES was related to structural differences in specific regions of the prefrontal cortex. The results suggested that the differences provided the structural evidence to explain the previously documented associations between SES and executive functioning behaviors that affect cognition and academic achievement. It was notable to researchers that even though parental education and family SES were highly correlated, they differed greatly predicting cortical thickness. Lawson et al. (2013) posited that the different SES indicators, such as income and education levels, reflected different environmental or genetic influences and should be considered separately in future studies. Additionally, the researchers noted that the results demonstrated correlation not causation and did not indicate that the cortical differences associated with SES were unchangeable.

Congruent with the previous studies that suggested that language, memory, socioemotional processing, and cognitive control correlated to differences in SES, Noble, Houston, Kan, and Sowell (2012) studied volumetric differences in regions of the brain associated with these behaviors across SES. Participants were 60 typically developing children, ages 6-17, who were part of a larger study on brain development. Researchers examined the MRIs of each participant to measure the cortical volume of specific regions of interest (ROI) in the brain associated with language, reading skills, memory, socioemotional processing, and regulation of cognitive control. The specific ROIs included the left superior temporal gyrus (LSTG), left middle temporal gyrus (LMTG), left inferior temporal gyrus (LITG), left inferior frontal gyrus (LIFG), left fusiform gyrus, the hippocampus, the amygdala, and the anterior

cingulate cortex (ACC). Researchers also documented the participants' family income, parental education levels, and IQ.

The results of the study demonstrated that SES was associated with certain ROIs but not with total cortical volume. After controlling for multiple variables including age and IQ, Noble et al. (2012) found that SES was significantly associated with cortical volume in the hippocampus and demonstrated an associative trend in the volume of the left inferior temporal gyrus. Moreover, parental education was specifically associated with changes in amygdala volume, while income level was associated with the hippocampus. Lower parental education levels correlated with larger amygdala volume, and higher income levels correlated with larger hippocampal volume. Additionally, as participants' ages increased and age ceased to be a controlled variable, parental education was also associated with volume differences in the left superior temporal gyrus and the left inferior frontal gyrus.

Noble et al. (2012) concluded that childhood SES was linked to specific differences in certain regions, or structures, of the brain associated with language, memory and socioemotional processing. The results of the study demonstrated that SES factors were related to differences in volumes of the hippocampus, the amygdala, and the left inferior temporal gyrus. Researchers argued this was important because it supported previous research that documented SES differences in cognitive and socioemotional development and may identify the specific neural structures for targeted future educational interventions. According to Noble et al. (2012), stress associated with lower SES may be linked to the changes identified in the hippocampus and amygdala. Because parental education was associated with variations in the amygdala and income level was associated with variations in the hippocampus, researchers posited that

different stressors were linked to each SES factor, including parenting style, cognitive stimulation, and material resources, and were important areas for further research.

Noble et al. (2012) also concluded that volume disparities in the left superior temporal gyrus and the left inferior frontal gyrus across SES levels increased with age. This was notable because these regions of the brain are linked to language. Researchers suggested that the findings reflected the cumulative effect of long-term differences in language exposure.

Strategies that Improve School Outcomes for Students in Poverty

Decades of research has illustrated how poverty negatively affects children's school success through impacts in language and brain development, executive functioning, and socioemotional skills. With a focus on reducing the poverty achievement gap, the following research aims to identify the strategies and interventions that schools can implement to improve low-income students' academic success in school.

Socioemotional Functioning Interventions

Raver, Jones, Li-Grining, Zhai, Bub, and Pressler (2011) examined the effectiveness of a preschool-based intervention targeting children's self-regulation. Researchers studied how the Chicago School Readiness Project (CSRP), a classroom-based intervention designed to support low-income children's development of self-regulation skills, impacted self-regulation and school readiness skills. CSRP provided a mental health consultant to train teachers on positive classroom management strategies and also provided ongoing consultation, both in and out of the classroom.

CSRP was implemented throughout 35 Head Start preschool classrooms using a cluster-randomized design, with classrooms designated as either a treatment or control classroom. Because treatment classrooms received extra support through the mental health

consultants, control classrooms included an extra teaching assistant. Participants were 543 low-income children with a mean age of 49.4 months. In fall and spring, trained assessors administered six tasks to measure participants' self-regulation skills in the areas of executive functioning, effortful control, and attention/impulse control. Using a cognitive assessment, participants' pre-academic skills in vocabulary, letter naming, and early math skills were measured. Additionally, researchers collected data on covariates such as participants' demographics and teachers' professional and mental health characteristics (Raver et al., 2011).

The results of the study indicated that the CSRP intervention led to significant treatment effects with both pre-academic and self-regulation skills. While no differences between the treatment and control groups in pre-academic or self-regulation skills were found in the fall, Raver et al. (2011) found that by spring, participants in the treatment group made significant gains in vocabulary, letter naming, and early math skills compared to participants in the control group. Results also indicated that participants in the treatment group had significantly higher scores in measures of executive functioning, attention, and impulse control than their control group peers. However, no differences were found in the measure of effortful control.

In the analysis, Raver et al. (2011) discovered a significant mediation role for two self-regulation measures on pre-academic scores. Researchers determined that measures of attention/impulse control were marginally significant for mediating vocabulary scores and statistically significant for mediating letter naming and early math skills. Executive functioning measures significantly mediated all three pre-academic skill areas. Effortful control measures were not found to significantly mediate pre-academics skills in vocabulary, letter naming, or early math.

Raver et al. (2011) concluded that a classroom-based intervention targeting preschooler's self-regulation skills was beneficial in several ways. Children exposed to the CSRP intervention were observed to have significantly higher attention and impulse control skills and scored higher on the executive function tasks than the preschoolers in the control group classroom. Researchers hypothesized that these benefits reflected a classroom environment that was more structured and positive, with fewer behavior disruptions and conflicts. This may have offered children more opportunities to practice following rules and routines, planning behavior, and maintaining attention; thereby strengthening key self-regulation skills.

The classroom-based intervention was also beneficial in increasing the preschooler's learning opportunities. Raver et al. (2011) concluded that children in the intervention classrooms demonstrated significant improvement in pre-academic skills over the school year compared to their peers in the control classroom. Since teachers in the treatment classrooms received no instructional or academic training or materials, researchers argued that the academic benefits of the intervention were due solely to the focus on socioemotional skills. Ravers et al. (2011) posited that the findings suggested that improving children's self-regulation skills in a preschool setting was critical for increased learning opportunities and achievement.

Similar to the Ravers et al. (2011) study, Sasser, Bierman, Heinrichs, and Nix (2017) examined the sustained effectiveness of a preschool intervention targeting socioemotional skills and language-literacy. They analyzed the executive functioning (EF) and academic outcomes over a five-year period. The researchers investigated the Research-Based, Developmentally Informed (REDI) program. REDI, a one-year intervention, included teacher training and classroom curriculum. Classroom teachers received training that focused on positive classroom management strategies, language use, and emotion coaching, both in and out the classroom. The

REDI intervention also included a weekly socioemotional lesson and activity targeting prosocial behavior; emotional regulation, and impulse control; a daily literacy lesson targeting language, vocabulary, and phonemic awareness skills; and a daily alphabet center.

The study was implemented in 44 preschool classrooms at 25 Head Start centers in Pennsylvania with centers randomly assigned to either the intervention or the control (standard Head Start practices) group. Participants included 356 children from low-income families who were followed longitudinally through the third-grade. Pre-intervention, participants were administered two IQ measures, and preschool teachers rated each student in the areas of attention, impulsivity, socioemotional skills, and overt aggression. Throughout the intervention, the participants' executive functioning skills were assessed using a variety of tasks that measured working memory, inhibitory control, and attention shifting which created the executive functioning composite. Post-intervention, researchers assessed each participants' reading fluency skills. Participants also evaluated their own reading ability using a scaled questionnaire. Teachers rated each child's academic performance in language arts and math and completed a Child Development Questionnaire (Sasser et al. 2017).

To analyze the results, Sasser et al. (2017) placed the participants who received the intervention into three trajectory classes based on initial executive functioning composite scores. The high EF group included 16% of participants. The demographic data indicated that the children came from higher SES families and tended to be slightly older than either the moderate (58% of participants) or low (26% of participants) EF trajectory group. The participants in the high EF group also tended to have the highest IQ, inattention, and social competence scores, followed by the moderate EF group and then the low EF group. Additionally, children in the low

EF group were initially rated by their teachers as more impulsive and aggressive than those in the other trajectory groups.

The results found a significant intervention effect for the participants in the low and high EF trajectory groups. By the end of the study, the highest and lowest EF participants demonstrated significantly higher third-grade EF scores than the controls. The low EF group also demonstrated more growth between preschool and third grade than the controls. No intervention effects were found for the moderate EF group. Considering academic outcomes, a significant intervention effect was found for the low EF trajectory group in reading fluency measures, teacher ratings of student's language arts and math performance, and participant's reading ability self-assessments. Intervention effects did not impact academic outcomes for the moderate or high EF groups (Sasser et al., 2017).

Sasser et al. (2017) concluded that the REDI intervention effectively provided sustained benefits for children identified with low executive functioning skills. Children with low executive functioning skills who received the intervention in preschool had significantly better executive functioning skills and more favorable academic outcomes in all measured academic areas by third grade than controls. Furthermore, the low EF children in the control group demonstrated a decline in skills over time. Researchers noted that the most vulnerable group of children (low EF) benefited the most from the intervention. Sasser et al. (2017) posited that the children may have been exposed to high levels of stress and instability, so the preschool intervention provided the needed structure and socioemotional support. Researchers concluded that the intervention promoted continued classroom engagement and executive functioning growth.

With several studies, such as Ravers et al. (2011) and Sasser et al (2017), demonstrating the effects of preschool-based socioemotional interventions, Zhai, Raver, and Jones (2015) sought to determine the long-term effects of such interventions. Zhai et al. (2015) examined how classroom-based social and emotional learning (SEL) services in third grade influenced economically disadvantaged children's socioemotional and academic development. Using follow-up data from a previous study on the preschool intervention the Chicago School Readiness Project (CSRP), researchers looked at the association between number of SEL services in a classroom and children's outcomes and whether the services moderated the initial effects of the CSRP intervention. Participants were 414 third grade children from the initial CSRP intervention and control groups. The children were recruited for the CSRP study if they attended one of 18 Head Start preschool programs located in economically disadvantaged neighborhoods in Chicago.

For the current study, Zhai et al. (2015) used data from the CSRP third grade survey to measure student outcomes and teachers' promotion of SEL services in the classroom. Participants' social skills, impulsiveness, child-teacher relationships, and behavior problems were measured through a variety of scales and teacher reports. Academic skills were measured through teacher's reports using the Academic Rating Scale. Zhai et al. (2015) measured the amount and quality of SEL services provided by teachers through a CSRP survey that asked about the frequency of classroom use of six types of SEL activities (behavior or effective classroom management, violence prevention, social and emotional development, character education, tolerance or diversity, and risk prevention).

Zhai et al. (2015) found that SEL activities in third grade were significantly associated with child development outcomes. Specifically, the results showed that weekly or daily use of

one additional SEL classroom activity was positively associated with social skills, student-teacher relationship and closeness, and children's academic skills in language and literacy; it was also robustly negatively associated with children's impulsiveness ratings. No significant associations were found between SEL activities and behavior problems, conflict, motor impulsiveness, and mathematical thinking (Zhai et al., 2015). The analysis results of CSRP intervention effects and third grade SES indicated that the CSRP intervention had minimal, if any significant effects on the participants' third grade outcomes. There was no evidence the third grade SEL activities moderated the CSRP intervention effects.

Zhai et al. (2015) concluded that the number of SEL services in third grade was positively associated with children's socioemotional and academic development. Exposure to one type of SEL activity in third grade positively impacted the Head Start children's social skills, student-teacher relationships, academic skills, and impulsiveness. Researchers believed that, since the number of reported SEL activities was high, the benefits were greater. While the results of the current study were positive, Zhai et al. (2015) noted that the sustained benefits of the CSRP intervention were disappointingly minimal or nonexistent by third grade. Researchers believed these findings suggested that preschool SEL focused interventions may need to be supported through SEL services in the later elementary school years to be effective long-term. Future studies should investigate whether the effects of third grade SEL activities are sustained over time to determine the true impact of SEL interventions on children's long-term outcomes.

Extending the research of socioemotional skills intervention to older students, Lemberger, Selig, Bowers, and Rogers (2015) investigated the effectiveness of the Student Success Skills (SSS) program on the socioemotional and academic outcomes of middle school students. SSS is a K-12 program implemented by school counselors that promotes developmentally appropriate

social and learning skills. SSS includes classroom guidance lessons and small group counseling sessions centered on cognitive factors, attitudinal skills, self-regulation and metacognition skills, behavioral skills, and social skills. Participants were 193 seventh grade students in 11 social studies classrooms in a southwestern school district. Classrooms were randomly assigned as either a treatment classroom receiving the SSS intervention or a control classroom. All components of SSS were implemented with fidelity except that small group counseling sessions for high-needs students were replaced by counselors who consulted with all teachers about the weekly SSS skills and discussed ways to support the skills in the classroom. Pre- and post-intervention, participants were given two self-report scales that measured executive functioning skills and perceptions of social support. Participants' academic achievement was measured using a district formative mathematics and reading competencies assessments given both pre- and post-intervention.

The results of the study indicated that students who received the SSS interventions demonstrated more favorable outcomes. Lemberger et al. (2015) controlled for pretest performance and demographics on all analyses. Participants in the intervention classrooms had significantly higher scores on the math and reading assessments post-intervention compared to the control classrooms. They demonstrated significantly more favorable scores on five of the eight executive functioning subscales (shift, emotional control, monitor, plan/organize, organization of materials, and task completion but not inhibit, shift, or working memory). Intervention classrooms demonstrated significantly higher scores than the treatment classrooms on one of the five social support subscales (Classmate Support).

As expected based on prior research, Lemberger et al. (2015) concluded that the results of the study supported the SSS program as an effective intervention for improving academic

performance of low-income students. While the current study did not include the small-group component as in prior studies, it was noted that the effect sizes for academic achievement, executive functioning, and social support were larger than previously reviewed. Additionally, the added counselor-teacher consultation component may have influenced the results in ways the researchers were unable to measure. Regardless, Lemberger et al. (2015) suggested that the findings not only supported the SSS program but also the general importance of utilizing school counselors and counseling interventions in schools. The effectiveness of the SSS program to increase academic performance also demonstrated the value of including learning and social skills activities across all areas of curriculum. Lemberger et al. (2015) argued that the SSS program may be an effective intervention to help to close the achievement gap for marginalized communities and should be a focus for future research.

As numerous studies documented the relationship between socio-emotional skills and academic achievement, Smith-Adcock, Leite, Kaya, and Amatea (2019) sought to determine how parental factors influenced this relationship. Smith-Adcock et al. (2019) examined the relationships considering parent resilience and risk factors, children's socioemotional skills, and reading achievement in families of low socioeconomic status (SES). Using data from the Early Childhood Longitudinal Study-Kindergarten, researchers measured the socioemotional readiness skills of 3444 children from lower SES families in spring of their kindergarten year. Socioemotional skills measured included self-control, interpersonal skills, externalizing and internalizing problem behaviors, and approaches to learning (attentiveness, learning independence, flexibility, and organization). Researchers measured parenting resilience and risk factors in the fall and spring of their child's kindergarten year. Resilience and risk factors included parenting stress, discipline, family rules, and school, home, and cultural involvement.

Finally, reading achievement was measured in the spring of kindergarten using an assessment that evaluated basic reading skills, vocabulary, and comprehension.

Smith-Adcock et al. (2019) found correlations between several of the variables: parent risk and resilience, child socioemotional and reading achievement. Between parenting risk and resilience factors and child socioemotional skills, only parenting stress and school involvement were shown to have an effect. Parental stress was related positively to externalizing problem behaviors and negatively to approaches to learning, self-control, and interpersonal skills. School involvement was related positively to approaches to learning, self-control, and interpersonal skills and negatively to externalizing and internalizing problem behaviors. When analyzing the relationship between socioemotional readiness skills and reading achievement, researchers found that approaches to learning were positively associated with reading scores and self-control was negatively associated with reading scores. Between the parenting risk and resilience factors and reading achievement, results indicated that school involvement had a direct relationship on reading scores that was partially mediated by approaches to learning and self-control (Smith-Adcock et al., 2019).

Smith-Adcock et al. (2019) hypothesized that in low-income families parenting risk and resilience factors were related to children's socioemotional skills and reading achievement. However, the only significant direct relationship was between parental school involvement and reading achievement. This relationship was mediated by approaches to learning and self-control, and these mediated the relationship between parenting stress and reading achievement. Because parental stress was associated with many of the children's socioemotional readiness skills and was a significant risk factor for low-income families, the link between approaches to learning and parental stress was important. Smith-Adcock et al. (2019) argued that approaches to learning

played a significant role in mediating the relationship to reading achievement. This was notable because skills such as attentiveness, learning independence, flexibility, and organization are teachable. Along with approaches to learning, researchers concluded that parental-involvement and self-control were also malleable factors and all may be important areas for future intervention programs.

Parental Involvement Interventions

Just as the Smith-Adcock et al. (2019) study demonstrated, parents play a crucial role in a child's education and schools have long-sought to involve parents in students' learning. Loughlin-Presnal and Bierman (2017) investigated how a parenting program promoting school readiness skills influenced low-income parent academic expectations and behaviors that affected kindergarten outcomes. The study implemented the Research-based Developmentally Informed Parent Program (REDI-P), an intervention geared for low-income parents of preschoolers that included activities and materials to improve child language-literacy, socioemotional skills, and motivational strategies to increase parental expectations. REDI-P strategies were administered through 10 home visits in the last year of preschool with six "booster" visits once the child entered kindergarten.

The study was implemented over two years at 24 Head start centers in Pennsylvania. Participants were 200 children and caregivers assigned to either the intervention or control group. During the final preschool year, home visitors provided parents with the monthly activity boxes, which included a list of parent-child activities focused on language-literacy and socioemotional skills, and demonstrated positive teaching techniques through role play and video. Each monthly home visit also included parent reflection and goal setting. Parents' academic expectations, parent-child interactive readings, and parent-child conversations were

measured through parent interviews given pre- and post-intervention. Child academic outcomes were assessed using three standardized literacy subtests measuring letter naming, letter sounds, and sight words and teacher ratings on the Academic Performance Rating Scale. Child socioemotional outcomes were measured through teacher questionnaires rating children's learning-oriented behaviors and social competence (Loughlin-Presnal and Bierman, 2017).

Loughlin-Presnal and Bierman (2017) found that the REDI-P intervention significantly increased parent academic expectations for their children. Initial analysis results demonstrated correlations between parent-child conversation and kindergarten reading quality. Correlations were also found between parent academic expectations and child academic performance, self-directed learning, and literacy skills. Similar correlations were found between parent-child conversations and child outcomes. Of the three parent mediators: parent academic expectations, parent-child interactive reading, and parent-child conversations, the intervention-related gains in parent academic expectations predicted gains in child literacy skills and self-directed learning but not child social competence. There were no statistically significant effects from either parent-child interactive reading or conversations on any child outcome measures. Finally, the results suggested that while gains in child skills lead to positive changes in parent expectations, the intervention itself had a non-mediated impact on parental expectations.

Loughlin-Presnal and Bierman (2017) concluded that the REDI-P intervention significantly increased parental academic expectations which positively influenced the children's emergent literacy skills and self-directed learning. Loughlin-Presnal and Bierman hypothesized that the materials and demonstrations by the home visitor made it easier for parents to feel confident in promoting child readiness skills. Additionally, parent reflection and goal setting may have increased parents' feelings of self-efficacy and enhanced the educational values for their

children which promoted parent academic expectations. Researchers also posited that the children may have gained confidence as they noticed their parents increased interest and expectations which influenced child outcome measures. Loughlin-Presnal and Bierman (2017) noted that increased parent-child interactive reading and conversation unexpectedly had no mediation effects on child outcomes. While it may be an anomaly, the researchers also suggested that it may have been because the intervention affected an unmeasured change in parent behavior. Loughlin-Presnal and Bierman (2017) concluded parental academic expectations played a critical role in increased academic achievement.

Similar to the Loughlin-Presnal and Bierman (2017) but with a focus on math achievement, Docherty, James, Spalding, and Walder (2018) examined how Learning Journals effectively increased parental engagement for students of low socioeconomic status (SES) and consequently improved math achievement. Learning Journals intervention consisted of an online interactive student journal where classroom teachers uploaded weekly photos, videos, home activities, and materials highlighting early math concepts. Participants were from 22 low-income families in Scotland and included one parent and one student from each family. Parents completed questionnaires measuring their views on school engagement and numeracy pre- and post-intervention. Parents were also interviewed about their experience using the Learning Journals and their values about social engagement following the intervention. Using a city-wide assessment, child participants were assessed in math before and after the intervention using a city-wide assessment. Additionally, researchers gathered students' views about math using an interactive activity.

The results of the study indicated that the Learning Journals increased parental engagement and student math achievement. Docherty et al. (2018) found a significant difference

between pre- and post-responses in the areas of math importance and parent confidence levels and knowledge about ways to support their child's math learning. No significant difference in parent's confidence about their own math skills was found between pre- and post-data collection. Post-intervention, the students expressed increased rates of math activities as enjoyable. When comparing student's pre- and post-intervention math achievement scores, Docherty et al. (2018) also found that the Learning Journal intervention led to a significant increase in participants' post-intervention math scores, particularly for those with lower SES. Additionally, the gains were greater for students who had very low pre-intervention scores.

Docherty et al. (2018) concluded that the Learning Journals effectively increased parental engagement and student achievement in math. Parents found that the intervention increased their understanding of and confidence in teaching math concepts. Researchers hypothesized that the Learning Journals increased the level of math talk and activities in the home environment in a way that benefited both parent and child participants, furthering the learning of students. The greatest gains were found among the students with the lowest SES. Docherty et al. (2018) argued that Learning Journals may be an effective way to address the poverty-related achievement gap; however, due to the small number of participants and short duration of the study, researchers cautioned against generalizing the results without further research.

Looking for an alternative to parent involvement (PI) programs typically used by schools, Alameda-Lawson (2014) investigated the effectiveness of a new model to engage low-income parents by targeting parent social networks. In the pilot study, Alameda-Lawson examined how the intervention, Collective Parent Engagement (CPE), influenced participants' feelings of empowerment and the academic achievement of their children. The CPE program was led by a school social worker and included three phases. In the first phase, parent groups identified areas

of need for themselves, their children, and the community. The second phase consisted of a 40-hour training course, and the final phase involved designing and implementing a school community program.

Using a post-hoc quasi-experimental design, participants were 32 parents with at least one child in the third grade or above who lived in an unidentified high-poverty urban community exposed to high levels of social exclusion and gun fire. Half of participants were in the CPE study group, and the other half a comparison group. Alameda-Lawson (2014) used a parent empowerment inventory and a parent involvement questionnaire. Mean reading, math and language scores on a standardized achievement test were collected pre- and post-intervention.

Alameda-Lawson (2014) found that parent empowerment and the CPE intervention moderated children's academic achievement differently. Greater parent empowerment was significantly associated with higher student standardized reading scores but not math or language. The CPE program was significantly associated with higher scores in math, reading, and language compared to the comparison group. However, when controlled for parent empowerment, the association between CPE and children's reading scores was no longer significant.

Alameda-Lawson (2014) concluded that even with significant study limitations the results suggested that a collective parent engagement group focused on improving families and the community positively related to both student academic achievement and parental feelings of empowerment. While 15 of 16 children in the CPE group showed improvement in academic scores post-intervention compared to only eight in the comparison group, Alameda-Lawson (2014) noted that the majority of children's scores did not reach proficiency, suggesting that multiple interventions may be needed to achieve optimal outcomes. Considering that parent

empowerment was only associated with achievement in reading, which contradicted previous study findings, the author hypothesized that parental empowerment may be more closely linked to a social construct not identified by the measures used in the CPE intervention. Alameda-Lawson (2014) cautioned that limitations, including a small sample size that represented a third of the CPE intervention and post-hoc comparison group, prevented generalization of results, and further research was needed to understand specifically how collective parent engagement programs influenced student achievement and parent empowerment.

School Climate

Looking beyond student, parent, and classroom factors to the school as a whole, school climate consists of many factors, such as the school structure and environment, a sense of community, and peer and school-wide norms, that are recognized as influencing the experiences of students and staff (Davis and Warner, 2018). Focusing on the disciplinary climate, Huang and Zhu (2017) examined the association between school disciplinary climate and student grit and academic achievement for low socioeconomic status (SES) students. Using data from the 2012 Program for International Student Assessment (PISA) collected by the Organization for Economic Co-Operation and Development (OECD), the study looked at the math and science assessments and survey responses of 4,978 15-year-old students in the U. S. Huang and Zhu (2017) narrowed the original sample to the 1,220 students who fell into the lowest SES quartile and categorized them into one of four achievement levels in math and science, from lowest to highest. To measure disciplinary climate, researchers used the student and school administrators responses on the PISA survey and created a classroom disciplinary climate (CDC) and school disciplinary climate (SDC) factor. Student grit was measured by student's survey responses to

self-perceived persistence. Huang and Zhu (2017) controlled for confounding variables such as student demographics and study habits, school size and teacher quality, and parental involvement.

Results of the study indicated that classroom disciplinary climate and student grit significantly predicted students who were considered high achievers. Defining high achievers as above average students, or those who performed in the top half of performers, Huang and Zhu (2017) determined that 31% of the 1,220 low-SES students were considered high achievers in math and 30% in science. After controlling for the aforementioned confounding variables, CDC and student grit were significantly associated with high achievement in both math and science, predicting whether a student fell into the high achievement category. School disciplinary climate was not found to be a significant factor. Researchers also determined that the most significant predictor of high achievement was school SES.

Huang and Zhu (2017) concluded that CDC and student grit were two crucial factors associated with students' high achievement in math and science. Compared to similar low-SES peers, students were more likely to be high achievers if they had more grit and were in classrooms with more positive disciplinary climates. Researchers argued that these factors could play a role in narrowing the income achievement gap as the study's sample of high achievers performed comparable to peers with higher than average SES. Since the study only tracked student performance at one point in time, it was concluded that future research should focus on longitudinal data to determine if CDC and student grit continued to be important factors in academic achievement in high school and beyond. Huang and Zhu (2017) suggested that future interventions for schools with a large number of low-SES students should target positive learning climates and resilience education.

Similar to Huang and Zhu (2017), Davis and Warner (2018) examined the relationship between school climate and student academic progress; however, the study also included the influence of student background factors. Using data from the New York City Department of Education's (NYCDOE) 2010-2011 Progress Report, researchers sought to determine whether perceptions of school climate or student background variables were the most significant predictor of student academic progress. To measure a school's growth in academic achievement, a student academic progress composite was produced from each school's credit accumulation along with data from the New York state exam completion and pass rates. School climate composites for students, parents, and teachers were created from NYCDOE survey response data measuring each school's academic expectations, communication, engagement, and safety and respect. Student background data was compiled from the NYCDOE Progress Report demographic statistics where 78.6% of students qualified for free and reduced-price lunches.

The study results indicated that school climate strongly predicted student academic progress. The first model of analysis looked only at school climate and student academics. The parent school climate composite was the strongest predictor followed by teacher and student climate composites. The second model of analysis used student background factors as predictors and indicated that school climate variables played a stronger role than student background variables in predicting student academic progress. The final model of analysis examined school climate and student background variables together. The results suggested that only total student enrollment and free and reduced-price lunch were significant background factors in predicting student academic progress. Additionally, teacher and parent school climate composites, but not students, were stronger predictors than either total enrollment or free and reduced-price lunch (Davis and Warner, 2018).

Davis and Warner (2018) concluded that while both school climate and student background factors predicted student academic progress, school climate explained more of the variance. Teachers' perceptions of school climate were found to be the most predictive of academic growth followed by parent perceptions of school climate, greater than student socioeconomic status (free and reduced-priced lunch). Students' perceptions were not significantly related to student academic progress which researchers hypothesized were possibly due to the high correlation between parent and student perceptions. Davis and Warner (2018) argued that their findings suggested that school climate affects "instructional quality and academic rigor within classrooms" and students' connection with a school (p. 976). While future research should include student-level data to compare differences between high and low performing schools, they also noted that, even in a large, urban district, improvement can happen at the school or district level by fostering positive school climates with high academic expectations; strong relationships among students, teachers, parents, and administration; active engagement for students and parents; and a safe, respectful learning environment.

Looking at how school climate influences students' perceptions of peers, Bell et al. (2019) evaluated the impact of school climate on academic achievement in Language Arts. The study focused on how social-normative expectations, or students' perceptions of their peers' future academic achievement based on school-wide behaviors and values, related to grades in Language Arts. Researchers hypothesized that more positive social-normative expectations would be associated with higher grades in Language Arts and vice versa. They also hypothesized that social-normative expectations were developed from the school climate; therefore, they would mediate school climate's effect on academic achievement.

The study used data from a 2012-2013 school improvement initiative in a low-performing, urban school district in New Jersey. The sample was comprised of 513 predominantly Latino 7th and 8th grade students from a low-income middle school where 88% of students qualified for free lunch. Bell et al. (2019) measured school climate through a Perception of School Climate scale based on four subscales: Student Respect, Friendship and Belonging, Student Shaping Environment, and Support/Care by/for Staff. Social-normative expectations were assessed through a six-item scale on educational attainment. Finally, the study used students' mean grade from four academic quarters in Language Arts.

Bell at al. (2019) found that Social-Normative Expectations negatively predicted final grades in Language Arts. Preliminary analysis indicated that total school climate was a significant positive predictor of final grade and social-normative expectations. School climate, once mediated by social-normative expectations, was associated with a .6-point lower final grades. Researchers then analyzed how each subscale of school climate mediated its effect on final grades. Results indicated that "Friendship and Belonging" and "Student Shaping Environment" were most strongly correlated to social-normative expectations; however, all the school climate subscales were negatively associated with final grades as mediated by social-normative expectations.

The study findings suggested that social-normative expectations are related to school climate yet are distinct in predicting final grades in Language Arts. Ben at al. (2019) concluded that social-normative expectations negatively mediated the relationship between perceptions of school climate and academic achievement in Language Arts. The results suggested that students with positive perceptions of both peers' academic futures and the school climate will have lower Language Arts grades. Researchers noted that their initial hypothesis was unexpectedly not

supported by the findings and contradicted prior research that noted positive relationships between school climate, teacher/student expectations, and academic achievement. Ben et al. (2019) argued that having low social-normative expectations was possibly a protective coping mechanism for students if they more realistically matched their challenging, low-performing school environment. Lack of racial and SES diversity in the study sample limited generalizations of data but researchers concluded students' perceptions of themselves, their peers, and their learning environment were important areas of focus for future interventions and research.

Teacher-Student Relationships

The research on school climate demonstrates the importance of community and relationships in a students' learning. Hughes (2011) investigated how perceptions of teacher-student relationship quality (TSRQ) impacted students' academic self-views, engagement, and academic achievement. Over a four-year period, the study examined how both teacher and student perceptions of support and conflict in the teacher-student relationship affected outcomes hypothesizing that each contributed in distinct ways. Participants were 714 racially and ethnically diverse students in Texas who were predominantly low-income; 66% qualified for free and reduced-price lunch. Additionally, all students were considered academically at-risk based on below the median scores on first grade literacy scores on district assessments. A structured interview was used to measure child and teacher ratings of the support, or warmth, and conflicts in the teacher-student relationship. Teachers also completed a questionnaire rating students' behavioral engagement in the classroom. Hughes (2011) used rating scales to measure students' self-perceived academic competencies, or self-efficacy, and sense of belonging. A standardized academic achievement test was administered yearly to measure students' academic performance in reading and math.

The results of the study indicated that teacher and student reports revealed unique effects in predicting outcome measures. Preliminary analyses found that teacher and student ratings of support were not significantly correlated but ratings of conflict were. Student's perceptions of reading self-efficacy significantly correlated with reading achievement and less with math achievement. Perceptions of math self-efficacy significantly correlated with math achievement but not reading. Teacher ratings of support and conflict in the teacher-student relationship correlated with students' behavioral engagement and math and reading achievement. Teacher support ratings positively correlated with students' math self-efficacy and sense of belonging; teacher conflict ratings negatively correlated with sense of belonging. Child reports of support and conflict in the teacher-student relationship correlated with student belonging. Student ratings of support predicted math and reading self-efficacy; student conflict ratings were related to math and reading achievement, sense of belonging, and student behavioral engagement. Overall, shared TSRQ was associated with statistically significant changes from baseline for sense of belonging, behavioral engagement, and academic achievement in math and reading (Hughes, 2011).

Hughes (2011) concluded that measures of TSRQ were related to statistically significant improvements in students' academic self-efficacy, sense of belonging, behavioral engagement, and academic achievement. Of all outcome measures, TSRQ measures had a smaller effect for measures of academic achievement than the others. Hughes (2011) argued that this small achievement effect may consequently affect academic achievement resulting in larger long-term effects. Also noted were the unique effects of student perceptions of TSRQ for academic self-efficacy, sense of belonging, and math achievement. These findings suggested that children's perceptions of their teacher-student relationship impacted academic outcomes even if their

perceptions didn't correlate with the teachers' perceptions. Moreover, Hughes concluded that students who believed their teachers were more supportive may have viewed themselves as belonging and academically competent.

Also studying teacher-student relationships, Gehlbach et al. (2016) examined how similarities between teachers and students affected relationships and academic achievement in various student populations. Researchers investigated the effects of an intervention that experimentally manipulated perceptions of similarities on teacher-student relationships (TSR). Participants were 315 ninth graders and 25 teachers from a suburban high school in southwestern U. S. In the first stage of the intervention, all participants completed an initial getting-to-know-you survey. Next, teacher-student dyads were randomly assigned to receive either feedback about similarities (treatment group) or generic feedback (control group). At the end of the school quarter, all participants completed a TSR scale and a similarity scale. Researchers also collected mid-quarter and final quarter grades.

The results indicated that the intervention increased perceptions of similarities but had mixed effects on TSR. Students and teachers in the treatment group had mild-to-moderately increased perceptions of similarities by the end of the quarter compared to the control groups. The teacher treatment group indicated more positive relationship ratings with students than teacher controls; however, the student treatment group did not differ from controls on the TSR scale ratings indicating no intervention effects. The academic results suggested that students whose teachers received feedback about similarities earned higher end-of-quarter grades but mid-quarter grades showed no effect (Gehlbach et al., 2016).

Gehlbach et al. (2016) also analyzed the intervention effects for student subgroups. Results indicated the intervention had no effect on well-served students but positive effects were

noted for under-served students. Under-served students and their teachers in the treatment group demonstrated significantly increased perceptions of similarities when compared to well-served students and their teachers. Under-served students whose teachers received feedback on similarities also demonstrated some evidence of increased grades when compared to well-served students.

Gehlback et al. (2016) concluded that the intervention positively altered students' and teachers' perceptions of commonalities and improved TSR from teachers' perspectives. Researchers suggested that the intervention may not have been effective for improving students' views of TSR because ninth graders may not be particularly motivated to form social relationships with their teacher regardless of what they have in common with each other. Conversely, for teachers, the intervention may have helped teachers feel more commonalities with their students thereby increasing their perceptions of TSR quality and positive interactions which, in turn, increased the students' learning and grades. Although the true effect on grades from the intervention was only mild-to-moderate overall, researchers noted the intervention could be implemented with ease and brevity, increasing goal attainability.

Gehlback et al. (2016) also concluded that the positive intervention effect on the grades of under-served students was a significant finding. They argued that the substantial increase in student grades possibly reduced the achievement gap by two-thirds. While the study had numerous limitations such as small sample size, imperfect implementation, and lack of statistical power, researchers believed that the findings concerning underserved students were strong enough to warrant future research targeting similar interventions.

Hosan and Hoglund (2017) extended the previous research to include peer relationships. Researchers examined the association between the quality of children's relationships with

teachers and friends and engagement in school with how it impacted academic achievement. The study specifically investigated the ways closeness and conflict in children's relationships influenced their emotional and behavioral engagement. Participants were 461 low-income children in kindergarten through third grade from high-needs, ethnically diverse schools in Western Canada. Over one school term, researchers collected pre-, mid-, and post-data, identified as Wave 1, Wave 2, and Wave 3. Teachers used a rating scale to identify the quality of the teacher-student relationship based on levels of closeness and conflict. Participants used a friendship scale to rate the perceived quality of one friendship based on closeness and conflict. Researchers rated participants' self-perceived levels of emotional and behavioral engagement in school. Academic achievement was measured in writing using a standardized achievement assessment.

The results indicated that the quality of teacher and child closeness was related to engagement and achievement in different ways. Friendship closeness was associated with greater levels of emotional engagement; emotional engagement at Wave 1 and Wave 2 predicted more advanced writing skills at Wave 3. Friendship closeness also correlated to greater levels of behavioral achievement; however, behavioral engagement did not significantly predict writing skills at Wave 3. Teacher-child closeness was not associated with either emotional or behavioral engagement (Hosan and Hoglund, 2017).

When analyzing conflict in relationships, Hosan and Hoglund (2017) found that both friendship and teacher conflict negatively predicted emotional and behavioral engagement, but friendship conflict alone was associated with more advanced writing skills at Wave 3.

Hosan and Hoglund (2017) also analyzed how the age of participants affected the association between relationship quality and engagement. They found that friendship conflict

negatively correlated with behavioral engagement for younger children (kindergarten and first grade) but not older children (second and third grades). Teacher-child closeness was associated with greater behavioral engagement in younger children, and friendship closeness was associated with greater behavioral engagement in older children.

Hosan and Hoglund (2017) concluded that the study findings supported the hypothesis that high-quality relationships were associated with children's emotional and behavioral engagement in school. Children with greater levels of friendship closeness and reduced levels of both friend and teacher conflicts had greater emotional engagement. Researchers noted that conflict in the teacher-child relationship appeared to be more important for children's emotional engagement than closeness, possibly due to the salience of conflict and children's expectations for a positive relationship with teachers. Similarly, the findings suggested that close friendships and less conflicted friend and teacher relationships were associated with greater behavioral engagement in school; and behavioral engagement reciprocally led to higher-quality friendships. Hosan and Hoglund (2017) argued that behavioral, not emotional, engagement promoted friendship quality as it was more salient for children. They also noted that teacher-child closeness, not friendship, was associated with increased behavioral engagement for younger students only. Because kindergarten and first grade students have more teacher directed activities, researchers speculated that friend interactions may be teacher directed and close teacher-child relationships may lead to greater desire for students to be actively engaged. Because friendship closeness was reciprocally related to behavioral engagement for older, not younger students, researchers concluded that behaviorally engaged older students may seek interaction with similar peers leading to closer relationships over time.

Concerning academic achievement, Hosan and Hoglund (2017) concluded that only friendship conflict and emotional engagement were associated with greater academic achievement. Because the study only measured writing skills, it was posited that children's emotional investment in learning may have been notable for independent activities such as writing, while behavioral engagement may have been more closely associated with group activities. Because friendship conflict was associated with greater academic achievement that contradicted the study hypotheses, researchers argued that friend conflicts possibly provided opportunities for problem-solving which in turn increased academic skills.

Expanding how teacher-student relationships are measured, Scales et al. (2019) investigated how teacher-student developmental relationships affected students' academic motivation, engagement, and performance. They also considered how student socioeconomic status (SES) influenced those associations. While previous research typically measured teacher-student relationships by warmth (caring) and high expectations (challenge), this study added elements for providing support, sharing power, and expanding possibilities to measure the developmental relationship between teachers and students. Participants were 534 students in grades six through eight at a middle school in a Midwestern suburb. Students completed an online survey at the beginning and end of one academic year. The survey included items that measured student-teacher relationships based on five elements: expressions of care, provisions of support, challenging students to grow, sharing of power, and expanding their possibilities (p. 654). Survey items also measured students' academic motivation, sense of belonging, and school climate. To measure SES, researchers used free- and reduced-price lunch qualification and one survey item asking students about financial hardship and strain. Additionally, researchers collected participant GPAs at three points over the academic year.

The results of the study indicated that stronger developmental student-teacher relationships were associated with significantly greater feelings of belonging, school climate, and motivation at both the beginning and end of the academic year. Overall, students rated their student-teacher developmental relationships as approximately a 3.4 on a 5-point scale. At the beginning of the year, Scales et al. (2019) found that student-teacher developmental relationships, not academic motivation, predicted belonging and school climate. By the end of the year, while both developmental relationships and academic motivation predicted belonging, student-teacher relationships were more strongly associated with outcomes. Students with stronger developmental relationships also had significantly higher motivation and GPA at both measurement points than students with poor developmental relationships. The analyses demonstrated that developmental relationships only indirectly impacted students' GPAs through motivation, a strong predictor of GPA. Scales et al. (2019) also found that when the student-teacher developmental relationships included support, shared power, and expanded possibilities, the predictive value increased compared to relationships that provided only care and challenge.

When analyzing the effect of SES on relationships and outcomes, Scales et al. (2019) found that SES was significantly associated with academic motivation but not student-teacher developmental relationships at the beginning of the school year. Students with lower-SES had lower motivation than their higher-SES peers. At the end of the year, the results indicated the opposite was true. Students with lower-SES had poorer student-teacher developmental relationships than higher-SES students at the end of the year and academic motivation was no longer related to SES. While student-teacher relationships declined across the year for all

students, students with lower-SES had worse student-teacher relationships at the beginning of the year and a greater decline in relationship status when compared with higher-SES students.

Scales et al. (2019) concluded student-teacher developmental relationships were positively related to academic motivation, belonging, and school climate and indirectly related to GPA. Researchers hypothesized that student-teacher relationships directly influenced motivation which led to better grades. They also concluded that there was evidence to expand the definition of student-teacher relationships beyond caring and challenge to include providing support, sharing power, and expanding possibilities. The expanded definition improved the accuracy of using relationships to predict academic outcomes. Scales et al. (2019) posited that it would be beneficial to redefine and strengthen student-teacher relationships more holistically.

Concerning SES, Scales et al. (2019) concluded there was no evidence that student SES moderated the relationship between developmental relationship and outcomes; however, SES was negatively associated with both student-teacher relationships and academic motivation. Researchers argued that these findings were significant considering that students with low-SES had lower-quality student-teacher relationships at the end of the school year and a greater decline in relationship quality as the year progressed compared to their more affluent peers. Most concerning to researchers was the indirect effect of SES on the GPA of lower-SES students as lower-quality relationships were linked to lower GPA. Scales et al. (2019) suggested that improving student-teacher developmental relationships for students with lower-SES may possibly reduce the achievement gap. Furthermore, they posited that teachers could strengthen their relationships with students in all five elements with minimal effort through small changes in interactions.

Teacher Instructional Strategies

Like teacher-student relationships and school climate effect, teacher instruction also affects student engagement and achievement. Croninger, Buese, and Larson (2012) examined the effects of teachers' instructional practices on academic achievement for low-income students and how educational policy influenced those practices. The longitudinal study sought to discover how fourth and fifth grade teachers from moderate- and high- poverty schools promoted student achievement in reading and math. Researchers focused on ways successful teachers reduced the achievement gap and adapted their teaching practices in response to educational challenges.

Using both qualitative and quantitative analyses, the study collected data from a variety of sources. Participants were 63 fourth- and fifth-grade teachers from 16 moderate- and high-poverty schools with higher than expected achievement. Croninger et al. (2012) identified classrooms as moderate-poverty if slightly less than half the students qualified for free and reduced-price meals services (FARMS) and high-poverty of the majority qualified for FARMS. Researchers conducted six to eight observations per classroom documenting the frequency of instruction that promoted high and low cognitive demands for students and linked procedural and conceptual knowledge to measure teacher instruction. Teacher logs were also collected daily to identify the breadth and depth of curricular topics covered. Student achievement was measured using scores from the spring state-mandated reading and math assessments. Qualitative data was based on case studies from two teachers, three schools, four teacher focus-group interviews, and principal interviews.

The results of the quantitative analysis indicated differences in teacher instructional practices during math lessons in the moderate- and majority-poverty classrooms. Croninger et al. (2012) observed teachers who created high cognitive demands, such as asking for alternative

answers or presenting higher order problems, an average of 17% of the time. The average percentage of time teachers required low cognitive demands from students, such as accepting simple answers, or managed behavior was 32% of the time. Comparisons of instruction in the moderate- and majority-poverty classrooms demonstrated that high cognitive demands occurred more frequently in the moderate-poverty classrooms (9% versus 6%) and lower cognitive demands occurred more frequently in the majority-poverty classrooms (23% versus 18%). Researchers found that teachers only spent 6% of a lesson linking procedural and conceptual knowledge. Forty-five percent of lesson content focused on procedural knowledge, and 25% focused on conceptual knowledge. When comparing instruction in the moderate- and majority-poverty classrooms, Croninger et al. (2012) found no percentage difference in classrooms that linked procedural and conceptual knowledge during a lesson. However, moderate-poverty classrooms had a greater focus on procedural knowledge than high-poverty classrooms (48% versus 42%), and majority-poverty classrooms focused more on conceptual knowledge than moderate-poverty classrooms (27% versus 23%). The analysis results for the amount of time spent on different topics indicated that majority-poverty classrooms demonstrated greater variability than moderate-poverty classrooms but the difference was not statistically significant. Croninger et al. (2012) found that the effects of instruction on student achievement were conditional based on the classroom poverty status. Controls for prior achievement, found that students in majority-poverty classrooms had lower achievement scores on the state-mandated assessments than those in moderate-poverty classrooms. Greater variability in topic coverage in math was associated with lower student achievement in both moderate- and majority-poverty classrooms. Using a ratio of high to low cognitive demands in teacher instructional practices, the results indicated that the cognitive high demands increased

achievement in majority-poverty classrooms but not moderate-poverty ones. Conversely, linking procedural and conceptual content increased achievement in moderate-poverty classrooms only.

The results of the qualitative analysis demonstrated the effects that a new math curriculum had on teachers' instructional practices. Both teachers from moderate- and majority-poverty classrooms described challenges implementing a new math curriculum that was fast paced, presented topics in an unfamiliar order, and emphasized conceptual knowledge. Many teachers from the majority-poverty classrooms were additionally concerned that the students did not have the foundational knowledge or skills needed. Croninger et al. (2012) also found the emphasis on vocabulary and math discussion was concerning when students possibly lacked the necessary language skills. While all teachers expressed greater comfort with the curriculum during the second year, covering all the required topics before the state-mandated exam in the spring remained challenging for all classrooms.

Croninger et al. (2012) concluded that what constituted quality teaching practices was dependent on the poverty status of the students. In moderate-poverty classrooms, researchers posited that students had the basic conceptual knowledge necessary to gain the math knowledge and skills through the curriculum lessons, textbook, and assignments. Conversely, students in the majority-poverty classrooms needed teachers to significantly mediate the curriculum to learn both the lacking basic conceptual knowledge and the new curriculum. Croninger et al. (2012) suggested that this may have been the reason that a greater ratio of high to low cognitive demands benefited the majority-poverty students the most. The majority-poverty students were more dependent on the teacher to make the curriculum accessible with more vocabulary discussion and multiple representation of concepts. Researchers also suggested that instruction that linked concepts and procedures was not as beneficial for the majority-poverty students

because they lacked the basic conceptual knowledge needed for understanding. Croninger et al. (2012) concluded that one important factor in quality teaching was the teachers' ability to navigate school policy based on the specific student needs.

Considering the influence of professional development on teacher instructional practices, Desimone, Smith, and Phillips (2013) investigated the relationships among teacher professional development, instructional practices, and the academic achievement of academically disadvantaged students. The three-year longitudinal study examined how instructional practices influenced student achievement growth in mathematics from third- through fifth-grade. The study also examined how teachers' participation in professional development influenced changes in instruction. Researchers used data from the U.S. Department of Education in the Longitudinal Evaluation of School Change and Performance (LESCP). The sample included 4,803 students from a third-grade cohort assigned to 457 teachers from 71 high-poverty Title I schools in seven states. To measure student achievement, scores from a norm-referenced standardized math test were used. The math assessment was given each spring from grades three through five. Teacher instruction was measured through self-reported surveys. Teacher participants reported on the time spent on mathematics instructions daily, the number of lessons taught that focused on basic versus advanced math topics, and the time spent on emphasizing memorization of facts versus solving novel problems in each lesson. Professional development was measured by the number of hours teachers participated in professional development focused on either math or reading content, or non-content related topics.

Desimone et al. (2013) found a correlation between teacher instruction focused on advanced math topics and solving novel problems and academic achievement growth. A focus on advanced math topics was positively associated with faster than average math achievement

growth, while a focus on basic math topics led to slower than average growth. However, both of the effects were small. Similarly, a focus on solving novel problems during instruction was associated with modest math achievement growth, and a focus on memorization of facts was associated with slower than average growth. The time spent on mathematics was not associated with achievement growth.

Concerning the relationship between professional development and changes in instruction, the results indicated that math-focused professional development was significantly associated with an increased focus on advanced topics in the classroom. Math-focused professional development was also associated with a minimal, yet significant, increase in solving novel problems during instruction. Desimone et al. (2013) did not find that professional development was associated with time spent on mathematics or a focus on basic topics and memorization of facts. No significant relationships were found between other types of professional development and changes in math instruction.

Desimone et al. (2013) concluded that student math achievement grew faster than average when teacher instruction emphasized advanced topics and novel problem solving; conversely, math achievement was slower than average when instruction focused on basic topics and fact memorization. Researchers noted that small effect sizes were a common finding in non-experimental design studies. Desimone et al. (2013) also concluded that teachers who participated in math-focused professional development were more likely to teach advanced math topics and use novel problem solving. Thus, researchers posited that content-focused professional development increased teachers' use of the types of instruction associated with academic achievement. While researchers noted that the study had limitations, such as a design that did not demonstrate cause-and-effect, they believed the results strongly supported previous

research findings suggesting student achievement for economically disadvantaged students may be increased when professional development is content-focused.

Similarly, Stipek and Chiatovich (2017) investigated how the quality of teacher instruction and classroom climate affected economically disadvantaged children's academic achievement and engagement. The longitudinal study examined whether the quality of math and reading instruction impacted student engagement for both low- and high-performing students. Participants were 314 students from low-income families in 136 elementary schools. The participants were followed from kindergarten or first grade to third grade. Researchers observed and assessed teacher instructional quality through a newly developed scale that measured the quality of classroom climate, math instruction, and reading instruction. Student engagement was assessed through observations and measured separately for each academic subject. Observations occurred over a half-day. Participants' academic skills were assessed in either the spring of kindergarten or first grade and then again at the end of third grade. Reading and math assessments included both standardized tests and performance-based tasks.

The results indicated that high quality instruction in reading and math impacted high- and low-performing students differently. Stipek and Chiatovich (2017) found that academic achievement remained relatively stable over time. The kindergarten and first grade assessments significantly predicted achievement in third grade. For high-performing students, or students who had high achievement in the early grades, teacher instructional quality in third grade was not associated with end of year math or reading performance. However, for low-performing students, instructional quality was strongly associated with third-grade achievement. High quality instruction in third grade was also associated with a decreased impact of prior achievement for math skills and eliminated the impact of prior achievement on reading skills. Concerning student

engagement, researchers found that the quality of reading instruction, but not math, and classroom climate scores were significantly associated with engagement.

Stipek and Chiatovich (2017) concluded that the newly developed scale of teacher instructional quality effectively predicted end-of-year academic achievement in third grade for students who had been identified as low-performing. For these students, high quality reading instruction eliminated the disadvantage from poor prior reading performance and high quality math instruction decreased the impact of prior math performance. Researchers also concluded that high-performing students were not affected by teacher instructional quality. They hypothesized that high-performing students possibly had a high level of initial mastery or other learning skills, like attention, that minimized the effect of poor quality instruction. Stipek and Chiatovich (2017) argued that the findings suggested that poor-performing students were strongly impacted by the quality of teacher instruction, and effective teachers had the potential to reduce the achievement gap. Since poor performance and low SES were highly correlated, researchers supported policies that placed the most effective teachers with these disadvantaged students.

Stipek and Chiatovich (2017) found that classroom climate and student engagement were highly correlated regardless of students' level of achievement. Quality reading instruction was also associated with student engagement. Researchers noted that quality instruction in math and reading and classroom climate scores were all highly correlated. They suggested that effective teachers were skilled instructors and had good classroom management skills.

Following the research on effective teachers, Hirn, Hollo, and Scott (2018) investigated the differences in teacher instruction between low- and high-performing Title I schools. Researchers examined the frequency of active instruction in 22 elementary schools in the

southwestern United States. Active instruction was defined as teacher behavior that presented students with opportunities to respond (OTR) and provided student feedback. Of the 22 schools, 11 were identified as high-poverty, high-performing with a score at or above the 70th percentile on state accountability measures. The other 11 schools were identified as high-poverty, low-performing with a score below the 70th percentile on state accountability measures. Participants were 530 teacher-student dyads consisting of the classroom teacher and one randomly selected student. Researchers used classroom observations to measure the number of teacher behaviors that represented individual and group OTR (verbal, gestural, or written) and positive and negative feedback (verbal or non-verbal). The observations were 15 minutes in length and occurred during content area instruction. Researchers also collected school-level data for school size, number of suspensions, and percentage of students qualifying for free- and reduced-price lunch (FRL).

Initial analyses focused on the differences between high- and low-performing schools. Hirn et al. (2018) found that the high- and low-performing schools were similar in school size and in percentage of students qualified for free- and reduced-priced lunch. Results indicated that much of the variance in teacher behaviors was found at the classroom not the school level. Clear differences were found in the performance scores, 52.55 compared to 71.09, and in suspension rates with the low-performing school having significantly higher suspension rates.

While no differences were found between schools for rates of individual OTR and positive feedback, Hirn et al. (2018) found significant differences between high- and low-performing schools in rates of group OTR and negative feedback. The results indicated that teachers in the high-performing schools had significantly higher rates of group OTR compared to teachers in the low-performing schools. High-performing schools demonstrated a group OTR

every minute compared to every 1.5 minutes in low-performing schools. The differences in rates of group OTR remained significant even when researchers controlled for school size, number of suspensions, and percentage of students qualified for FRL. Teachers in high-performing schools also provided significantly less negative feedback than teachers in low-performing schools. The rate of negative feedback in high-performing schools was once every 100 minutes compared to once every 42 minutes in low-performing schools. However, when researchers controlled for school size, number of suspensions, and percentage of FRL, Hirn et al. (2018) found that the variances in rates of negative feedback were no longer significant. Results demonstrated that rates of negative feedback increased as the rates of school suspensions increased.

Hirn et al. (2018) concluded that teacher instruction differed in high-performing and low-performing schools. School level differences were not found for individual OTR and positive feedback, and teacher behavior varied more at the classroom level than at the school-level. The results demonstrated that students in high-performing schools had more opportunities to respond as a group during instruction than those in low-performing schools. Researchers posited that higher rates of OTR may contribute to better school achievement. While the differences found in OTR were small, Hirn et al. (2018) argued that, when extrapolating the results from one 15-minute observation over the course of a school week, students in high-performing schools had 260 more opportunities to respond during instruction than their peers in low-performing schools. Teachers at low-performing schools not only had lower rates of OTR, they also spent more time dealing with misbehavior. Despite some study limitations such as the small sample size and the dyadic relationship of the teacher and student, researchers concluded that instructional strategies to effectively engage students should be an integral part of professional development as they have the potential to increase student achievement even in

high-poverty schools. Hirn et al. (2018) argued future research should further examine the relationship between OTR and student achievement.

Congruent to the studies by Hirn et al. (2018) and others demonstrating the significant role of instructional quality in student achievement, Hoisington, Slate, Martinez-Garcia, and Barnes (2018) investigated the relationship between the instructional expenditures in school districts and academic achievement for economically disadvantaged students. Researchers analyzed the connection between the school districts' instructional expenditure ratios and the passing rates for students in poverty on the Texas Assessment of Knowledge & Skills (TAKS), the state academic performance exam. Using a nonexperimental research design, data was collected from a public database over a five-year period. Instructional expenditure ratios for every Texas school district were divided into one of five categories, ranging from below 57.94% to above 65%. Participants included all students in poverty who took the TAKS Reading, Mathematics, Science, Social Studies, and Writing Exams from 2006-2011. Researchers examined each districts' TAKS passing rates for students in poverty.

Results indicated that there was an overall small but statistically significant association between instructional expenditures ratios and TAKS passing rates for economically disadvantaged students. In the 2006-2007 school year, the TAKS Mathematics, Science, and Writing passing rates for students in poverty increased as a function of instructional expenditure ratios. Varying with the exam, districts with instructional expenditure ratios of at least 57.5% to 60% had statistically significant higher passing rates for students in poverty compared to districts with lower instructional expenditure ratios. No statistically significant differences were found on the TAKS Reading or Social Studies exams. In the 2007-2008 school year, the TAKS Reading, Mathematics, Science, and Writing passing rates for students in poverty increased as a function

of instructional expenditure ratios. Statistically significant increases in passing rates were found with instructional expenditure ratios that ranged from 57.5% to 62.49%, depending on the exam. No statistically significant differences were found on the TAKS Social Studies exam. In the 2008-2009 school year, the TAKS Reading, Mathematics, Science, Writing, and Social Studies passing rates for students in poverty increased as a function of instructional expenditure ratios. Analyses revealed that increased passing rates for students of color occurred with instructional expenditure ratios of 59.99% to 65%, varying with the type of exam. In the 2009-2010 school year, passing rates on all five TAKS exams increased as a function of instructional expenditure ratios. When compared to districts with lower ratios, those with instructional expenditure ratios of at least 57.49% to 65% (dependent on the particular exam) had statistically significant higher passing rates for students in poverty. Concerning the 2010-2011 school year, Hoisington et al. (2018) found statistically significant differences in passing rates on all of the TAKS exams. When school districts had instructional expenditure ratios of 62.49% to 65%, students in poverty had significantly increased TAKS passing rates.

Housington et al. (2018) concluded that the academic achievement for economically disadvantaged students increased when instructional expenditure ratios were higher. Statistically significant differences in TAKS passing rates were found in all five years of the study. Researchers posited that results suggested a benchmark of at least a 60% instructional expenditure ratio was the most beneficial. Hoisington et al. (2018) argued that a purposeful assignment of financial resources was critical in order to reduce the achievement gap.

CHAPTER III: DISCUSSION AND CONCLUSION

Summary of the Literature

With high stakes testing and a large number of public schools with high concentrations of students in poverty, the impact of poverty in education has been at the forefront of research for years. Approximately one in five children in the U.S. lives in poverty, and 50 percent of public schools identify as mid-high or high- poverty schools (Parolin, 2020; U.S. Department of Education, 2020). Considering decades of research demonstrating a significant and unchanging academic achievement gap between students in poverty and those not in poverty, improving school outcomes for these students is a great priority for all educators (Hanushek et al., 2019). The success of students in poverty is paramount to the success of any school.

Research has identified a multitude of ways that poverty impacts children's development and experiences, including lack of access to literacy resources, lack of school-focused strategies, and neurological differences. Poverty has been demonstrated to affect language functioning in children as young as seven months with deficits noted in foundational language skills (Betancourt et al., 2015). By 18 months, crucial differences are noted in the vocabulary and language processing skills of lower SES children compared to higher SES children. By 24 months, low SES children produced 150 fewer words than their higher SES peers (Fernals at al., 2013). By preschool age, Nelson et al. (2010) found that two-thirds of low-income preschool children demonstrated a clinically significant language delay. Academic and socioemotional impairment increased in parallel with the degree of language delay. Although other studies demonstrated that parents of low SES children also have lower language skills (Betancourt et al. 2015), Neuman et al. (2018) found that low SES children experienced a "double dose of

disadvantage" being exposed to less complex and varied language in both the home and preschool setting (p. 115).

While some language deficits may be due to environmental factors, several studies found neurological differences in brain development. The research of Lipina et al. (2013) and Lawson and Farrah (2017) determined that children from low SES families demonstrated significantly lower executive functioning skills than children from higher SES families. Lower executive functioning skills were associated with lower academic achievement, and researchers speculated that environmental factors associated with living in poverty mediated different aspects of neurological development (Lipina et al., 2013). The studies of Hanson et al. (2011), Hanson et al. (2013), Lawson et al. (2013), and Noble et al. (2012) all determined that SES was associated with changes in brain volume and/or differences in specific regions of the brain. The differences documented in brain structure and volume in the brains of lower SES children and mid- or higher SES children were noted starting as early as infancy (Hanson et al., 2011). All of the brain regions identified as structurally or volumetrically different were associated with language, memory, socioemotional, and/or executive functioning processing (Noble et al., 2012; Lawson et al., 2013; Hanson et al., 2013; Hanson et al., 2011).

While the effect of poverty on child development is alarming, research has identified various ways to improve school outcomes for economically disadvantaged children. The works of Raver et al. (2011), Sasser et al. (2017), Zhai et al (2015), and Lemberger et al. (2015) found that interventions focused on improving socioemotional skills and self-regulation improved social and executive functioning skills in low-income children and led to higher academic achievement. Parent involvement may also be a key factor in increasing achievement for children in poverty. Loughlin-Presnal and Bierman (2017), Docherty et al. (2018), and Alameda-Lawson

(2014) concluded that increasing parental engagement with student learning or school activities improved parental expectations and/or empowerment which indirectly increased academic achievement.

The literature also found a connection with classroom/school climate and teacher-student relationships and increased academic achievement and school engagement. Specific aspects of school climate, such as classroom discipline and teachers' perceptions of school climate, were associated with higher academic achievement for low-income students (Huang and Zhu, 2017; Davis and Warner, 2018). Davis and Warner (2018) concluded that school climate more strongly predicted academic achievement than other student factors, such as percentage of students in poverty. The works of Hughes (2011), Gehlback et al. (2016), Hosan and Hoglund (2017) and Scales et al. (2019) found that high quality relationships between teachers and students increased behavioral and emotional engagement and led to increased academic achievement particularly for low-income students. Scales et al. (2019) determined that stronger teacher-student relationships were associated with students' improved sense of belonging and school climate, and increased student motivation, which possibly resulted in increased academic achievement.

Teacher instructional quality is another area of focus in the literature. Teacher instruction is critical as districts with higher instructional expenditures have increased academic achievement (Hoisington et al., 2018). The studies by Croninger et al. (2012), Desimone et al. (2012), Stipek and Chiatovich (2017), and Horn et al. (2018) demonstrated the complexity in measuring what constitutes instructional quality. The research determined that teacher instructional practices like making high cognitive demands and focus on conceptual knowledge, advanced topics and novel problem solving were associated with increased academic achievement for high-poverty students. However, the studies found that mid- or low-poverty

student achievement was associated with other instructional practices or was not significantly affected by teacher instructional quality (Croninger et al., 2012; Stipek and Chiatovich, 2017). When comparing instructional differences between high-performing and low-performing schools with large concentrations of students in poverty, Horn et al. (2018) found that high rates of group response opportunities and low rates of negative feedback during instruction were associated with improved academic performance. The research suggested that what constitutes quality instruction is determined by a students' SES status and needs (Croninger et al., 2012; Stipek and Chiatovich, 2017)..

Professional Application

The impact of child poverty is a critical topic when considering overall school performance and educational outcomes for all students. Not only have economic inequities been brought to the forefront of education due to the pandemic, where one if five U.S. students in poverty, poverty should matter to all teachers (Parolin, 2020). The research demonstrates that children in poverty typically behave and perform differently in a classroom than their higher SES counterparts (Atwell et al., 2020; Barrett et al., 2017; U.S. Department of Education, 2020). With high-stakes testing and an unchanging economic achievement gap, all public schools and educators are most likely well-aware of the poor academic outcomes for students in poverty. It's crucial that educators are aware not only of the detrimental effects poverty has on children's development, but also that there are interventions and strategies that can improve outcomes. Educators need to realize that behavioral and performance differences in their students in poverty are not a result of intentional misbehavior or lack of parental concern. Being aware that there are neurological changes in the brain due to the stressors of poverty that affect executive functioning, socioemotional skills, language, and memory allows educators to reframe how they see behavior

and learning for this vulnerable population (Noble et al., 2012; Lawson et al., 2013; Hanson et al., 2013; Hanson et al., 2011). Moreover, a sole focus on teacher instruction and academics is not enough. A consideration of the whole child is critical when thinking of strategies to improve outcomes.

While Minnesota has overall lower rates of poverty, there are schools statewide that are identified as having large concentrations of students in poverty. The metro school districts of Minneapolis and Saint Paul have student poverty percentages of 60.3 percent and 70 percent, respectively (Minneapolis Public Schools, 2020; Saint Paul Public Schools; 2020). The well being of children in poverty is relevant to my public school colleagues. As an educator, delivering quality instruction can make a difference in the learning of my students, but this is only one part of the picture. I take heart knowing that my relationships with my students and their families matter. My classroom environment and climate make a difference in how my students learn. Taking class time to focus on self-regulation, attention and memory strategies, and social skills changes the way my students learn. Poverty may have impacted the development and experiences for low-income students in ways that make school more challenging, but I believe that this research empowers us as educators to truly see student needs and utilize evidence-based strategies to improve all aspects of their education.

Limitations of the Research

When conducting the literature review, I limited my research pool to include only studies that focused on academic achievement and included students in poverty. Similarly, when searching for studies demonstrating the effects of poverty on children's development and experiences, I narrowed the pool to focus on those impacts that directly related to future school outcomes (i.e. language, executive functioning, brain structure). I expected to find numerous

articles investigating what makes high-performing high-poverty schools successful; I found only a handful of studies that used an experimental design. There were also a limited number of recent articles in my research pertaining to parent involvement and school climate that included students in poverty. While I found numerous articles examining teacher instructional practices and low-income students, most had a very narrow focus of grade and subject that made it irrelevant to my search.

Implications for Future Research

Many of the studies in my research had significant limitations, with small sample sizes or unmeasured factors that possibly mediated the outcomes. The research seemed to determine that things like socioemotional curriculum, school climate, and teacher relationships were associated with increased academic achievement for students in poverty, but narrowing the focus of the studies to examine which factors related to each topic would seem to make the most impact. For example, school climate is made up of many factors such as classroom discipline, school expectations, interpersonal relationships, and students' sense of belonging. Which school climate factors are more important than others in improving outcomes for low-income students? The same is true for complex, multi-layered topics like socioemotional skills and student-teacher relationships. As noted earlier, future research examining the differences between high-performing high-poverty schools and high-poverty low-performing schools would be useful. I realize that there are a multitude of interventions that can improve school outcomes for students in poverty but I am left questioning which is critical to the success of students in high-poverty high-performing schools.

Conclusion

How does poverty impact students in ways that lead to poor educational outcomes? What can schools and educators do to improve the outcomes for students living in poverty? These questions guided my research as I sought to determine why poverty so greatly impacts student learning outcomes and what educators can do about it. The stress and experience of living in poverty affects neurological development in infancy and leads to brain changes associated with language, memory, socioemotional, and executive functioning processing. Additionally, environmental factors such as access to resources and family experiences and influences compound these effects. The research demonstrates that schools can implement a variety of strategies focused on the whole child to mitigate the effects of poverty. Improving school and classroom climate and teacher-student relationships; implementing curriculum focused on improving executive functioning and social skills; designing programs that encourage parent involvement; and increasing both teacher instructional quality and instructional expenditures are all ways that schools can improve the outcomes for students in poverty.

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